Nnadiekwe, Chiderah David

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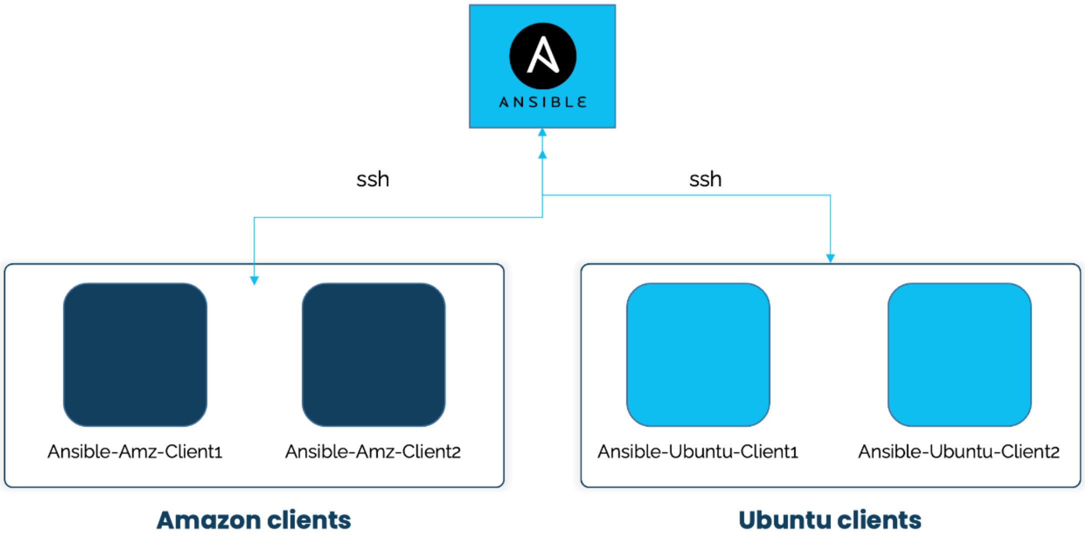
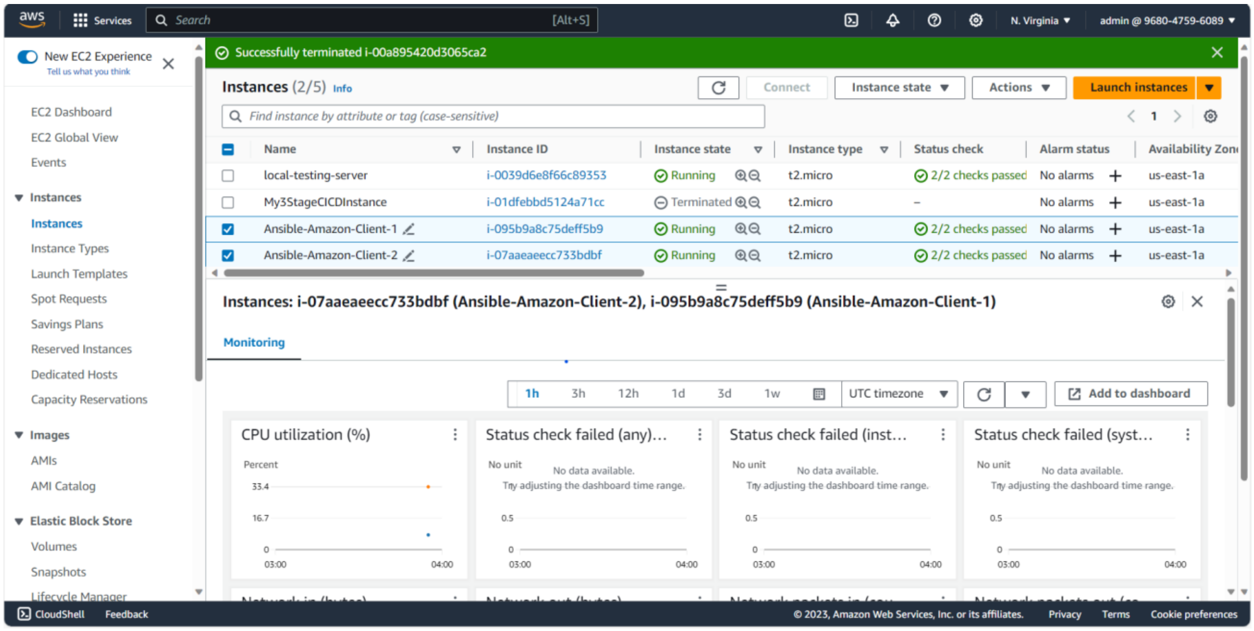
Project*- Setting up Ansible*

For this project, I'll be setting up the Ansible infrastructure below:



- First, I launched 2 Amazon Linux instanes (Amazon clients) and 3 Ubuntu instances (i.e 2 ubuntu clients and 1 ubuntu controller)


Successfully terminated i-00a895420d3065ca2

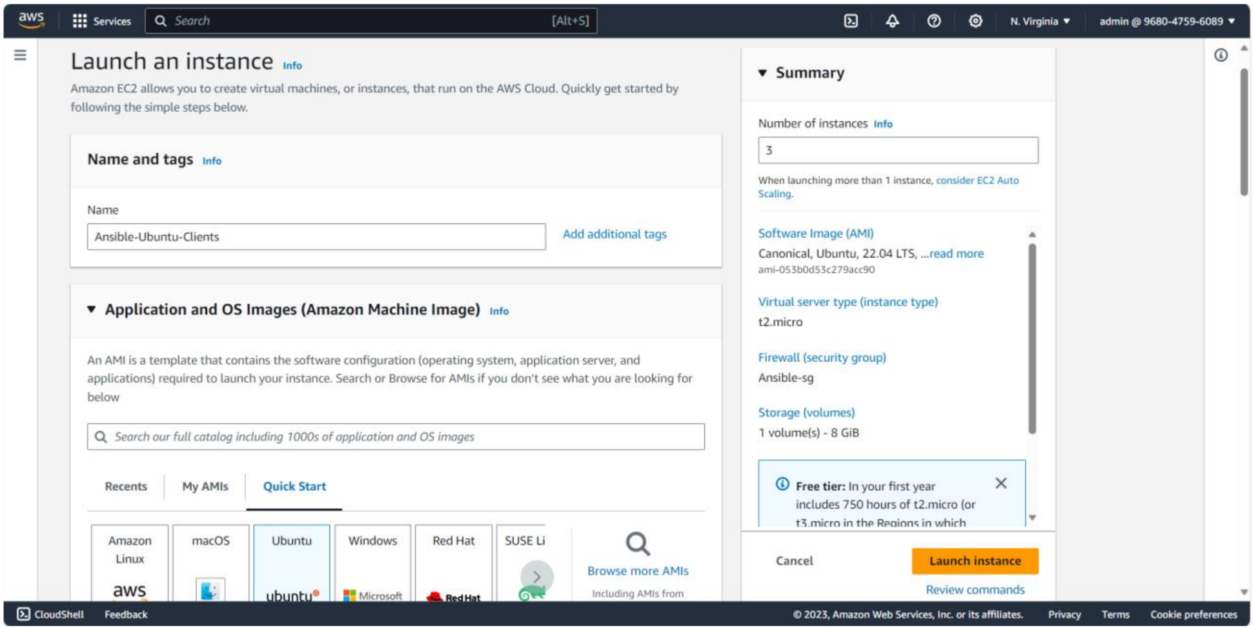
Instances (2/5)

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone
☐ local-testing-server	i-0039d6e8f66c89353	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a
☐ My3StageCICDInstance	i-01dfebbd5124a71cc	Terminated	t2.micro	–	No alarms	us-east-1a
☑ Ansible-Amazon-Client-1	i-095b9a8c75deff5b9	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a
☑ Ansible-Amazon-Client-2	i-07aaeaeecc733bdbf	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a

Instances: i-07aaeaeecc733bdbf (Ansible-Amazon-Client-2), i-095b9a8c75deff5b9 (Ansible-Amazon-Client-1)

The 2 Amazon Linux instances have SSH enabled and an IAM role attached. Also, the instances were created in a public subnet. I set the count to “2” when creating the instances to make it quicker.

Next, I launched the 3 Ubuntu instances;



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: Ansible-Ubuntu-Clients

▾ 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

▾ Summary

Number of instances Info: 3

When launching more than 1 instance, consider EC2 Auto Scaling.

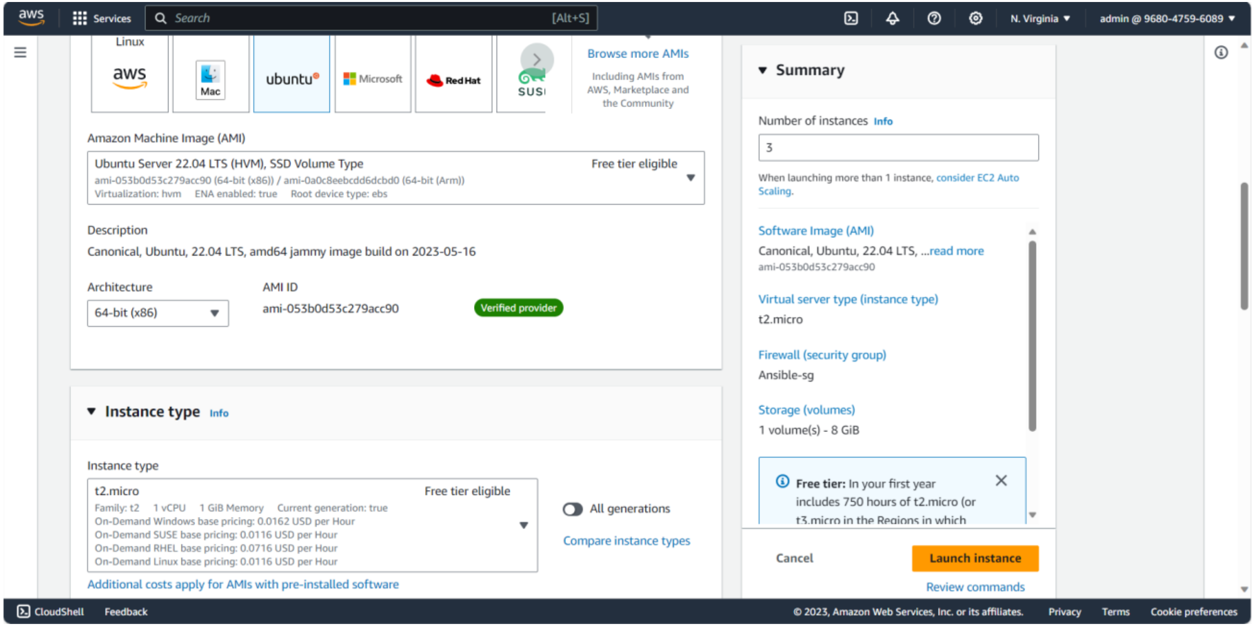
Software Image (AMI)
Canonical, Ubuntu, 22.04 LTS, ...read more
ami-053b0d53c279acc90

Virtual server type (instance type)
t2.micro

Firewall (security group)
Ansible-sg

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



Amazon Machine Image (AMI)

Ubuntu Server 22.04 LTS (HVM), SSD Volume Type — Free tier eligible
ami-053b0d53c279acc90 (64-bit (x86)) / ami-0a0c8eebcdd6dcbd0 (64-bit (Arm))
Virtualization: hvm   ENA enabled: true   Root device type: ebs

Description
Canonical, Ubuntu, 22.04 LTS, amd64 jammy image build on 2023-05-16

Architecture: 64-bit (x86)

AMI ID: ami-053b0d53c279acc90 — Verified provider

▾ Instance type Info

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 SUSE base pricing: 0.0116 USD per Hour
On-Demand RHEL base pricing: 0.0716 USD per Hour
On-Demand Linux base pricing: 0.0116 USD per Hour

▾ Summary

Number of instances Info: 3

When launching more than 1 instance, consider EC2 Auto Scaling.

Software Image (AMI)
Canonical, Ubuntu, 22.04 LTS, ...read more
ami-053b0d53c279acc90

Virtual server type (instance type)
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Storage (volumes)
1 volume(s) - 8 GiB

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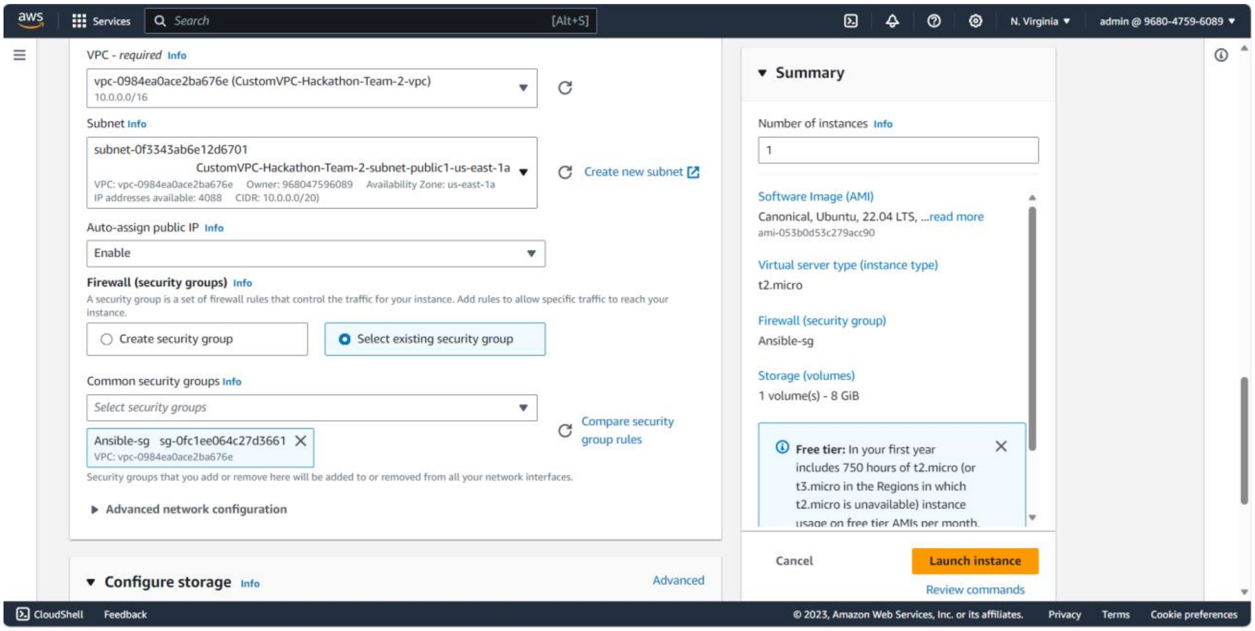


VPC - *required* Info

vpc-0984ea0ace2ba676e (CustomVPC-Hackathon-Team-2-vpc) ▾
10.0.0.0/16

Subnet Info

subnet-0f3343ab6e12d6701
CustomVPC-Hackathon-Team-2-subnet-public1-us-east-1a ▾
VPC: vpc-0984ea0ace2ba676e Owner: 968047596089 Availability Zone: us-east-1a
IP addresses available: 4088 CIDR: 10.0.0.0/20)

Create new subnet

Auto-assign public IP Info

Enable ▾

Firewall (security groups) Info

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

○ Create security group ● Select existing security group

Common security groups Info

Select security groups ▾

Ansible-sg sg-0fc1ee064c27d3661 ✕
VPC: vpc-0984ea0ace2ba676e

Compare security group rules

Security groups that you add or remove here will be added to or removed from all your network interfaces.

▸ **Advanced network configuration**

▾ **Configure storage** Info Advanced

▾ **Summary**

Number of instances Info

1

Software Image (AMI)
Canonical, Ubuntu, 22.04 LTS, ...read more
ami-053b0d53c279acc90

Virtual server type (instance type)
t2.micro

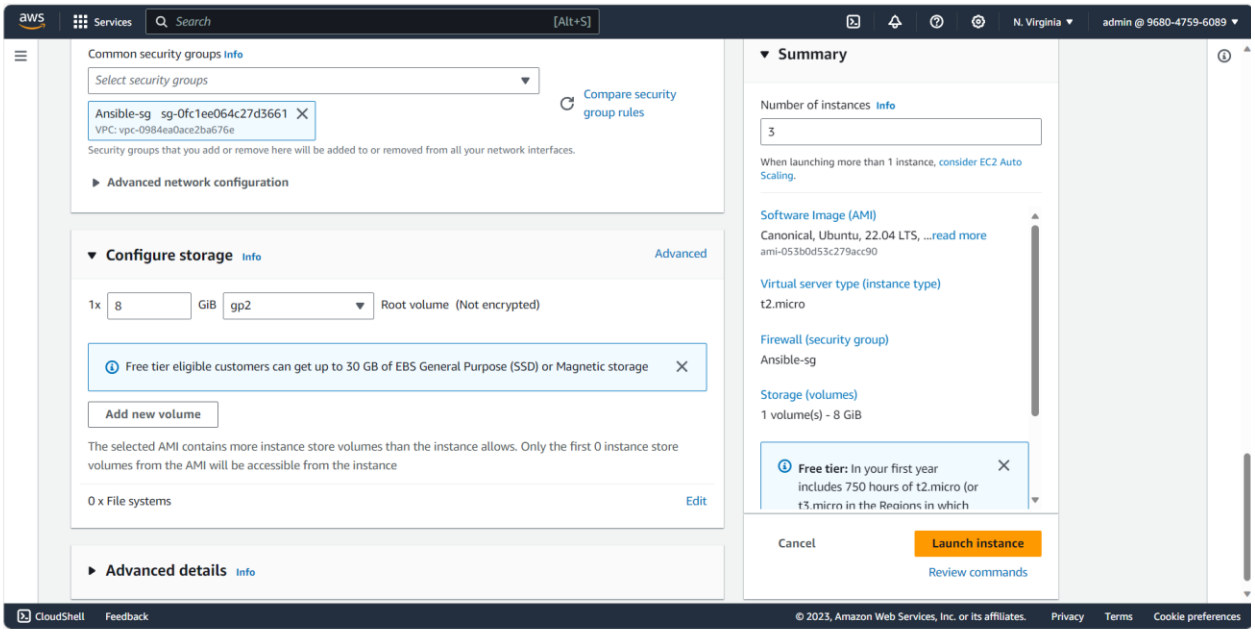
Firewall (security group)
Ansible-sg

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.

Cancel **Launch instance**

Review commands



Common security groups Info

Select security groups ▾

Ansible-sg sg-0fc1ee064c27d3661 ✕
VPC: vpc-0984ea0ace2ba676e

Compare security group rules

Security groups that you add or remove here will be added to or removed from all your network interfaces.

▸ **Advanced network configuration**

▾ **Configure storage** Info Advanced

1x 8 GiB gp2 ▾ Root volume (Not encrypted)

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage ✕

Add new volume

The selected AMI contains more instance store volumes than the instance allows. Only the first 0 instance store volumes from the AMI will be accessible from the instance

0 x File systems Edit

▸ **Advanced details** Info

▾ **Summary**

Number of instances Info

3

When launching more than 1 instance, consider EC2 Auto Scaling.

Software Image (AMI)
Canonical, Ubuntu, 22.04 LTS, ...read more
ami-053b0d53c279acc90

Virtual server type (instance type)
t2.micro

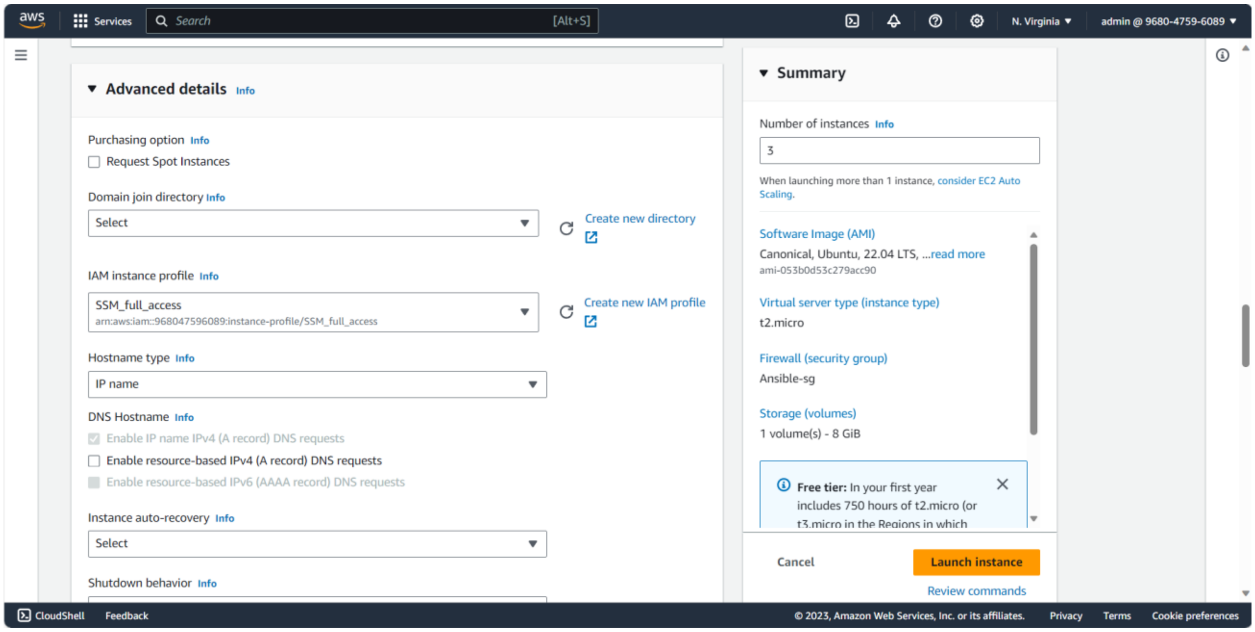
Firewall (security group)
Ansible-sg

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

Cancel **Launch instance**

Review commands



Advanced details Info

Purchasing option Info

□ Request Spot Instances

Domain join directory Info

Select

IAM instance profile Info

SSM_full_access
arn:aws:iam::968047596089:instance-profile/SSM_full_access

Hostname type Info

IP name

DNS Hostname Info

☑ Enable IP name IPv4 (A record) DNS requests

□ Enable resource-based IPv4 (A record) DNS requests

□ Enable resource-based IPv6 (AAAA record) DNS requests

Instance auto-recovery Info

Select

Shutdown behavior Info

Summary

Number of instances Info

3

When launching more than 1 instance, consider EC2 Auto Scaling.

Software Image (AMI)
Canonical, Ubuntu, 22.04 LTS, ...read more
ami-053b0d53c279acc90

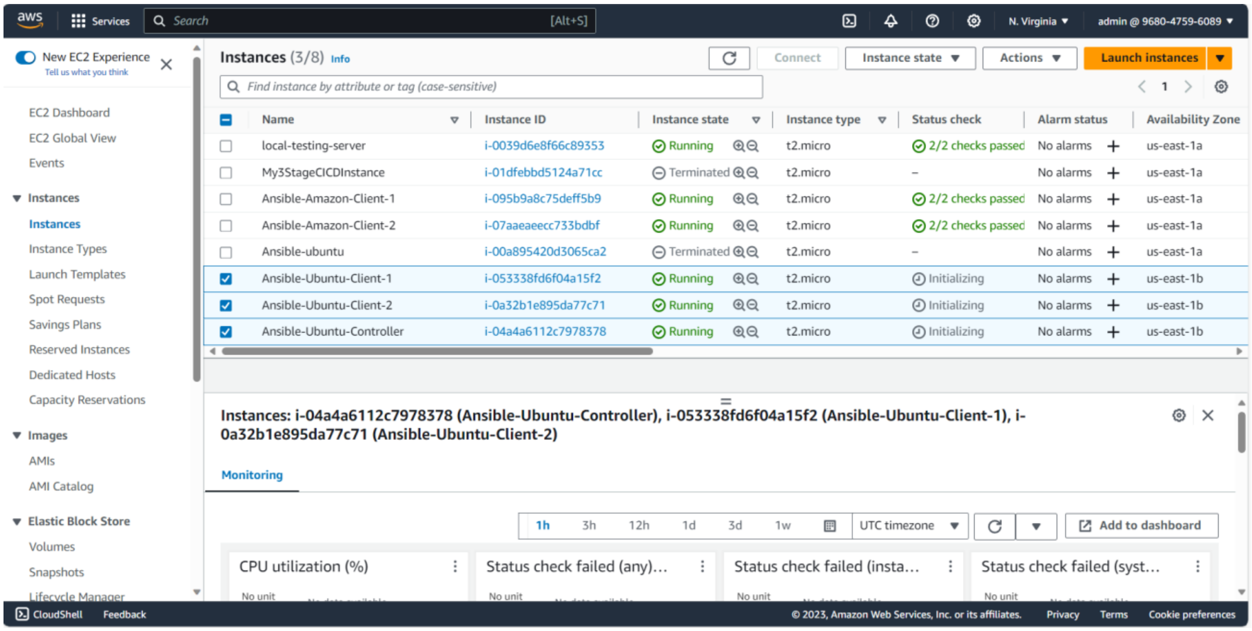
Virtual server type (instance type)
t2.micro

Firewall (security group)
Ansible-sg

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

Next, I renamed/tagged the instances to; Ansible-Ubuntu-client-1, Ansible-Ubuntu-client-2 and Ubuntu-Controller



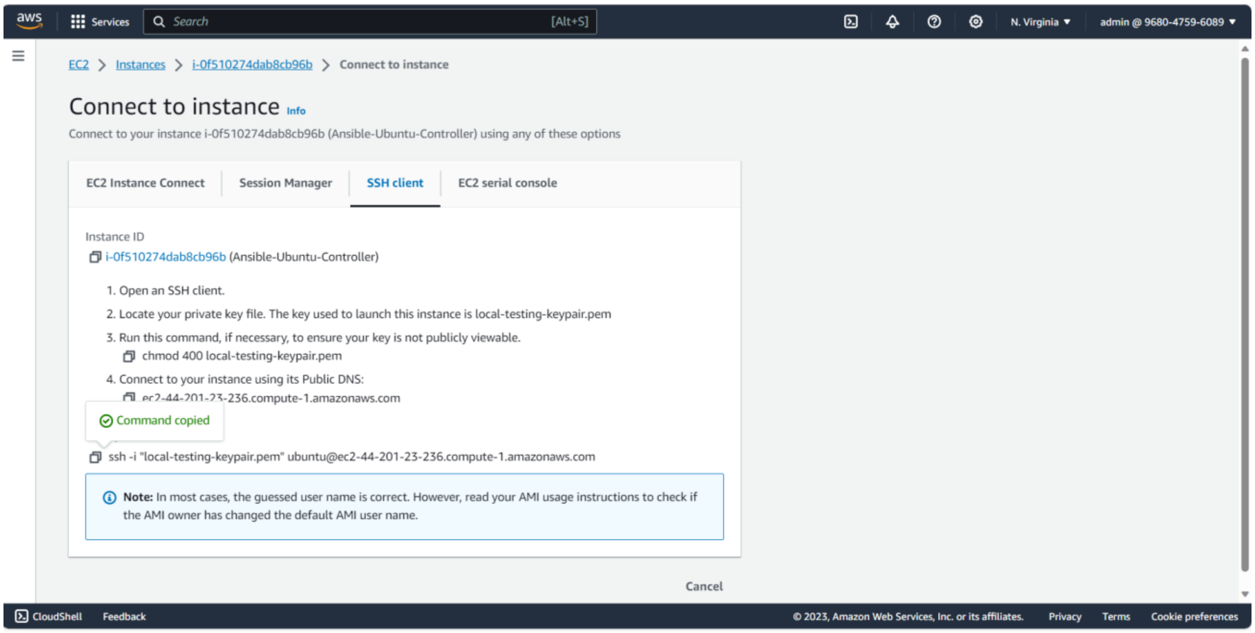
Instances (3/8) Info

	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone
□	local-testing-server	i-0039d6e8f66c89353	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a
□	My3StageCICDInstance	i-01dfebbd5124a71cc	Terminated	t2.micro	–	No alarms	us-east-1a
□	Ansible-Amazon-Client-1	i-095b9a8c75deff5b9	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a
□	Ansible-Amazon-Client-2	i-07aaeaeecc733bdbf	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a
□	Ansible-ubuntu	i-00a895420d3065ca2	Terminated	t2.micro	–	No alarms	us-east-1a
☑	Ansible-Ubuntu-Client-1	i-053338fd6f04a15f2	Running	t2.micro	Initializing	No alarms	us-east-1b
☑	Ansible-Ubuntu-Client-2	i-0a32b1e895da77c71	Running	t2.micro	Initializing	No alarms	us-east-1b
☑	Ansible-Ubuntu-Controller	i-04a4a6112c7978378	Running	t2.micro	Initializing	No alarms	us-east-1b

Instances: i-04a4a6112c7978378 (Ansible-Ubuntu-Controller), i-053338fd6f04a15f2 (Ansible-Ubuntu-Client-1), i-0a32b1e895da77c71 (Ansible-Ubuntu-Client-2)

Next, Installing Ansible on Ubuntu

I referenced the official ansible documentation "Installing Ansible"
First, I connected to the Ansible-Ubuntu-Controller instance since we will be installing ansible only on the controller.



Connect to instance Info

Connect to your instance i-0f510274dab8cb96b (Ansible-Ubuntu-Controller) using any of these options

Instance ID
i-0f510274dab8cb96b (Ansible-Ubuntu-Controller)

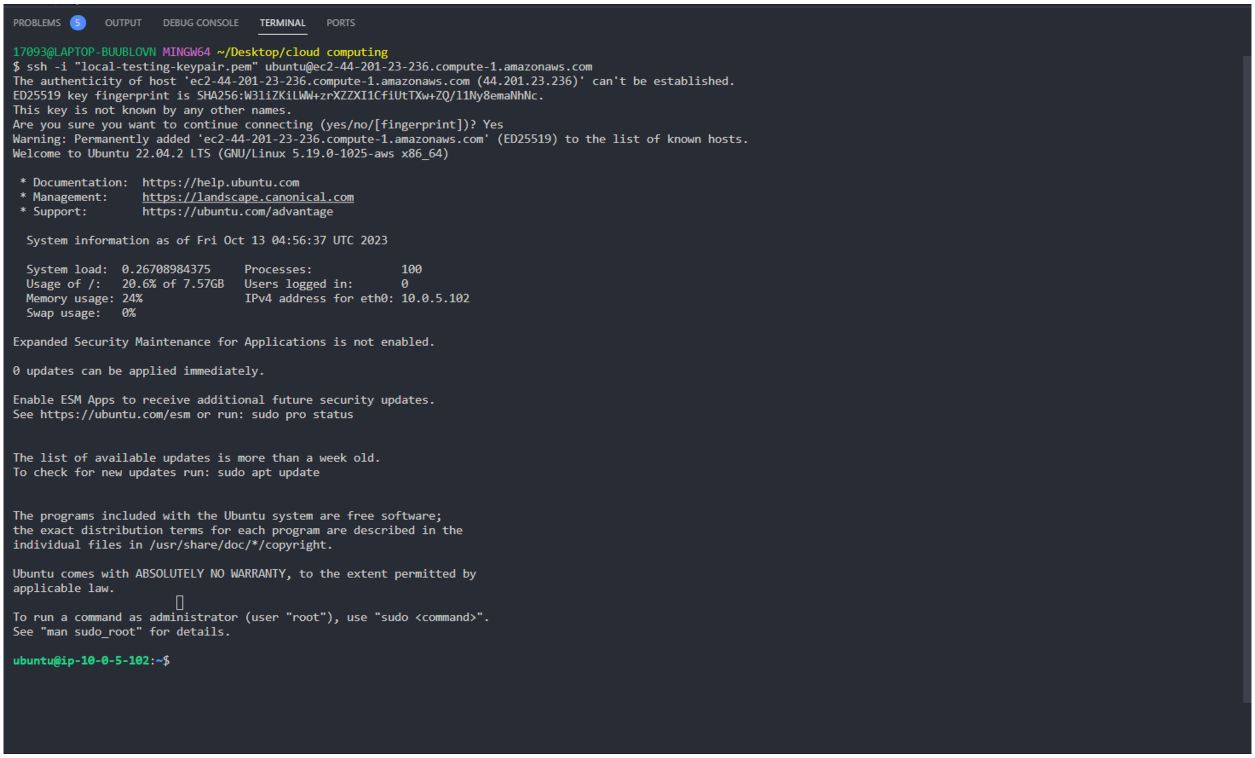
1. Open an SSH client.
2. Locate your private key file. The key used to launch this instance is local-testing-keypair.pem
3. Run this command, if necessary, to ensure your key is not publicly viewable.
   `chmod 400 local-testing-keypair.pem`
4. Connect to your instance using its Public DNS:
   `ec2-44-201-23-236.compute-1.amazonaws.com`

Command copied

```
ssh -i "local-testing-keypair.pem" ubuntu@ec2-44-201-23-236.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 AMI user name.

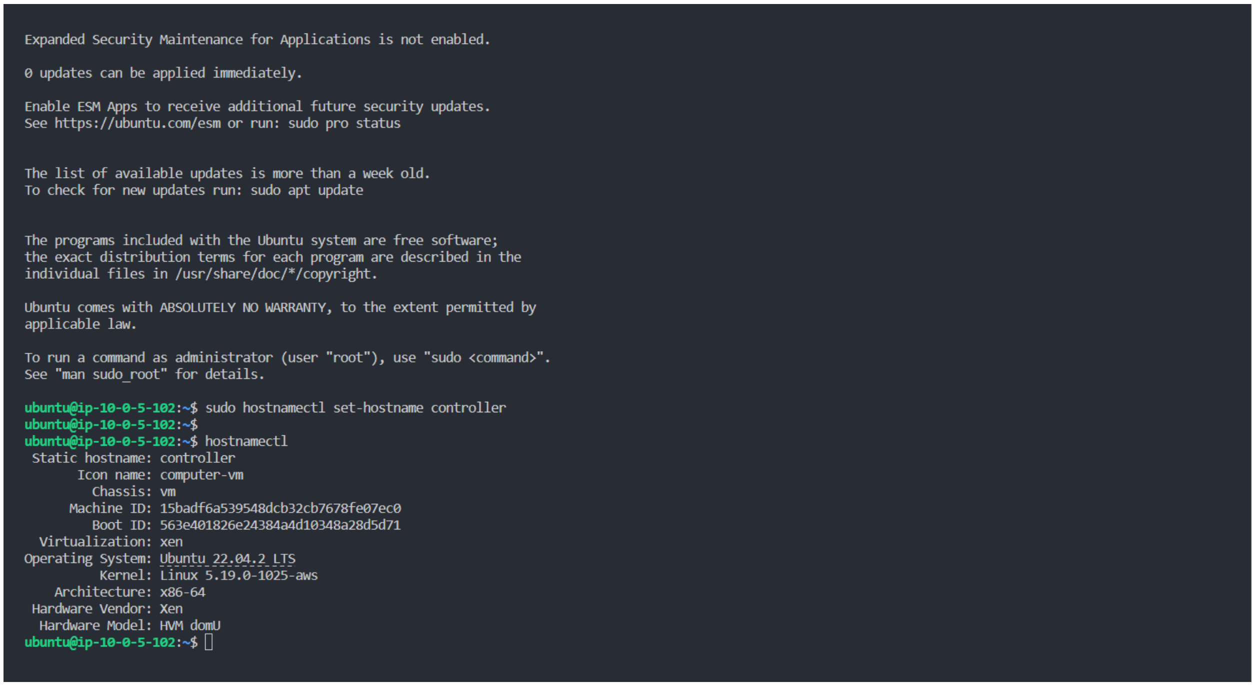
I close to SSH via the terminal;



```
17093@LAPTOP-BUUBLOVN MINGW64 ~/Desktop/cloud computing
$ ssh -i "local-testing-keypair.pem" ubuntu@ec2-44-201-23-236.compute-1.amazonaws.com
The authenticity of host 'ec2-44-201-23-236.compute-1.amazonaws.com (44.201.23.236)' can't be established.
ED25519 key fingerprint is SHA256:W3liZKiLWW+zrXZZXI1CfiUtTXw+ZQ/l1Ny8emaNhNc.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? Yes
Warning: Permanently added 'ec2-44-201-23-236.compute-1.amazonaws.com' (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 Oct 13 04:56:37 UTC 2023

  System load:  0.26708984375     Processes:             100
  Usage of /:   20.6% of 7.57GB   Users logged in:       0
  Memory usage: 24%               IPv4 address for eth0: 10.0.5.102
  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-10-0-5-102:~$
```

Next, I set Hostname of the instance as "Controller" so avoid confusion down the road.

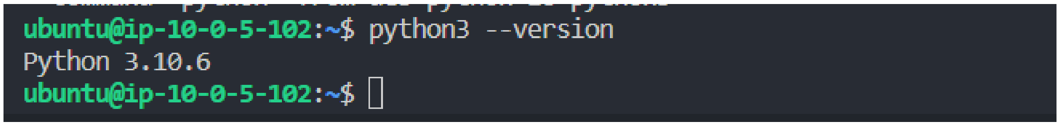
I used the command; sudo hostnamectl set-hostname controller



```
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-10-0-5-102:~$ sudo hostnamectl set-hostname controller
ubuntu@ip-10-0-5-102:~$
ubuntu@ip-10-0-5-102:~$ hostnamectl
 Static hostname: controller
       Icon name: computer-vm
         Chassis: vm
      Machine ID: 15badf6a539548dcb32cb7678fe07ec0
         Boot ID: 563e401826e24384a4d10348a28d5d71
  Virtualization: xen
Operating System: Ubuntu 22.04.2 LTS
          Kernel: Linux 5.19.0-1025-aws
    Architecture: x86-64
 Hardware Vendor: Xen
  Hardware Model: HVM domU
ubuntu@ip-10-0-5-102:~$ 
```

I then verified if the name was set successfully using the command; hostnamectl

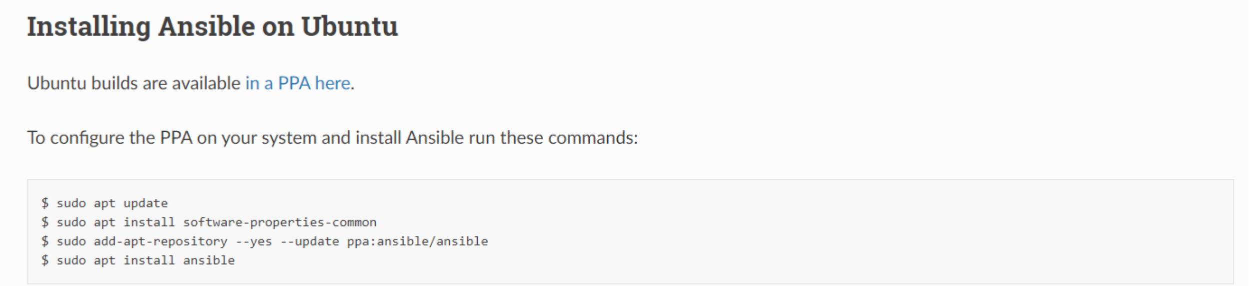
Ansible requires python to work hence, we need to check if python is installed in the instance. **If python is not installed, you need to install it!**



```
ubuntu@ip-10-0-5-102:~$ python3 --version
Python 3.10.6
ubuntu@ip-10-0-5-102:~$ 
```

We have python 3.10.6 already pre-installed in the instance

Now, we can proceed to install ansible using the following commands from the ansible official documentation.

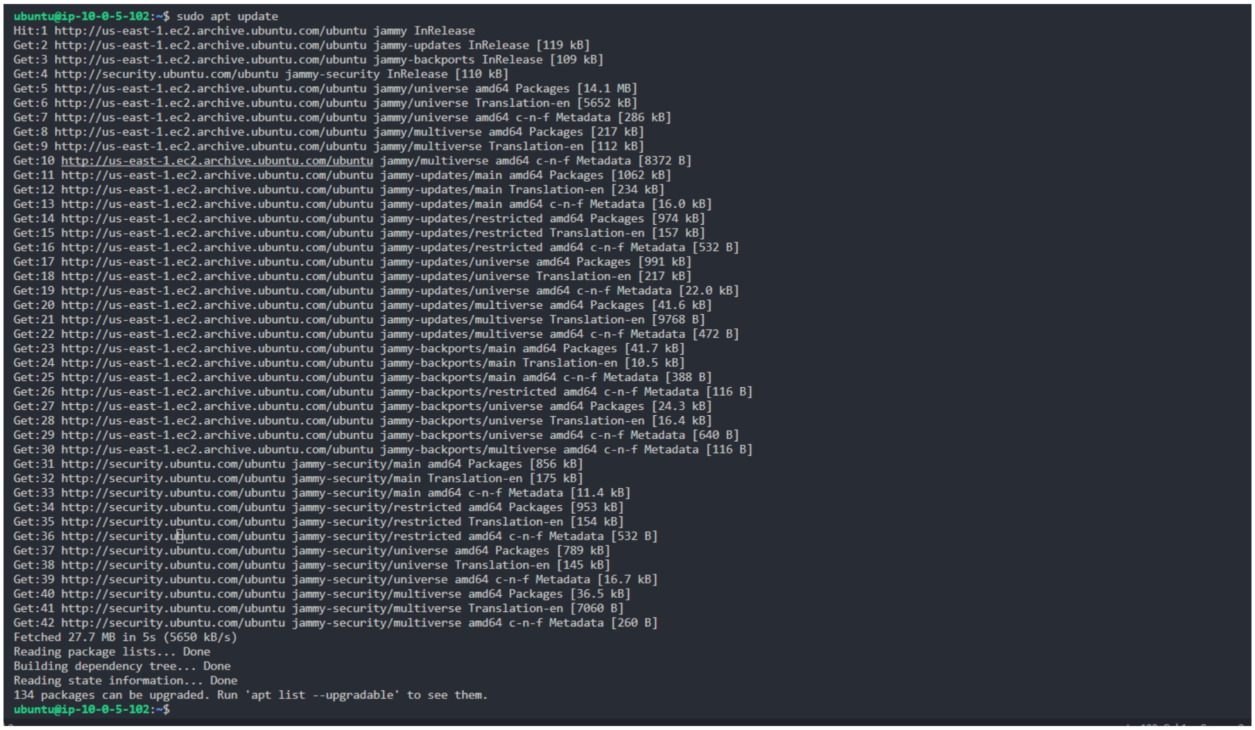


Installing Ansible on Ubuntu

Ubuntu builds are available in a PPA here.

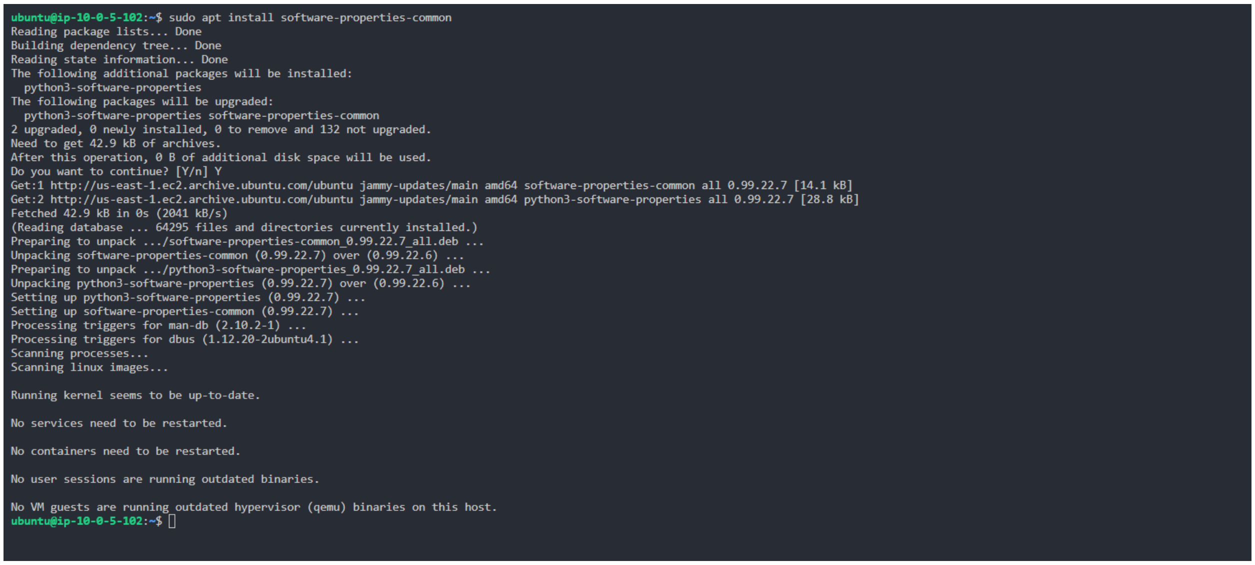
To configure the PPA on your system and install Ansible run these commands:

```
$ sudo apt update
$ sudo apt install software-properties-common
$ sudo add-apt-repository --yes --update ppa:ansible/ansible
$ sudo apt install ansible
```



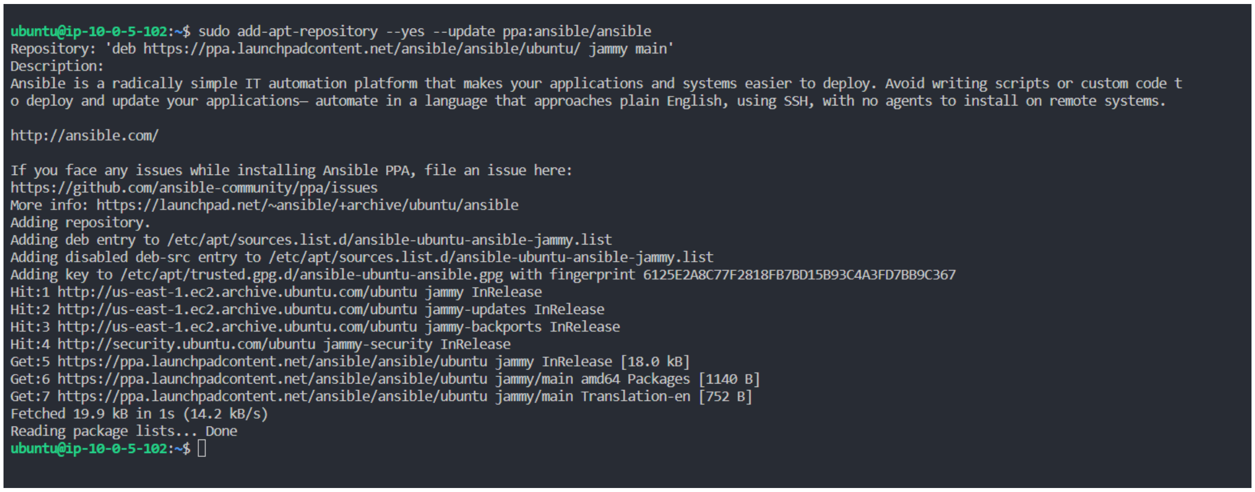
```
ubuntu@ip-10-0-5-102:~$ sudo apt update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [109 kB]
Get:4 http://security.ubuntu.com/ubuntu 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 [8372 B]
Get:11 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [1062 kB]
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [234 kB]
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [16.0 kB]
Get:14 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [974 kB]
Get:15 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [157 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 [991 kB]
Get:18 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [217 kB]
Get:19 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 c-n-f Metadata [22.0 kB]
Get:20 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [41.6 kB]
Get:21 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse Translation-en [9768 B]
Get:22 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 c-n-f Metadata [472 B]
Get:23 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 Packages [41.7 kB]
Get:24 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main Translation-en [10.5 kB]
Get:25 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/main amd64 c-n-f Metadata [388 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 [24.3 kB]
Get:28 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe Translation-en [16.4 kB]
Get:29 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 c-n-f Metadata [640 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 [856 kB]
Get:32 http://security.ubuntu.com/ubuntu jammy-security/main Translation-en [175 kB]
Get:33 http://security.ubuntu.com/ubuntu jammy-security/main amd64 c-n-f Metadata [11.4 kB]
Get:34 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [953 kB]
Get:35 http://security.ubuntu.com/ubuntu jammy-security/restricted Translation-en [154 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 [789 kB]
Get:38 http://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [145 kB]
Get:39 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 c-n-f Metadata [16.7 kB]
Get:40 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 Packages [36.5 kB]
Get:41 http://security.ubuntu.com/ubuntu jammy-security/multiverse Translation-en [7060 B]
Get:42 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 c-n-f Metadata [260 B]
Fetched 27.7 MB in 5s (5650 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
134 packages can be upgraded. Run 'apt list --upgradable' to see them.
ubuntu@ip-10-0-5-102:~$
```

Next, we use the following commands; sudo apt install software-properties-common



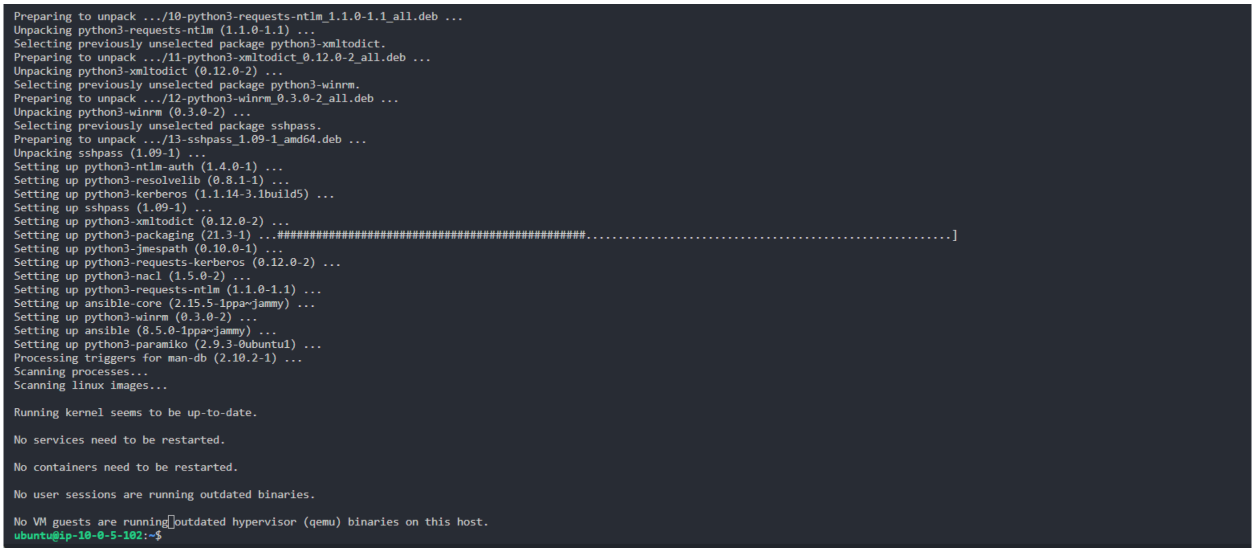
```
ubuntu@ip-10-0-5-102:~$ sudo apt install software-properties-common
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  python3-software-properties
The following packages will be upgraded:
  python3-software-properties software-properties-common
2 upgraded, 0 newly installed, 0 to remove and 132 not upgraded.
Need to get 42.9 kB of archives.
After this operation, 0 B of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 software-properties-common all 0.99.22.7 [14.1 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 python3-software-properties all 0.99.22.7 [28.8 kB]
Fetched 42.9 kB in 0s (2041 kB/s)
(Reading database ... 64295 files and directories currently installed.)
Preparing to unpack .../software-properties-common_0.99.22.7_all.deb ...
Unpacking software-properties-common (0.99.22.7) over (0.99.22.6) ...
Preparing to unpack .../python3-software-properties_0.99.22.7_all.deb ...
Unpacking python3-software-properties (0.99.22.7) over (0.99.22.6) ...
Setting up python3-software-properties (0.99.22.7) ...
Setting up software-properties-common (0.99.22.7) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for dbus (1.12.20-2ubuntu4.1) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
ubuntu@ip-10-0-5-102:~$ 
```

Next, we use the following commands; sudo add-apt-repository --yes --update ppa:ansible/ansible



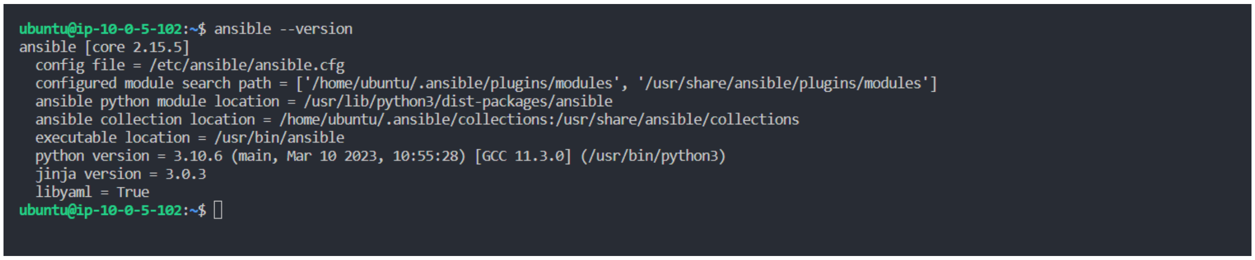
```
ubuntu@ip-10-0-5-102:~$ sudo add-apt-repository --yes --update ppa:ansible/ansible
Repository: 'deb https://ppa.launchpadcontent.net/ansible/ansible/ubuntu/ jammy main'
Description:
Ansible is a radically simple IT automation platform that makes your applications and systems easier to deploy. Avoid writing scripts or custom code t
o deploy and update your applications— automate in a language that approaches plain English, using SSH, with no agents to install on remote systems.

http://ansible.com/

If you face any issues while installing Ansible PPA, file an issue here:
https://github.com/ansible-community/ppa/issues
More info: https://launchpad.net/~ansible/+archive/ubuntu/ansible
Adding repository.
Adding deb entry to /etc/apt/sources.list.d/ansible-ubuntu-ansible-jammy.list
Adding disabled deb-src entry to /etc/apt/sources.list.d/ansible-ubuntu-ansible-jammy.list
Adding key to /etc/apt/trusted.gpg.d/ansible-ubuntu-ansible.gpg with fingerprint 6125E2A8C77F2818FB7BD15B93C4A3FD7BB9C367
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu jammy-security InRelease
Get:5 https://ppa.launchpadcontent.net/ansible/ansible/ubuntu jammy InRelease [18.0 kB]
Get:6 https://ppa.launchpadcontent.net/ansible/ansible/ubuntu jammy/main amd64 Packages [1140 B]
Get:7 https://ppa.launchpadcontent.net/ansible/ansible/ubuntu jammy/main Translation-en [752 B]
Fetched 19.9 kB in 1s (14.2 kB/s)
Reading package lists... Done
ubuntu@ip-10-0-5-102:~$
```

Next, we run the last chain of command in the documentation; sudo apt install ansible



```
Preparing to unpack .../10-python3-requests-ntlm_1.1.0-1.1_all.deb ...
Unpacking python3-requests-ntlm (1.1.0-1.1) ...
Selecting previously unselected package python3-xmltodict.
Preparing to unpack .../11-python3-xmltodict_0.12.0-2_all.deb ...
Unpacking python3-xmltodict (0.12.0-2) ...
Selecting previously unselected package python3-winrm.
Preparing to unpack .../12-python3-winrm_0.3.0-2_all.deb ...
Unpacking python3-winrm (0.3.0-2) ...
Selecting previously unselected package sshpass.
Preparing to unpack .../13-sshpass_1.09-1_amd64.deb ...
Unpacking sshpass (1.09-1) ...
Setting up python3-ntlm-auth (1.4.0-1) ...
Setting up python3-resolvelib (0.8.1-1) ...
Setting up python3-kerberos (1.1.14-3.1build5) ...
Setting up sshpass (1.09-1) ...
Setting up python3-xmltodict (0.12.0-2) ...
Setting up python3-packaging (21.3-1) ...################################################.........................................................]
Setting up python3-jmespath (0.10.0-1) ...
Setting up python3-requests-kerberos (0.12.0-2) ...
Setting up python3-nacl (1.5.0-2) ...
Setting up python3-requests-ntlm (1.1.0-1.1) ...
Setting up ansible-core (2.15.5-1ppa~jammy) ...
Setting up python3-winrm (0.3.0-2) ...
Setting up ansible (8.5.0-1ppa~jammy) ...
Setting up python3-paramiko (2.9.3-0ubuntu1) ...
Processing triggers for man-db (2.10.2-1) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
ubuntu@ip-10-0-5-102:~$
```

Next step is to verify if ansible was successfully installed using the command: ansible –version



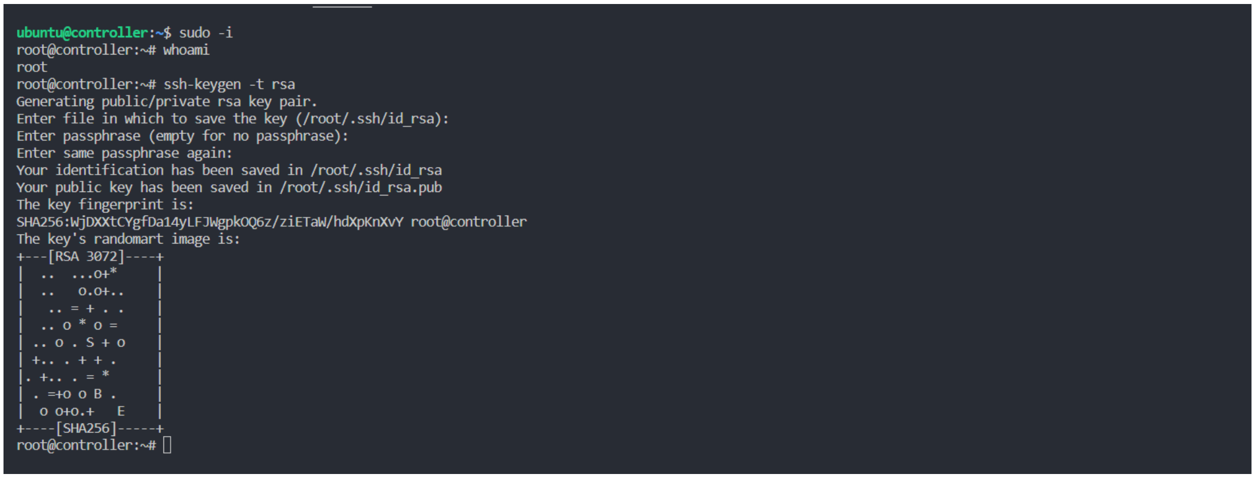
```
ubuntu@ip-10-0-5-102:~$ ansible --version
ansible [core 2.15.5]
  config file = /etc/ansible/ansible.cfg
  configured module search path = ['/home/ubuntu/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python3/dist-packages/ansible
  ansible collection location = /home/ubuntu/.ansible/collections:/usr/share/ansible/collections
  executable location = /usr/bin/ansible
  python version = 3.10.6 (main, Mar 10 2023, 10:55:28) [GCC 11.3.0] (/usr/bin/python3)
  jinja version = 3.0.3
  libyaml = True
ubuntu@ip-10-0-5-102:~$
```

Ansible [core 2.12.5] was successfully installed! 😊

Since the controller needs to SSH into the clients, we need to generate private keys for the controller and public keys for the clients.

Generating Public and Private keys for the Controller

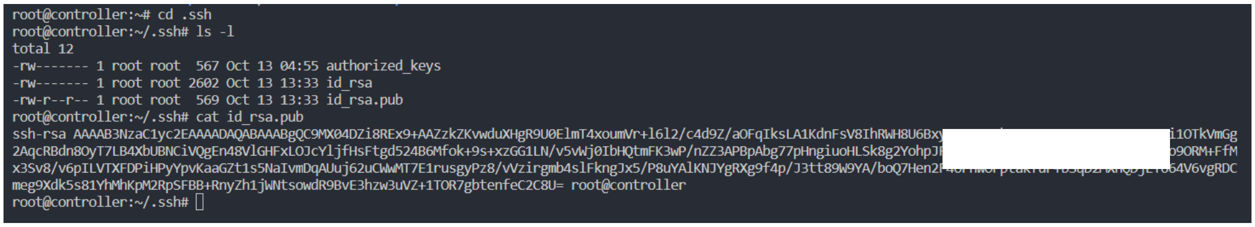
To generate the private key for the controller, we need to upgrade to sudo user using the command “sudo -i” then we generate public and private key of type in the controller “rsa” using the command “ssh-keygen -t rsa”



```
ubuntu@controller:~$ sudo -i
root@controller:~# whoami
root
root@controller:~# ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /root/.ssh/id_rsa
Your public key has been saved in /root/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:WjDXXtCYgfDa14yLFJWgpkOQ6z/ziETaW/hdXpKnXvY root@controller
The key's randomart image is:
+---[RSA 3072]----+
|  ..  ...o+*     |
|  ..   o.o+..    |
|   .. = + . .    |
|  .. o * o =     |
| .. o . S + o    |
| +.. . + + .     |
|. +.. . = *      |
| . =+o o B .     |
|  o o+o.+   E    |
+----[SHA256]-----+
root@controller:~# ▯
```

The keys are usually stored in hidden location hence, we need to use “ls -al” to list all directories. Next, we need to cat into id_rsa.pub (public key) and copy it and paste into each of the clients.

NOTE: The Controller Holds Private Key while the Clients Hold Public Keys

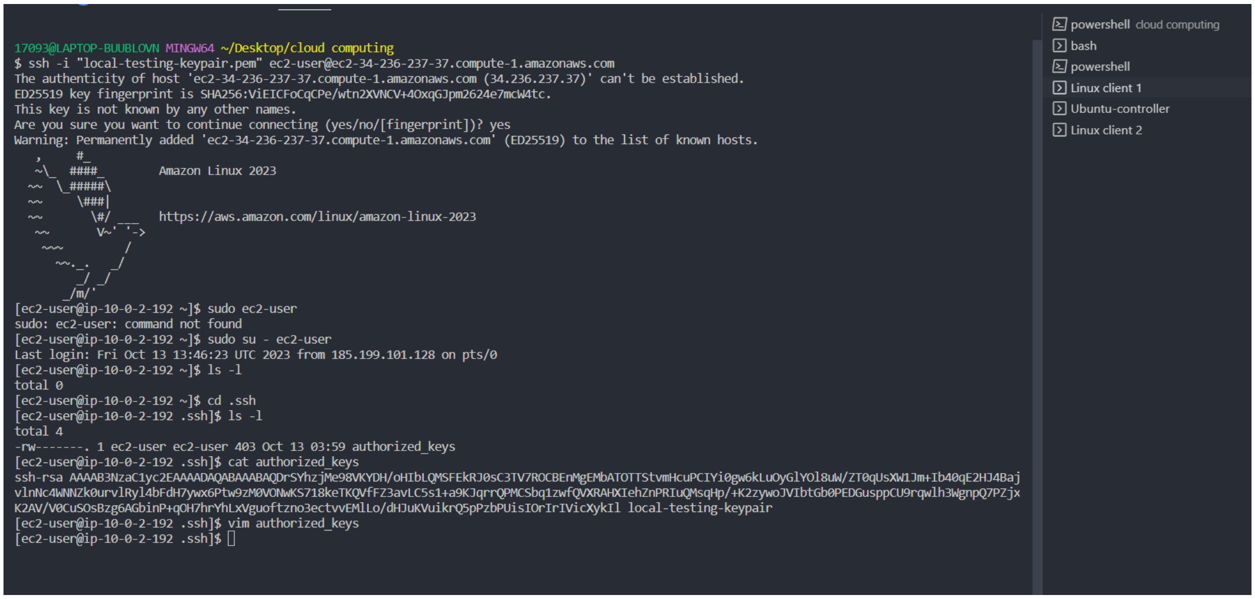


```
root@controller:~# cd .ssh
root@controller:~/.ssh# ls -l
total 12
-rw------- 1 root root  567 Oct 13 04:55 authorized_keys
-rw------- 1 root root 2602 Oct 13 13:33 id_rsa
-rw-r--r-- 1 root root  569 Oct 13 13:33 id_rsa.pub
root@controller:~/.ssh# cat id_rsa.pub
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQC9MX04DZi8REx9+AAZzkZKvwduXHgR9U0ElmT4xoumVr+l6l2/c4d9Z/aOFqIksLA1KdnFsV8IhRWH8U6Bxy[redacted]i1OTkVmGg
2AqcRBdn8OyT7LB4XbUBNCiVQgEn48VlGHFxLOJcYljfHsFtgd524B6Mfok+9s+xzGG1LN/v5vWj0IbHQtmFK3wP/nZZ3APBpAbg77pHngiuoHLSk8g2YohpJ[redacted]o9ORM+FfM
x3Sv8/v6pILVTXFDPiHPyYpvKaaGZt1s5NaIvmDqAUuj62uCWwMT7E1rusgyPz8/vVzirgmb4slFkngJx5/P8uYAlKNJYgRXg9f4p/J3tt89W9YA/boQ7Hen2[redacted]64V6vgRDC
meg9Xdk5s81YhMhKpM2RpSFBB+RnyZh1jWNtsowdR9BvE3hzw3uVZ+1TOR7gbtenfeC2C8U= root@controller
root@controller:~/.ssh# ▯
```

- ## Saving the Public keys in each of the clients

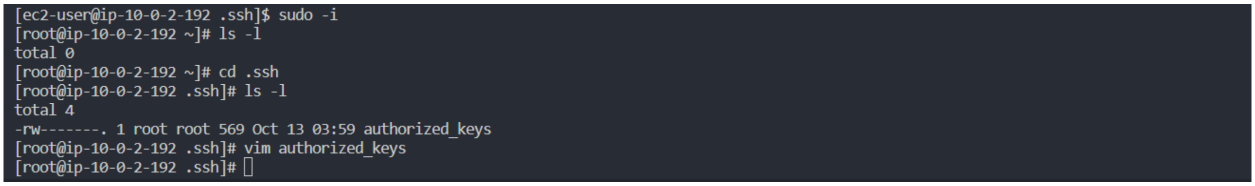
Now, we paste the public keys into each of the clients

- ### Ansible-Amazon-client-1



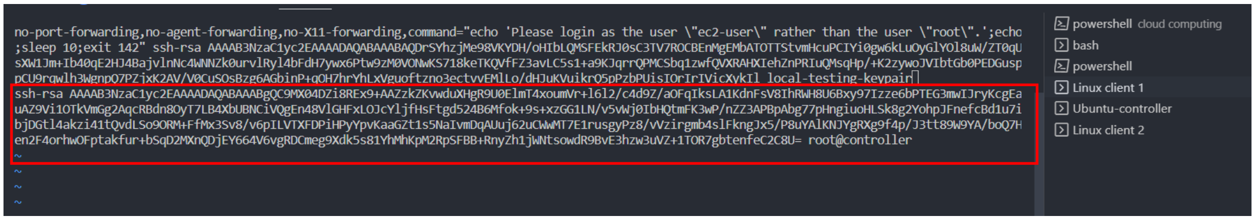
```
17093@LAPTOP-BUUBLOVN MINGW64 ~/Desktop/cloud computing
$ ssh -i "local-testing-keypair.pem" ec2-user@ec2-34-236-237-37.compute-1.amazonaws.com
The authenticity of host 'ec2-34-236-237-37.compute-1.amazonaws.com (34.236.237.37)' can't be established.
ED25519 key fingerprint is SHA256:ViEICFoCqCPe/wtn2XVNCV+4OxqGJpm2624e7mcW4tc.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-34-236-237-37.compute-1.amazonaws.com' (ED25519) to the list of known hosts.
   ,     #_
   ~\_  ####_        Amazon Linux 2023
  ~~  \_#####\
  ~~     \###|
  ~~       \#/ ___   https://aws.amazon.com/linux/amazon-linux-2023
   ~~       V~' '->
    ~~~         /
      ~~._.   _/
         _/ _/
       _/m/'
[ec2-user@ip-10-0-2-192 ~]$ sudo ec2-user
sudo: ec2-user: command not found
[ec2-user@ip-10-0-2-192 ~]$ sudo su - ec2-user
Last login: Fri Oct 13 13:46:23 UTC 2023 from 185.199.101.128 on pts/0
[ec2-user@ip-10-0-2-192 ~]$ ls -l
total 0
[ec2-user@ip-10-0-2-192 ~]$ cd .ssh
[ec2-user@ip-10-0-2-192 .ssh]$ ls -l
total 4
-rw-------. 1 ec2-user ec2-user 403 Oct 13 03:59 authorized_keys
[ec2-user@ip-10-0-2-192 .ssh]$ cat authorized_keys
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABAQDrSYhzjMe98VKYDH/oHIbLQMSFEkRJ0sC3TV7ROCBEnMgEMbATOTTStvmHcuPCIYi0gw6kLuOyGlYOl8uW/ZT0qUsXW1Jm+Ib40qE2HJ4Baj
vlnNc4WNNZk0urvlRyl4bFdH7ywx6Ptw9zM0VONwKS718keTKQVfFZ3avLC5s1+a9KJqrrQPMCSbq1zwfQVXRAHXIehZnPRIuQMsqHp/+K2zywoJVIbtGb0PEDGusppCU9rqwlh3WgnpQ7PZjx
K2AV/V0CuSOsBzg6AGbinP+qOH7hrYhLxVguoftzno3ectvvEMlLo/dHJuKVuikrQ5pPzbPUisIOrIrIVicXykIl local-testing-keypair
[ec2-user@ip-10-0-2-192 .ssh]$ vim authorized_keys
[ec2-user@ip-10-0-2-192 .ssh]$ 
```

We need to edit the authorized_keys as a sudo user



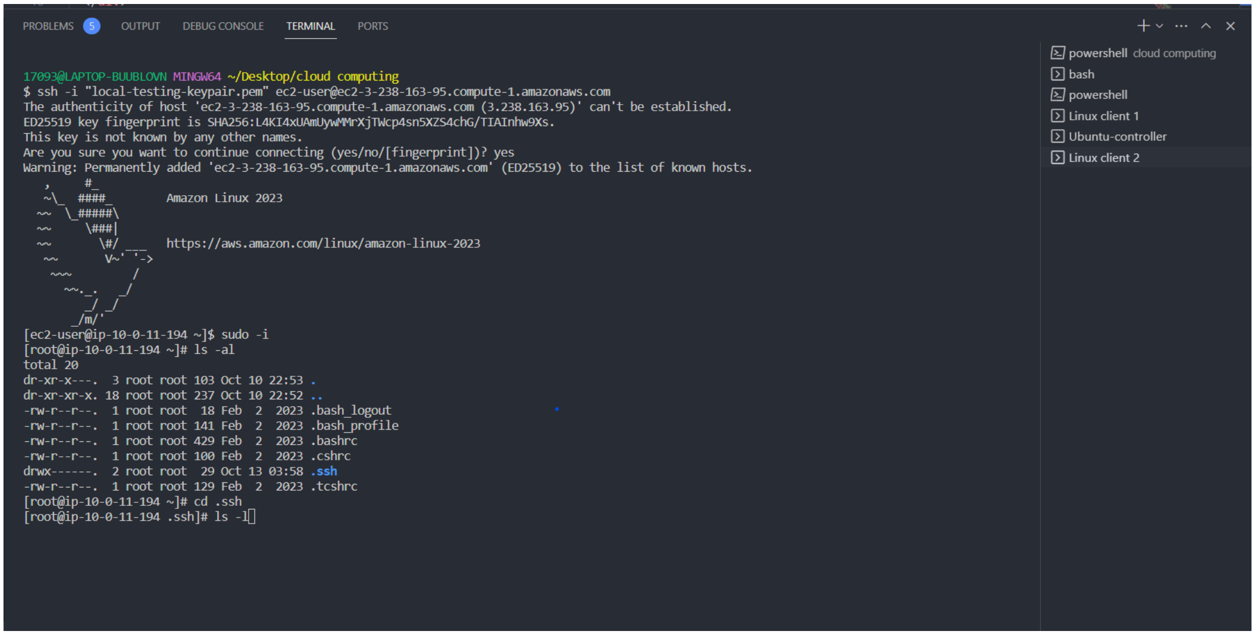
```
[ec2-user@ip-10-0-2-192 .ssh]$ sudo -i
[root@ip-10-0-2-192 ~]# ls -l
total 0
[root@ip-10-0-2-192 ~]# cd .ssh
[root@ip-10-0-2-192 .ssh]# ls -l
total 4
-rw-------. 1 root root 569 Oct 13 03:59 authorized_keys
[root@ip-10-0-2-192 .ssh]# vim authorized_keys
[root@ip-10-0-2-192 .ssh]# 
```

Next, we copy and paste the controller’s public key inside the “authorized_keys” file in the client and save.



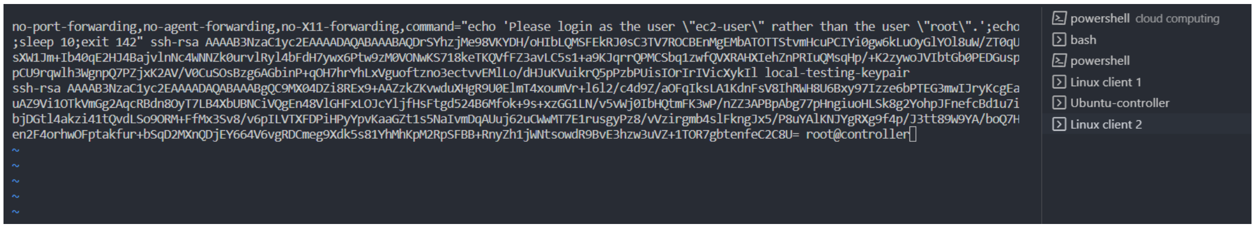
```
no-port-forwarding,no-agent-forwarding,no-X11-forwarding,command="echo 'Please login as the user \"ec2-user\" rather than the user \"root\".';echo
;sleep 10;exit 142" ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABAQDrSYhzjMe98VKYDH/oHIbLQMSFEkRJ0sC3TV7ROCBEnMgEMbATOTTStvmHcuPCIYi0gw6kLuOyGlYOl8uW/ZT0qU
sXW1Jm+Ib40qE2HJ4BajvlnNc4WNNZk0urvlRyl4bFdH7ywx6Ptw9zM0VONwKS718keTKQVfFZ3avLC5s1+a9KJqrrQPMCSbq1zwfQVXRAHXIehZnPRIuQMsqHp/+K2zywoJVIbtGb0PEDGusp
pCU9rqwlh3WgnpQ7PZjxK2AV/V0CuSOsBzg6AGbinP+qOH7hrYhLxVguoftzno3ectvvEMlLo/dHJuKVuikrQ5pPzbPUisIOrIrIVicXykIl local-testing-keypair
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQC9MX04DZi8REx9+AAZzkZKvwduXHgR9U0ElmT4xoumVr+l6l2/c4d9Z/aOFqIksLA1KdnFsV8IhRWH8U6Bxy97Izze6bPTEG3mwIJryKcgEa
uAZ9Vi1OTkVmGg2AqcRBdn8OyT7LB4XbUBNCiVQgEn48VlGHFxLOJcYljfHsFtgd524B6Mfok+9s+xzGG1LN/v5vWj0IbHQtmFK3wP/nZZ3APBpAbg77pHngiuoHLSk8g2YohpJFnefcBd1u7i
bjDGtl4akzi41tQvdLSo9ORM+FfMx3Sv8/v6pILVTXFDPiHPyYpvKaaGZt1s5NaIvmDqAUuj62uCWwMT7E1rusgyPz8/vVzirgmb4slFkngJx5/P8uYAlKNJYgRXg9f4p/J3tt89W9YA/boQ7H
en2F4orhwOFptakfur+bSqD2MXnQDjEY664V6vgRDCmeg9Xdk5s81YhMhKpM2RpSFBB+RnyZh1jWNtsowdR9BvE3hzw3uVZ+1TOR7gbtenfeC2C8U= root@controller
~
~
~
~
```

- ## Ansible-Amazon-client-2



```
17093@LAPTOP-BUUBLOVN MINGW64 ~/Desktop/cloud computing
$ ssh -i "local-testing-keypair.pem" ec2-user@ec2-3-238-163-95.compute-1.amazonaws.com
The authenticity of host 'ec2-3-238-163-95.compute-1.amazonaws.com (3.238.163.95)' can't be established.
ED25519 key fingerprint is SHA256:L4KI4xUAmUywMMrXjTWcp4sn5XZS4chG/TIAInhw9Xs.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-3-238-163-95.compute-1.amazonaws.com' (ED25519) to the list of known hosts.
   ,     #_
   ~\_  ####_        Amazon Linux 2023
  ~~  \_#####\
  ~~     \###|
  ~~       \#/ ___   https://aws.amazon.com/linux/amazon-linux-2023
   ~~       V~' '->
    ~~~         /
      ~~._.   _/
         _/ _/
       _/m/'
[ec2-user@ip-10-0-11-194 ~]$ sudo -i
[root@ip-10-0-11-194 ~]# ls -al
total 20
dr-xr-x---.  3 root root 103 Oct 10 22:53 .
dr-xr-xr-x. 18 root root 237 Oct 10 22:52 ..
-rw-r--r--.  1 root root  18 Feb  2  2023 .bash_logout
-rw-r--r--.  1 root root 141 Feb  2  2023 .bash_profile
-rw-r--r--.  1 root root 429 Feb  2  2023 .bashrc
-rw-r--r--.  1 root root 100 Feb  2  2023 .cshrc
drwx------.  2 root root  29 Oct 13 03:58 .ssh
-rw-r--r--.  1 root root 129 Feb  2  2023 .tcshrc
[root@ip-10-0-11-194 ~]# cd .ssh
[root@ip-10-0-11-194 .ssh]# ls -l
```

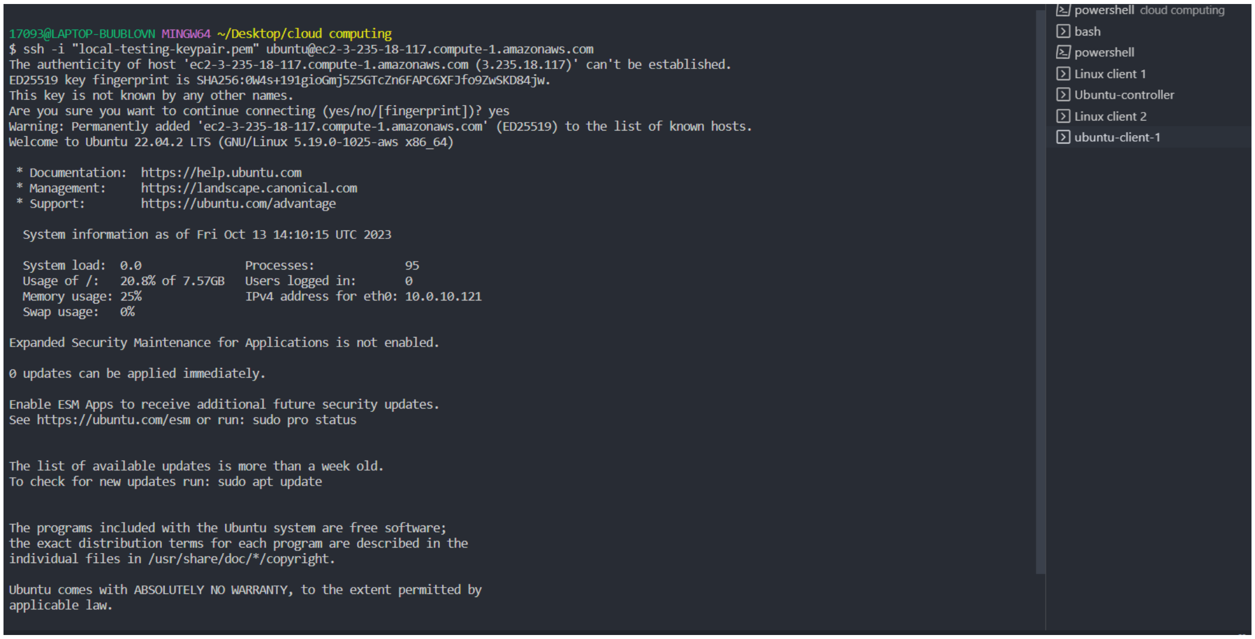
Copy and paste the controller’s public key into the client-2



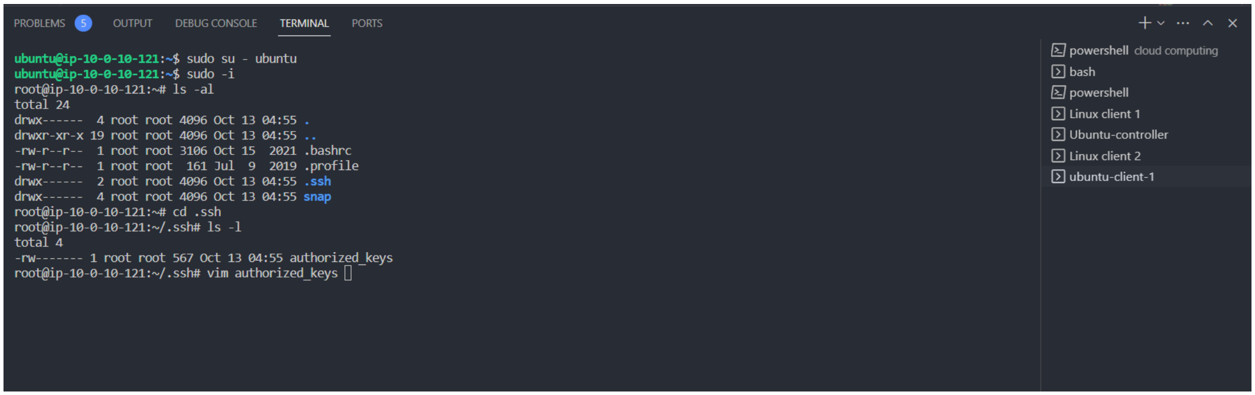
```
no-port-forwarding,no-agent-forwarding,no-X11-forwarding,command="echo 'Please login as the user \"ec2-user\" rather than the user \"root\".';echo
;sleep 10;exit 142" ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABAQDrSYhzjMe98VKYDH/oHIbLQMSFEkRJ0sC3TV7ROCBEnMgEMbATOTTStvmHcuPCIYi0gw6kLuOyGlYOl8uW/ZT0qU
sXW1Jm+Ib40qE2HJ4BajvlnNc4WNNZk0urvlRyl4bFdH7ywx6Ptw9zM0VONwKS718keTKQVfFZ3avLC5s1+a9KJqrrQPMCSbq1zwfQVXRAHXIehZnPRIuQMsqHp/+K2zywoJVIbtGb0PEDGusp
pCU9rqwlh3WgnpQ7PZjxK2AV/V0CuSOsBzg6AGbinP+qOH7hrYhLxVguoftzno3ectvvEMlLo/dHJuKVuikrQ5pPzbPUisIOrIrIVicXykIl local-testing-keypair
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQC9MX04DZi8REx9+AAZzkZKvwduXHgR9U0ElmT4xoumVr+l6l2/c4d9Z/aOFqIksLA1KdnFsV8IhRWH8U6Bxy97Izze6bPTEG3mwIJryKcgEa
uAZ9Vi1OTkVmGg2AqcRBdn8OyT7LB4XbUBNCiVQgEn48VlGHFxLOJcYljfHsFtgd524B6Mfok+9s+xzGG1LN/v5vWj0IbHQtmFK3wP/nZZ3APBpAbg77pHngiuoHLSk8g2YohpJFnefcBd1u7i
bjDGtl4akzi41tQvdLSo9ORM+FfMx3Sv8/v6pILVTXFDPiHPyYpvKaaGZt1s5NaIvmDqAUuj62uCWwMT7E1rusgyPz8/vVzirgmb4slFkngJx5/P8uYAlKNJYgRXg9f4p/J3tt89W9YA/boQ7H
en2F4orhwOFptakfur+bSqD2MXnQDjEY664V6vgRDCmeg9Xdk5s81YhMhKpM2RpSFBB+RnyZh1jWNtsowdR9BvE3hzw3uVZ+1TOR7gbtenfeC2C8U= root@controller
~
~
~
~
~
```

- ## Ansible-Ubuntu-client-1

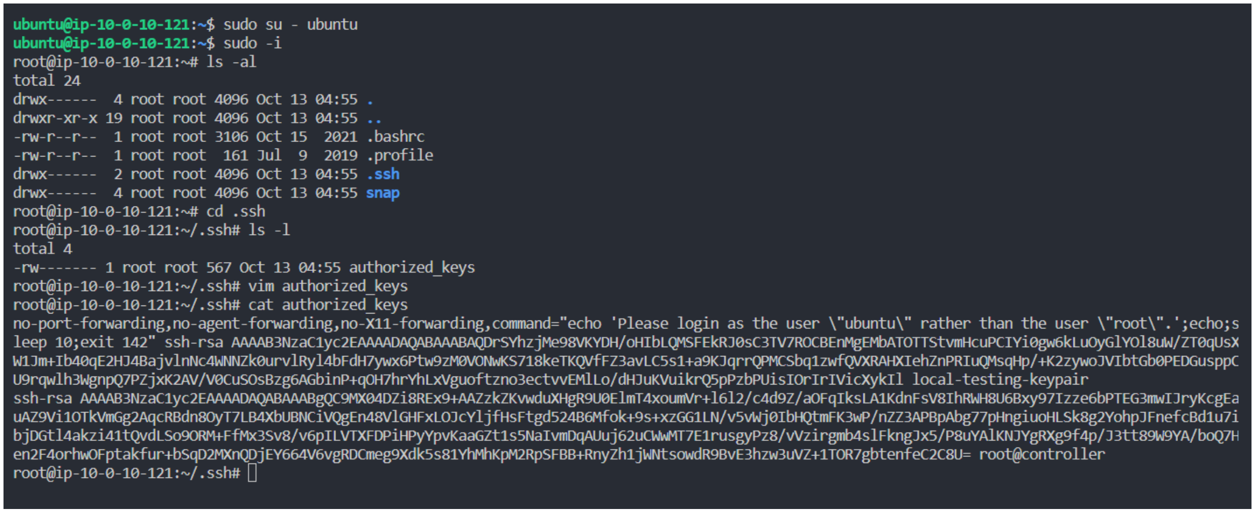
Do the same for the ubuntu clients



```
17093@LAPTOP-BUUBLOVN MINGW64 ~/Desktop/cloud computing
$ ssh -i "local-testing-keypair.pem" ubuntu@ec2-3-235-18-117.compute-1.amazonaws.com
The authenticity of host 'ec2-3-235-18-117.compute-1.amazonaws.com (3.235.18.117)' can't be established.
ED25519 key fingerprint is SHA256:0W4s+191gioGmj5Z5GTcZn6FAPC6XFJfo9ZwSKD84jw.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-3-235-18-117.compute-1.amazonaws.com' (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 Oct 13 14:10:15 UTC 2023

  System load:  0.0               Processes:             95
  Usage of /:   20.8% of 7.57GB   Users logged in:       0
  Memory usage: 25%               IPv4 address for eth0: 10.0.10.121
  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.
```



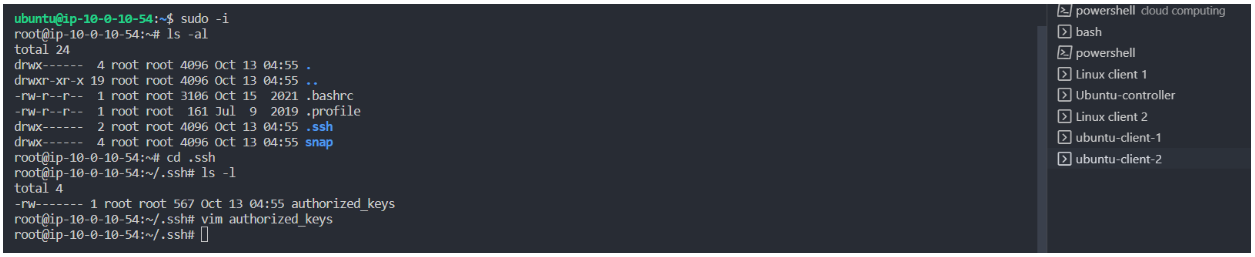
```
ubuntu@ip-10-0-10-121:~$ sudo su - ubuntu
ubuntu@ip-10-0-10-121:~$ sudo -i
root@ip-10-0-10-121:~# ls -al
total 24
drwx------  4 root root 4096 Oct 13 04:55 .
drwxr-xr-x 19 root root 4096 Oct 13 04:55 ..
-rw-r--r--  1 root root 3106 Oct 15  2021 .bashrc
-rw-r--r--  1 root root  161 Jul  9  2019 .profile
drwx------  2 root root 4096 Oct 13 04:55 .ssh
drwx------  4 root root 4096 Oct 13 04:55 snap
root@ip-10-0-10-121:~# cd .ssh
root@ip-10-0-10-121:~/.ssh# ls -l
total 4
-rw------- 1 root root 567 Oct 13 04:55 authorized_keys
root@ip-10-0-10-121:~/.ssh# vim authorized_keys
```



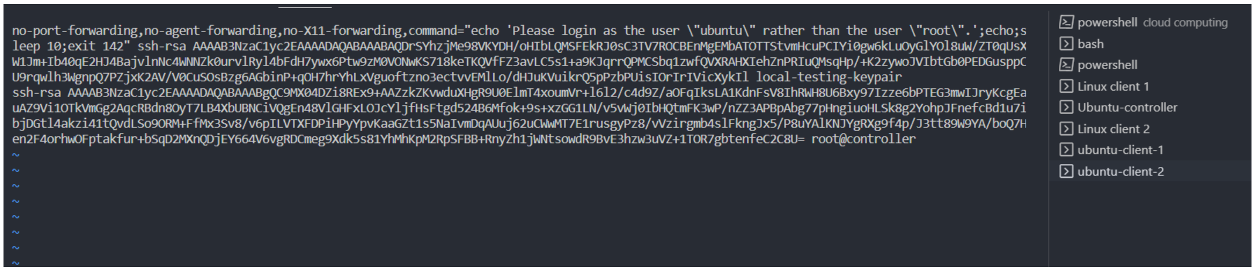
```
ubuntu@ip-10-0-10-121:~$ sudo su - ubuntu
ubuntu@ip-10-0-10-121:~$ sudo -i
root@ip-10-0-10-121:~# ls -al
total 24
drwx------  4 root root 4096 Oct 13 04:55 .
drwxr-xr-x 19 root root 4096 Oct 13 04:55 ..
-rw-r--r--  1 root root 3106 Oct 15  2021 .bashrc
-rw-r--r--  1 root root  161 Jul  9  2019 .profile
drwx------  2 root root 4096 Oct 13 04:55 .ssh
drwx------  4 root root 4096 Oct 13 04:55 snap
root@ip-10-0-10-121:~# cd .ssh
root@ip-10-0-10-121:~/.ssh# ls -l
total 4
-rw------- 1 root root 567 Oct 13 04:55 authorized_keys
root@ip-10-0-10-121:~/.ssh# vim authorized_keys
root@ip-10-0-10-121:~/.ssh# cat authorized_keys
no-port-forwarding,no-agent-forwarding,no-X11-forwarding,command="echo 'Please login as the user \"ubuntu\" rather than the user \"root\".';echo;s
leep 10;exit 142" ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABAQDrSYhzjMe98VKYDH/oHIbLQMSFEkRJ0sC3TV7ROCBEnMgEMbATOTTStvmHcuPCIYi0gw6kLuOyGlYOl8uW/ZT0qUsX
W1Jm+Ib40qE2HJ4BajvlnNc4WNNZk0urvlRyl4bFdH7ywx6Ptw9zM0VONwKS718keTKQVfFZ3avLC5s1+a9KJqrrQPMCSbq1zwfQVXRAHXIehZnPRIuQMsqHp/+K2zywoJVIbtGb0PEDGusppC
U9rqwlh3WgnpQ7PZjxK2AV/V0CuSOsBzg6AGbinP+qOH7hrYhLxVguoftzno3ectvvEMlLo/dHJuKVuikrQ5pPzbPUisIOrIrIVicXykIl local-testing-keypair
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQC9MX04DZi8REx9+AAZzkZKvwduXHgR9U0ElmT4xoumVr+l6l2/c4d9Z/aOFqIksLA1KdnFsV8IhRWH8U6Bxy97Izze6bPTEG3mwIJryKcgEa
uAZ9Vi1OTkVmGg2AqcRBdn8OyT7LB4XbUBNCiVQgEn48VlGHFxLOJcYljfHsFtgd524B6Mfok+9s+xzGG1LN/v5vWj0IbHQtmFK3wP/nZZ3APBpAbg77pHngiuoHLSk8g2YohpJFnefcBd1u7i
bjDGtl4akzi41tQvdLSo9ORM+FfMx3Sv8/v6pILVTXFDPiHPyYpvKaaGZt1s5NaIvmDqAUuj62uCWwMT7E1rusgyPz8/vVzirgmb4slFkngJx5/P8uYAlKNJYgRXg9f4p/J3tt89W9YA/boQ7H
en2F4orhwOFptakfur+bSqD2MXnQDjEY664V6vgRDCmeg9Xdk5s81YhMhKpM2RpSFBB+RnyZh1jWNtsowdR9BvE3hzw3uVZ+1TOR7gbtenfeC2C8U= root@controller
root@ip-10-0-10-121:~/.ssh#
```

- ## Ansible-Ubuntu-client-2

Do the same thing for the ubuntu-client-2



```
ubuntu@ip-10-0-10-54:~$ sudo -i
root@ip-10-0-10-54:~# ls -al
total 24
drwx------  4 root root 4096 Oct 13 04:55 .
drwxr-xr-x 19 root root 4096 Oct 13 04:55 ..
-rw-r--r--  1 root root 3106 Oct 15  2021 .bashrc
-rw-r--r--  1 root root  161 Jul  9  2019 .profile
drwx------  2 root root 4096 Oct 13 04:55 .ssh
drwx------  4 root root 4096 Oct 13 04:55 snap
root@ip-10-0-10-54:~# cd .ssh
root@ip-10-0-10-54:~/.ssh# ls -l
total 4
-rw------- 1 root root 567 Oct 13 04:55 authorized_keys
root@ip-10-0-10-54:~/.ssh# vim authorized_keys
root@ip-10-0-10-54:~/.ssh#
```



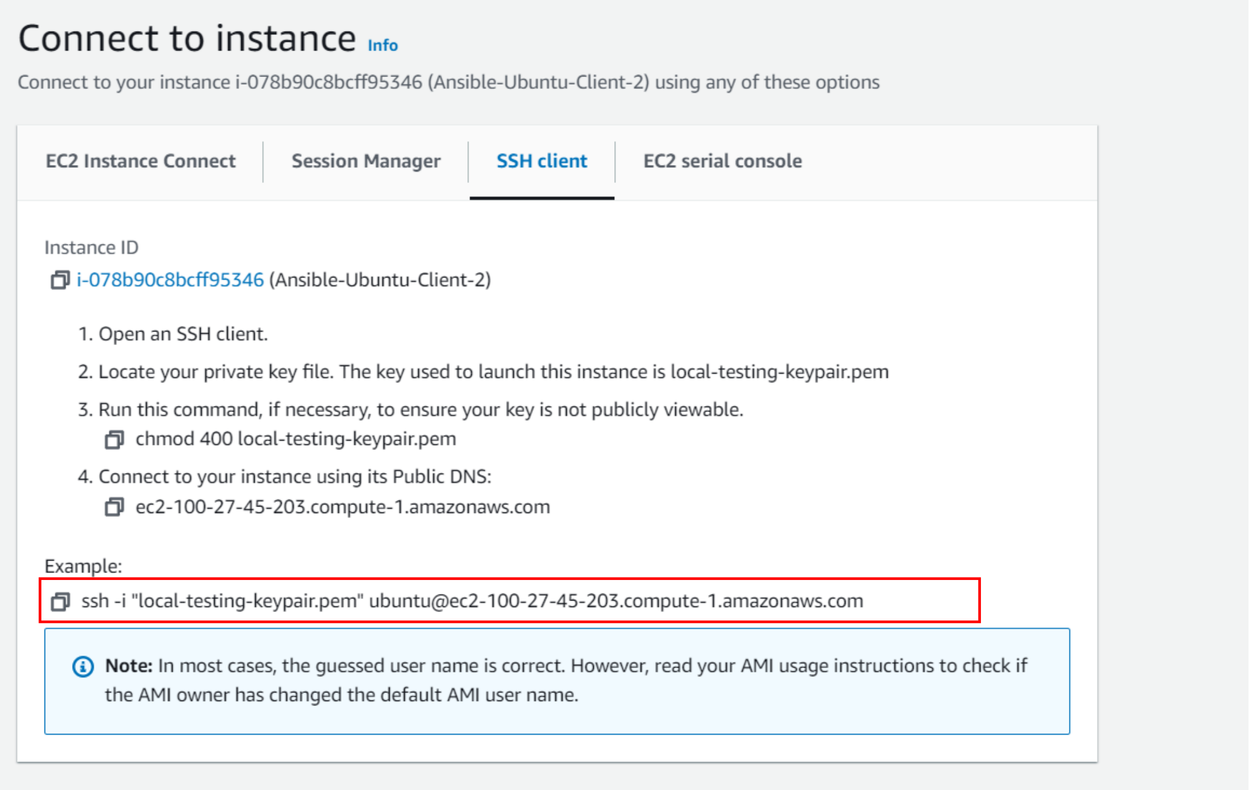
```
no-port-forwarding,no-agent-forwarding,no-X11-forwarding,command="echo 'Please login as the user \"ubuntu\" rather than the user \"root\".';echo;s
leep 10;exit 142" ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABAQDrSYhzjMe98VKYDH/oHIbLQMSFEkRJ0sC3TV7ROCBEnMgEMbATOTTStvmHcuPCIYi0gw6kLuOyGlYOl8uW/ZT0qUsX
W1Jm+Ib40qE2HJ4BajvlnNc4WNNZk0urvlRyl4bFdH7ywx6Ptw9zM0VONwKS718keTKQVfFZ3avLC5s1+a9KJqrrQPMCSbq1zwfQVXRAHXIehZnPRIuQMsqHp/+K2zywoJVIbtGb0PEDGusppC
U9rqwlh3WgnpQ7PZjxK2AV/V0CuSOsBzg6AGbinP+qOH7hrYhLxVguoftzno3ectvvEMlLo/dHJuKVuikrQ5pPzbPUisIOrIrIVicXykIl local-testing-keypair
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQC9MX04DZi8REx9+AAZzkZKvwduXHgR9U0ElmT4xoumVr+l6l2/c4d9Z/aOFqIksLA1KdnFsV8IhRWH8U6Bxy97Izze6bPTEG3mwIJryKcgEa
uAZ9Vi1OTkVmGg2AqcRBdn8OyT7LB4XbUBNCiVQgEn48VlGHFxLOJcYljfHsFtgd524B6Mfok+9s+xzGG1LN/v5vWj0IbHQtmFK3wP/nZZ3APBpAbg77pHngiuoHLSk8g2YohpJFnefcBd1u7i
bjDGtl4akzi41tQvdLSo9ORM+FfMx3Sv8/v6pILVTXFDPiHPyYpvKaaGZt1s5NaIvmDqAUuj62uCWwMT7E1rusgyPz8/vVzirgmb4slFkngJx5/P8uYAlKNJYgRXg9f4p/J3tt89W9YA/boQ7H
en2F4orhwOFptakfur+bSqD2MXnQDjEY664V6vgRDCmeg9Xdk5s81YhMhKpM2RpSFBB+RnyZh1jWNtsowdR9BvE3hzw3uVZ+1TOR7gbtenfeC2C8U= root@controller
~
~
~
~
~
~
~
~
```

- ## Testing the SSH connectivity

To test the connectivity, we SSH from the controller to each of the clients to be sure that the connection was set up successfully

To do this, there are several ways we can achieve this, we can either use the private IP address of each of the clients or we can just paste in the SSH script from the console.

To test the connectivity to the Ansible-ubuntu-client-2



Connect to your instance i-078b90c8bcff95346 (Ansible-Ubuntu-Client-2) using any of these options

Instance ID

i-078b90c8bcff95346 (Ansible-Ubuntu-Client-2)

1. Open an SSH client.
2. Locate your private key file. The key used to launch this instance is local-testing-keypair.pem
3. Run this command, if necessary, to ensure your key is not publicly viewable.
   `chmod 400 local-testing-keypair.pem`
4. Connect to your instance using its Public DNS:
   ec2-100-27-45-203.compute-1.amazonaws.com

Example:

```
ssh -i "local-testing-keypair.pem" ubuntu@ec2-100-27-45-203.compute-1.amazonaws.com
```

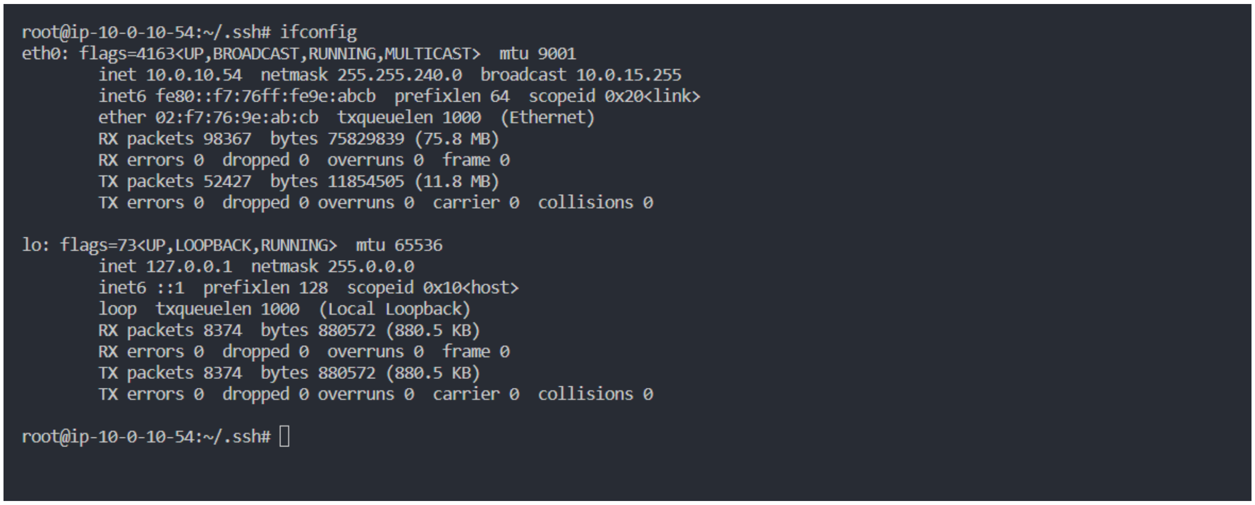
Note: In most cases, the guessed user name is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.

If we want to connect as the root user, we can replace “ubuntu” with root. Hence the command becomes ssh -i “local-testing-keypair.pem” root@ec2-100-27-45-203.compute-1.amazonaws.com”

Just to avoid any confusion when we successfully connect, let’s rename the hostname from “10-0-10-54” to “Ubuntu-client-2” so that when we successfully connect, we can then know that we are connected. To rename the hostname we use the command: “hostnamectl set-hostname ubuntu-client-2”

We have to rename al the clients accordingly.

Next, we check the private ip address of the server so we can ping it after we SSH. We use the command: ifconfig



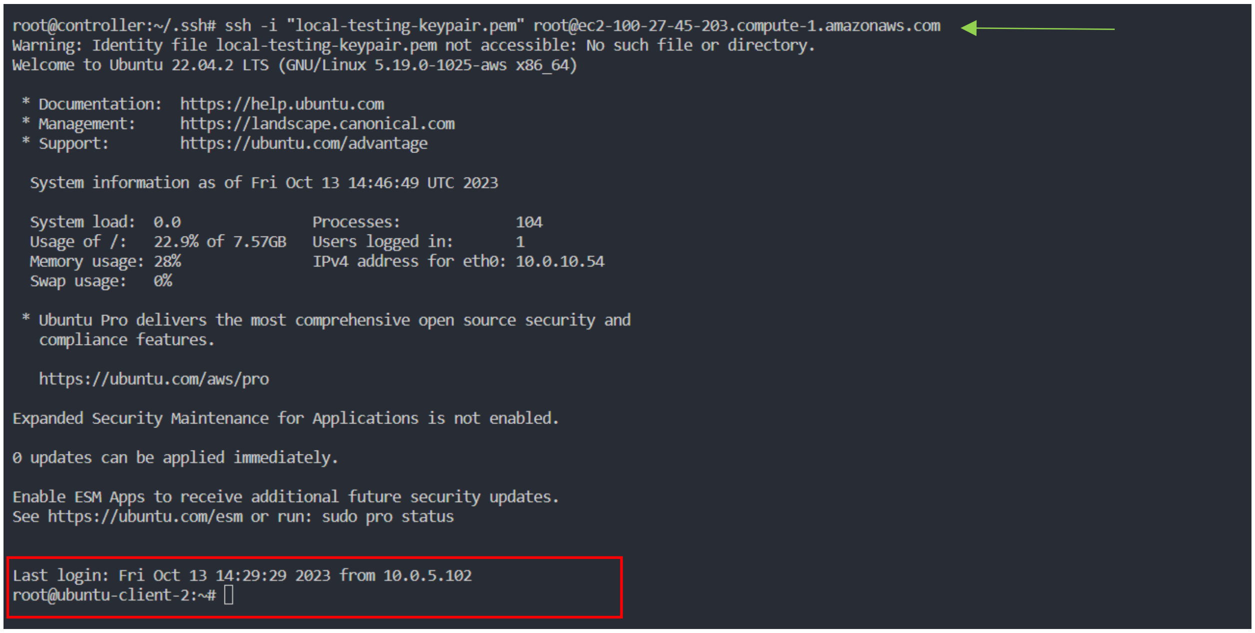
```
root@ip-10-0-10-54:~/.ssh# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 9001
        inet 10.0.10.54  netmask 255.255.240.0  broadcast 10.0.15.255
        inet6 fe80::f7:76ff:fe9e:abcb  prefixlen 64  scopeid 0x20<link>
        ether 02:f7:76:9e:ab:cb  txqueuelen 1000  (Ethernet)
        RX packets 98367  bytes 75829839 (75.8 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 52427  bytes 11854505 (11.8 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 8374  bytes 880572 (880.5 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 8374  bytes 880572 (880.5 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

root@ip-10-0-10-54:~/.ssh# 
```

As seen, the ***Private ip is 10.0.10.54***

SSHing into the Ansible-Ubuntu-client-2 from the controller:

Using Method 1:

Using the command below, we can SSH from the controller
ssh -i "local-testing-keypair.pem" root@ec2-100-27-45-203.compute-1.amazonaws.com



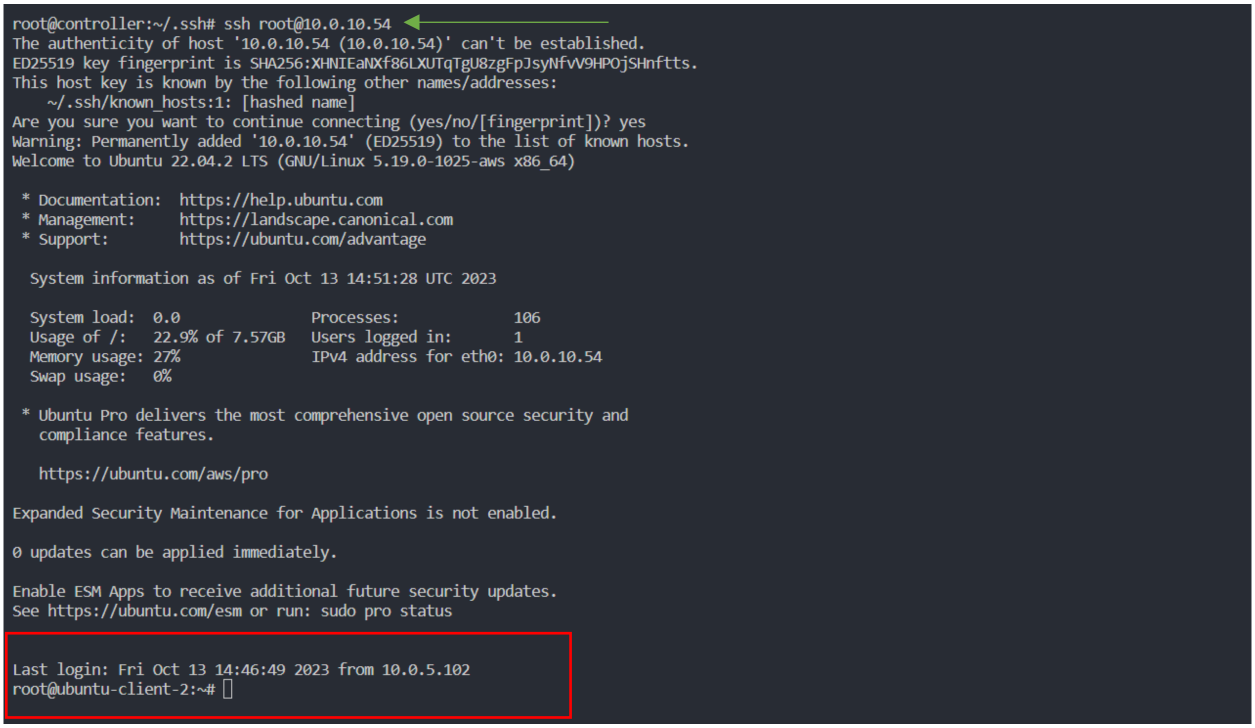
```
root@controller:~/.ssh# ssh -i "local-testing-keypair.pem" root@ec2-100-27-45-203.compute-1.amazonaws.com
Warning: Identity file local-testing-keypair.pem not accessible: No such file or directory.
Welcome to Ubuntu 22.04.2 LTS (GNU/Linux 5.19.0-1025-aws x86_64)

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

  System information as of Fri Oct 13 14:46:49 UTC 2023

  System load:  0.0               Processes:             104
  Usage of /:   22.9% of 7.57GB   Users logged in:       1
  Memory usage: 28%               IPv4 address for eth0: 10.0.10.54
  Swap usage:   0%

 * Ubuntu Pro delivers the most comprehensive open source security and
   compliance features.

   https://ubuntu.com/aws/pro

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


Last login: Fri Oct 13 14:29:29 2023 from 10.0.5.102
root@ubuntu-client-2:~# 
```

As seen above, we have successfully SSH into the ubuntu-client-2

There is an alternative method to SSH into the ubuntu-client-2

Using Method 2:

You can just use the command ssh root@10.0.10.54 where 10.0.10.54 is the private ip

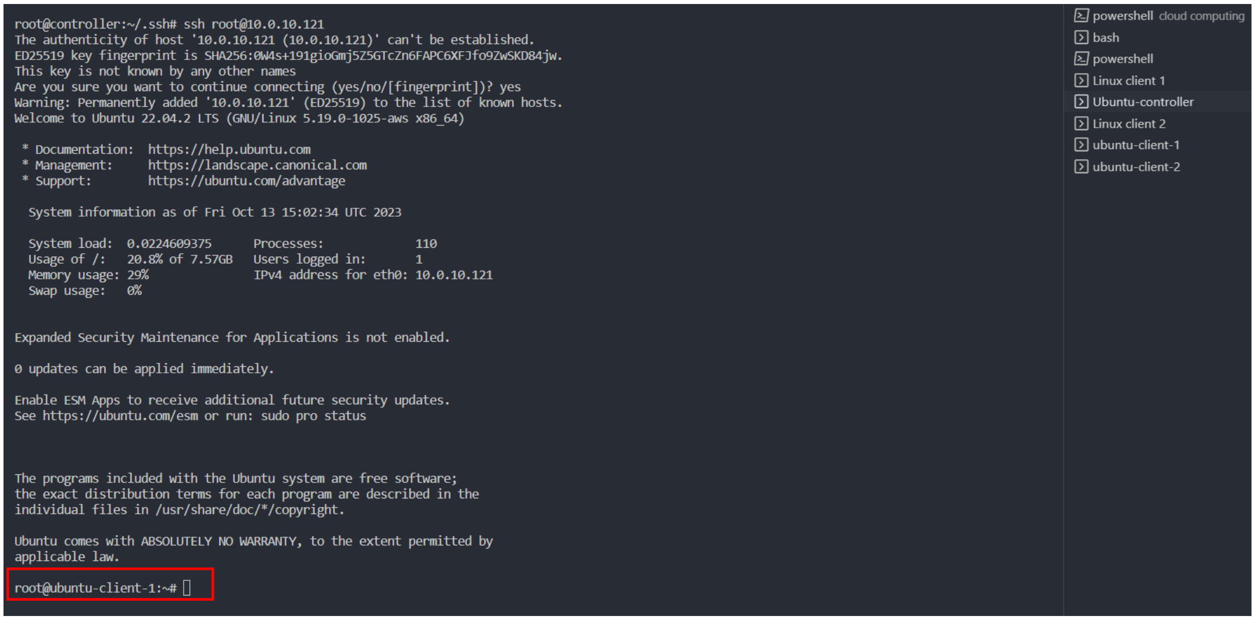


```
root@controller:~/.ssh# ssh root@10.0.10.54
The authenticity of host '10.0.10.54 (10.0.10.54)' can't be established.
ED25519 key fingerprint is SHA256:XHNIEaNXf86LXUTqTgU8zgFpJsyNfvV9HPOjSHnftts.
This host key is known by the following other names/addresses:
    ~/.ssh/known_hosts:1: [hashed name]
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '10.0.10.54' (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 Oct 13 14:51:28 UTC 2023

  System load:  0.0               Processes:             106
  Usage of /:   22.9% of 7.57GB   Users logged in:       1
  Memory usage: 27%               IPv4 address for eth0: 10.0.10.54
  Swap usage:   0%

 * Ubuntu Pro delivers the most comprehensive open source security and
   compliance features.

   https://ubuntu.com/aws/pro

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


Last login: Fri Oct 13 14:46:49 2023 from 10.0.5.102
root@ubuntu-client-2:~# 
```

Same method applies to the other clients.

Ansible-ubuntu-client-1:

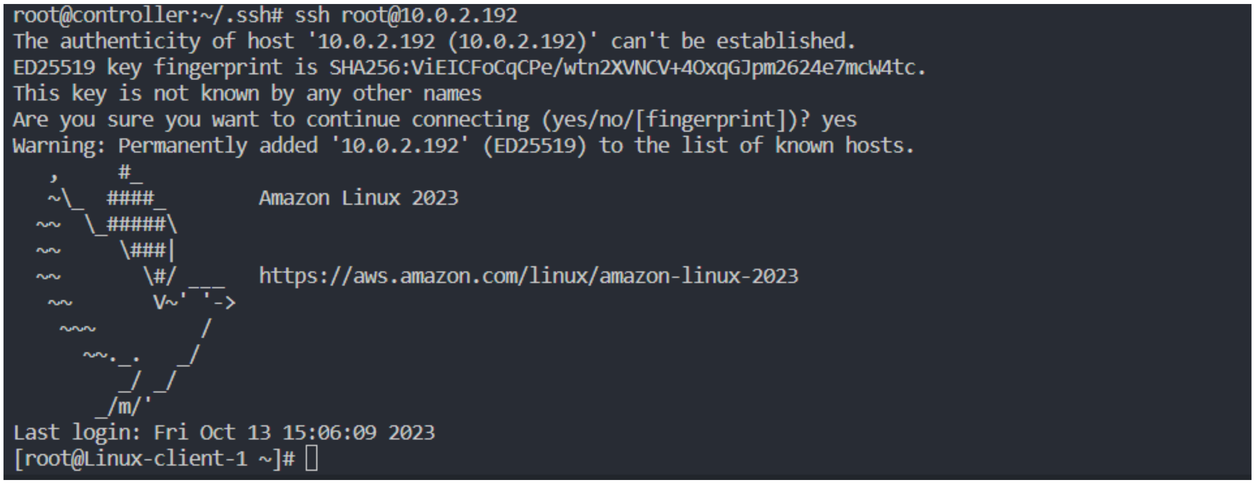
Private ip: 10.0.10.121. SSHing from the controller



```
root@controller:~/.ssh# ssh root@10.0.10.121
The authenticity of host '10.0.10.121 (10.0.10.121)' can't be established.
ED25519 key fingerprint is SHA256:0W4s+191gioGmj5Z5GTcZn6FAPC6XFJfo9ZwSKD84jw.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '10.0.10.121' (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 Oct 13 15:02:34 UTC 2023

  System load:  0.0224609375      Processes:             110
  Usage of /:   20.8% of 7.57GB   Users logged in:       1
  Memory usage: 29%               IPv4 address for eth0: 10.0.10.121
  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 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.

root@ubuntu-client-1:~# 
```

Ansible-Linux-client-1:

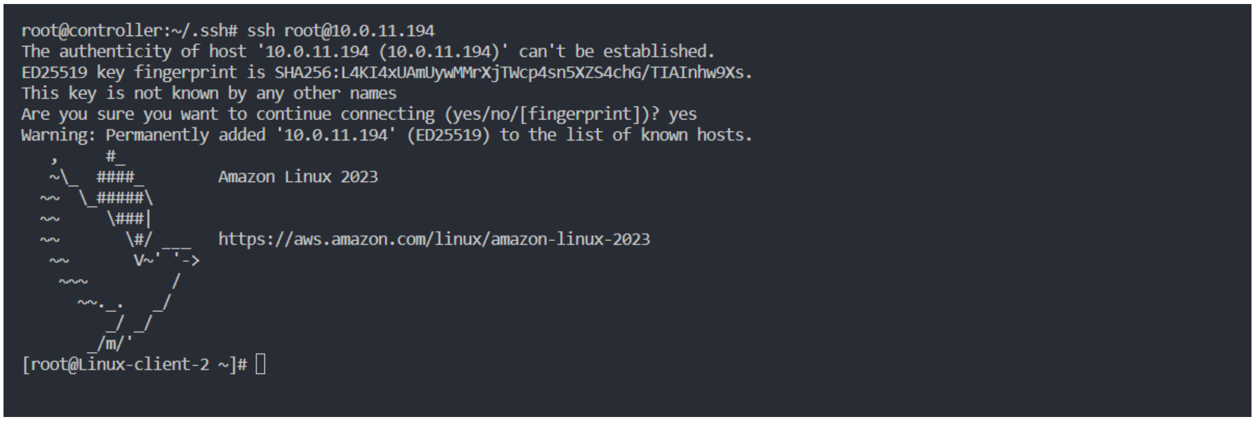
Private ip: 10.0.2.192



```
root@controller:~/.ssh# ssh root@10.0.2.192
The authenticity of host '10.0.2.192 (10.0.2.192)' can't be established.
ED25519 key fingerprint is SHA256:ViEICFoCqCPe/wtn2XVNCV+4OxqGJpm2624e7mcW4tc.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '10.0.2.192' (ED25519) to the list of known hosts.
   ,     #_
   ~\_  ####_        Amazon Linux 2023
  ~~  \_#####\
  ~~     \###|
  ~~       \#/ ___   https://aws.amazon.com/linux/amazon-linux-2023
   ~~       V~' '->
    ~~~         /
      ~~._.   _/
         _/ _/
       _/m/'
Last login: Fri Oct 13 15:06:09 2023
[root@Linux-client-1 ~]# 
```

Ansible-Linux-client-2:

Private ip: 10.0.11.194



```
root@controller:~/.ssh# ssh root@10.0.11.194
The authenticity of host '10.0.11.194 (10.0.11.194)' can't be established.
ED25519 key fingerprint is SHA256:L4KI4xUAmUywMMrXjTWcp4sn5XZS4chG/TIAInhw9Xs.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '10.0.11.194' (ED25519) to the list of known hosts.
   ,     #_
   ~\_  ####_        Amazon Linux 2023
  ~~  \_#####\
  ~~     \###|
  ~~       \#/ ___   https://aws.amazon.com/linux/amazon-linux-2023
   ~~       V~' '->
    ~~~         /
      ~~._.   _/
         _/ _/
       _/m/'
[root@Linux-client-2 ~]# 
```

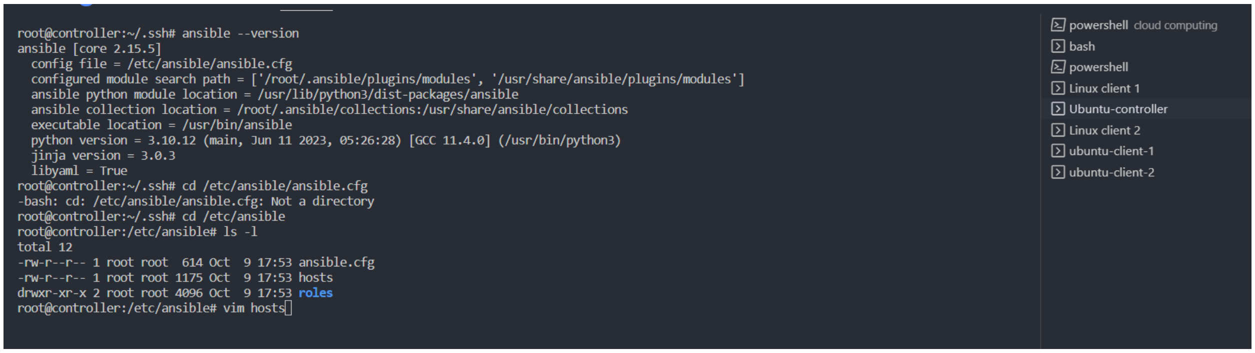
The controller was able to SSH into all the clients successfully! 😊

Summary of all the private ip addresses

Client	Private ip
Ansible-Linux-client-1	10.0.2.192
Ansible-Linux-client-2	10.0.11.194
Ansible-ubuntu-client-1	10.0.10.121
Ansible-ubuntu-client-2	10.0.10.54

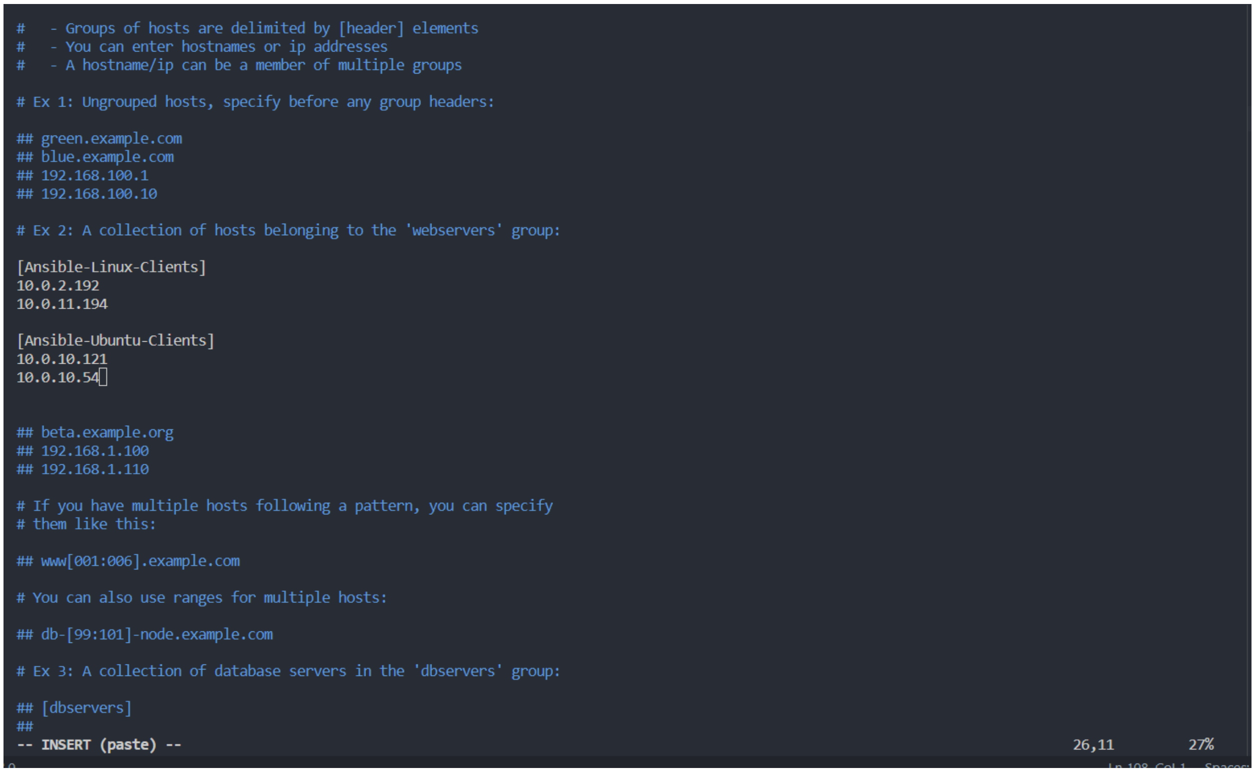
Testing if Ansible works between controller and clients using Ping!

To do this, we need to access the inventory document of the controller and input the private ips of each of the clients.



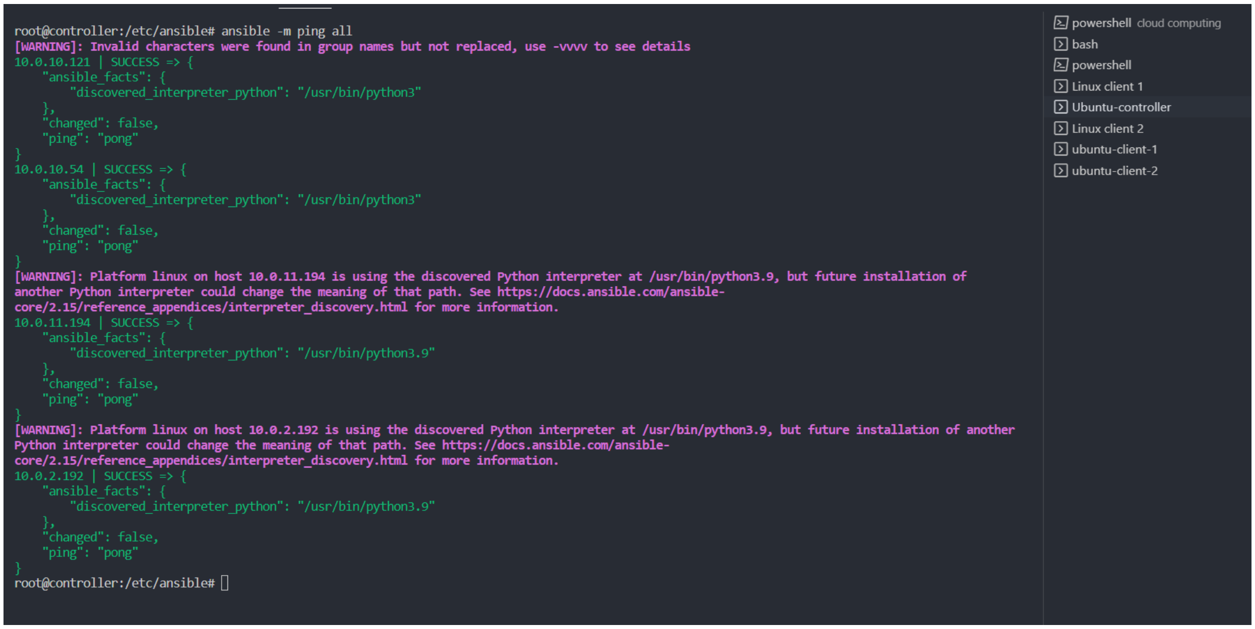
```
root@controller:~/.ssh# ansible --version
ansible [core 2.15.5]
  config file = /etc/ansible/ansible.cfg
  configured module search path = ['/root/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python3/dist-packages/ansible
  ansible collection location = /root/.ansible/collections:/usr/share/ansible/collections
  executable location = /usr/bin/ansible
  python version = 3.10.12 (main, Jun 11 2023, 05:26:28) [GCC 11.4.0] (/usr/bin/python3)
  jinja version = 3.0.3
  libyaml = True
root@controller:~/.ssh# cd /etc/ansible/ansible.cfg
-bash: cd: /etc/ansible/ansible.cfg: Not a directory
root@controller:~/.ssh# cd /etc/ansible
root@controller:/etc/ansible# ls -l
total 12
-rw-r--r-- 1 root root  614 Oct  9 17:53 ansible.cfg
-rw-r--r-- 1 root root 1175 Oct  9 17:53 hosts
drwxr-xr-x 2 root root 4096 Oct  9 17:53 roles
root@controller:/etc/ansible# vim hosts
```

Now, we edit the inventory file and add the private ips of the clients



```
#   - Groups of hosts are delimited by [header] elements
#   - You can enter hostnames or ip addresses
#   - A hostname/ip can be a member of multiple groups

# Ex 1: Ungrouped hosts, specify before any group headers:

## green.example.com
## blue.example.com
## 192.168.100.1
## 192.168.100.10

# Ex 2: A collection of hosts belonging to the 'webservers' group:

[Ansible-Linux-Clients]
10.0.2.192
10.0.11.194

[Ansible-Ubuntu-Clients]
10.0.10.121
10.0.10.54


## beta.example.org
## 192.168.1.100
## 192.168.1.110

# If you have multiple hosts following a pattern, you can specify
# them like this:

## www[001:006].example.com

# You can also use ranges for multiple hosts:

## db-[99:101]-node.example.com

# Ex 3: A collection of database servers in the 'dbservers' group:

## [dbservers]
##
-- INSERT (paste) --                                                                      26,11         27%
```

Next, we ping from ansible in the controller using the command: **ansible -m ping all**



```
root@controller:/etc/ansible# ansible -m ping all
[WARNING]: Invalid characters were found in group names but not replaced, use -vvvv to see details
10.0.10.121 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3"
    },
    "changed": false,
    "ping": "pong"
}
10.0.10.54 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3"
    },
    "changed": false,
    "ping": "pong"
}
[WARNING]: Platform linux on host 10.0.11.194 is using the discovered Python interpreter at /usr/bin/python3.9, but future installation of
another Python interpreter could change the meaning of that path. See https://docs.ansible.com/ansible-
core/2.15/reference_appendices/interpreter_discovery.html for more information.
10.0.11.194 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.9"
    },
    "changed": false,
    "ping": "pong"
}
[WARNING]: Platform linux on host 10.0.2.192 is using the discovered Python interpreter at /usr/bin/python3.9, but future installation of another
Python interpreter could change the meaning of that path. See https://docs.ansible.com/ansible-
core/2.15/reference_appendices/interpreter_discovery.html for more information.
10.0.2.192 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.9"
    },
    "changed": false,
    "ping": "pong"
}
root@controller:/etc/ansible# 
```

As seen above, all the clients responded (pong) successfully! 😊