Module 5: Ansible Assignment - 1

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Course Offered: -Advanced Cloud Computing and Devops
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Date Of Submission: -26/02/2025

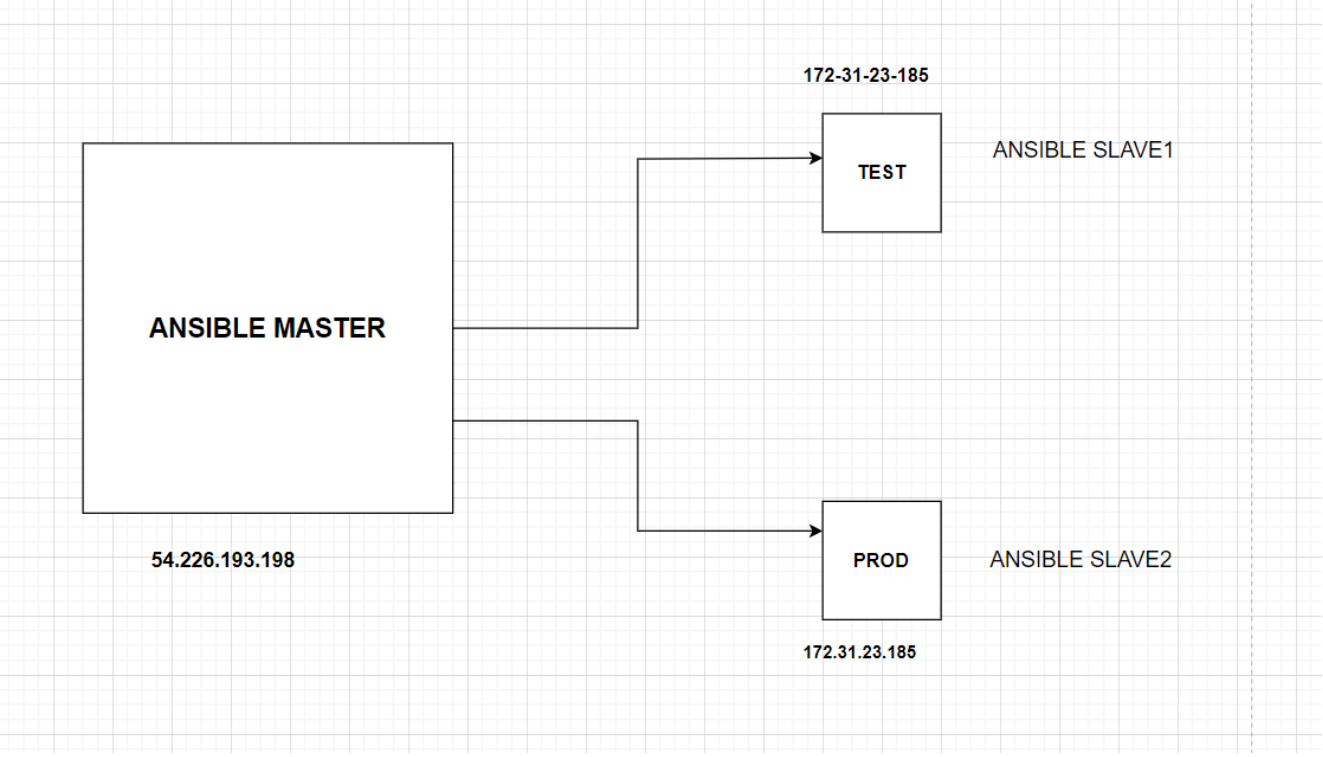
Tasks To Be Performed:

1. Setup Ansible cluster with 3 nodes
2. On slave 1 install Java
3. On slave 2 install MySQL server

Do the above tasks using Ansible Playbooks

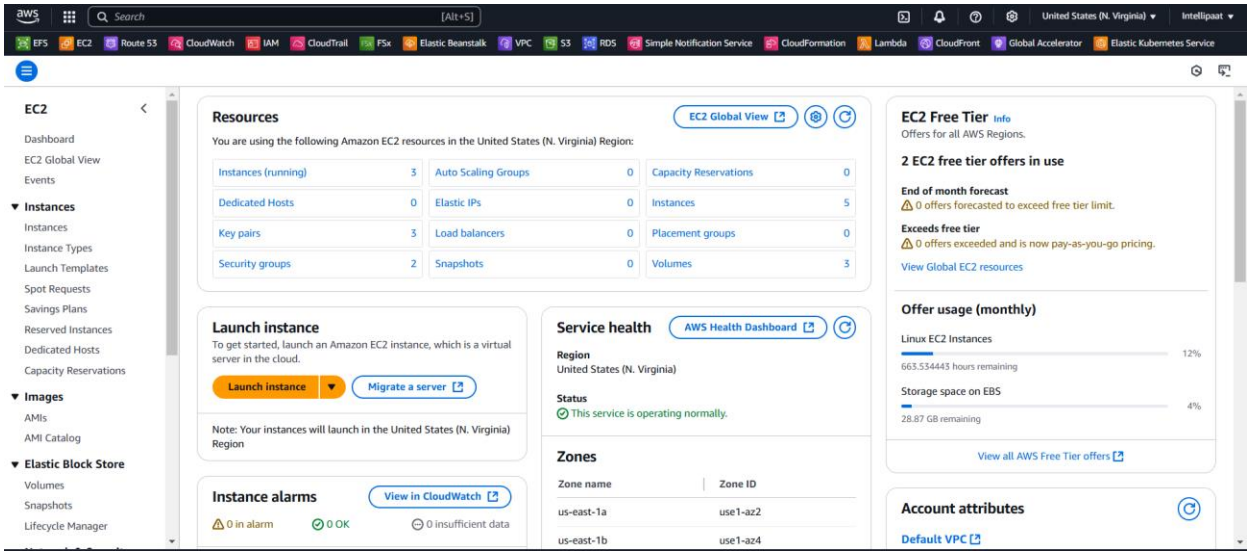
SOLUTION

ARCHITECTURE OF ANSIBLE

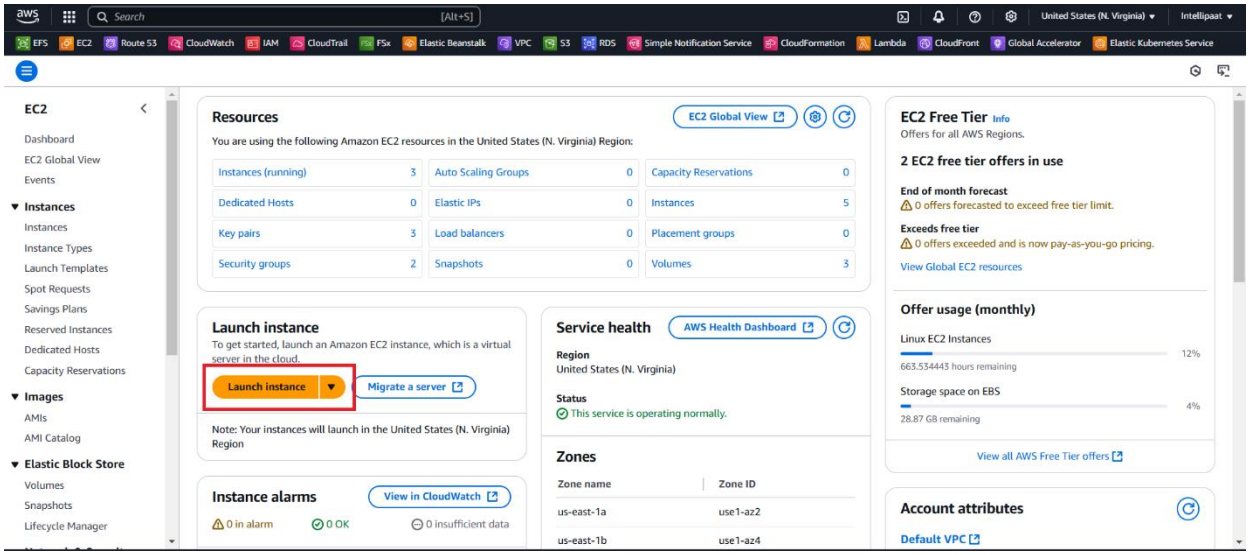


1. Setup Ansible cluster with 3 nodes

Launch 3 Instances in AWS and add Tags as Ansible-M, Ansible-S1,Ansible-S2



Click the Launch Instance and Launch 3 Instance

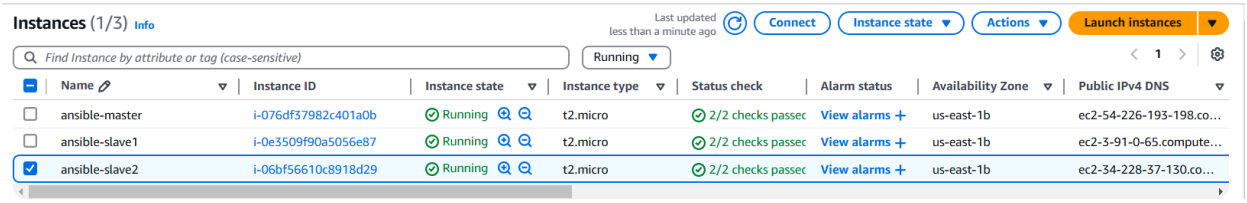


After Launch the instances Rename the instances.

1.ansible master

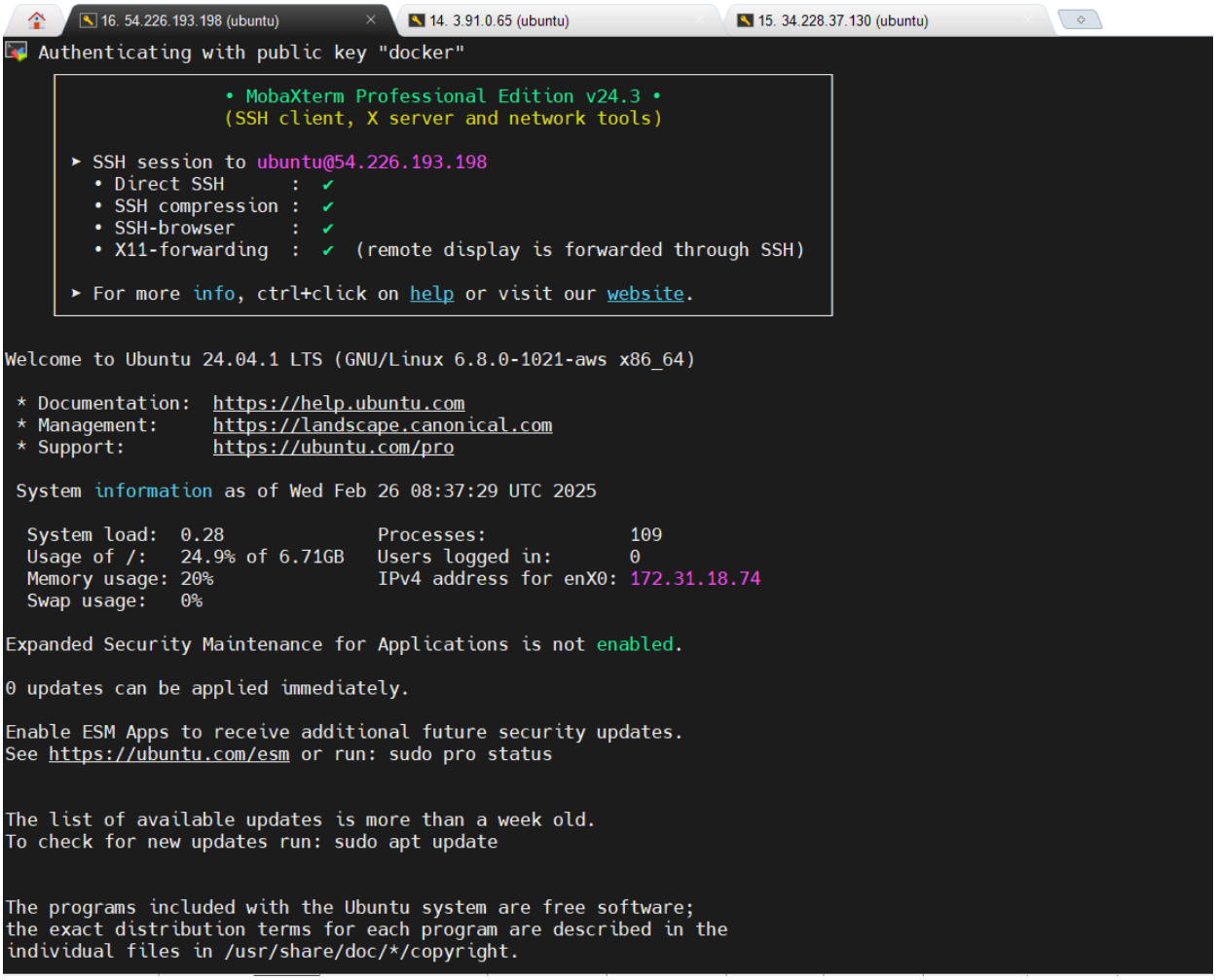
2.ansible slave 1

3.ansible slave 2

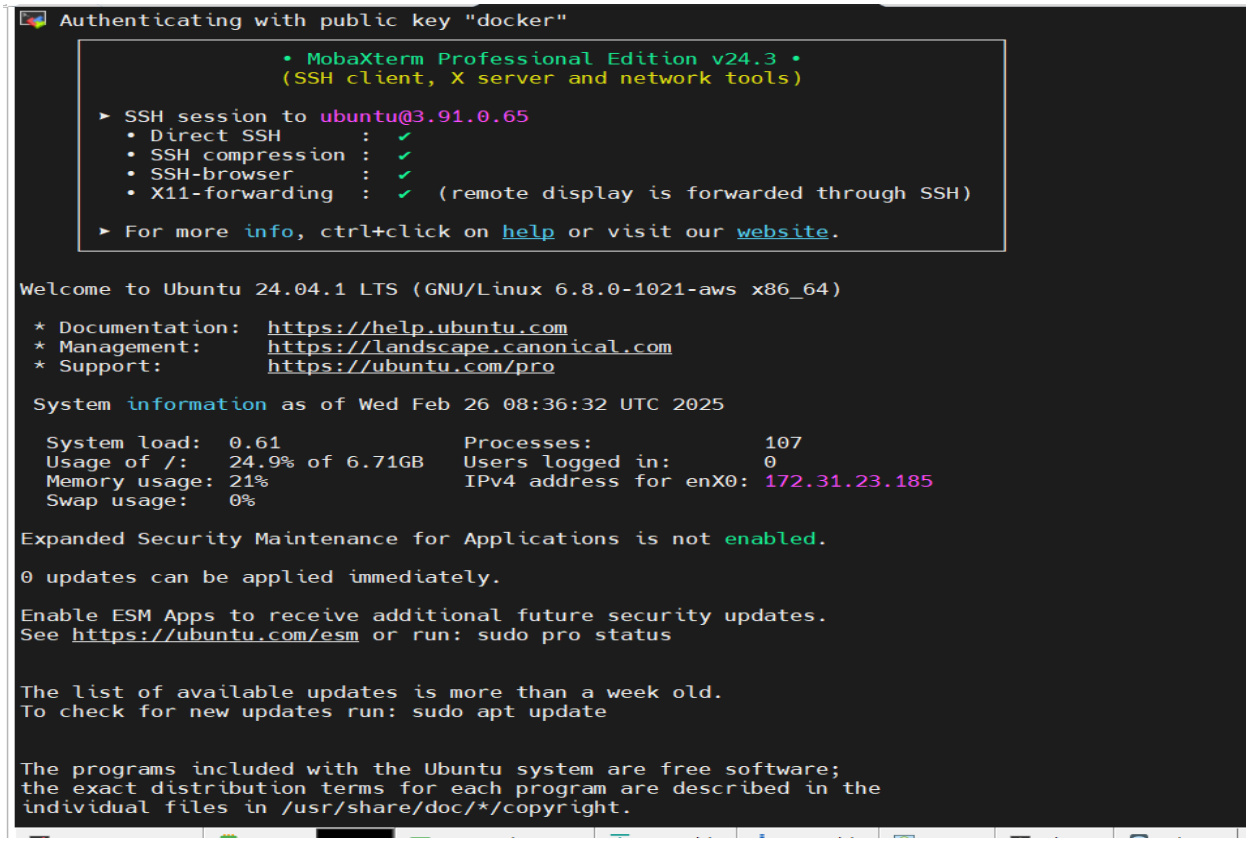


Connect with all the three Instances.

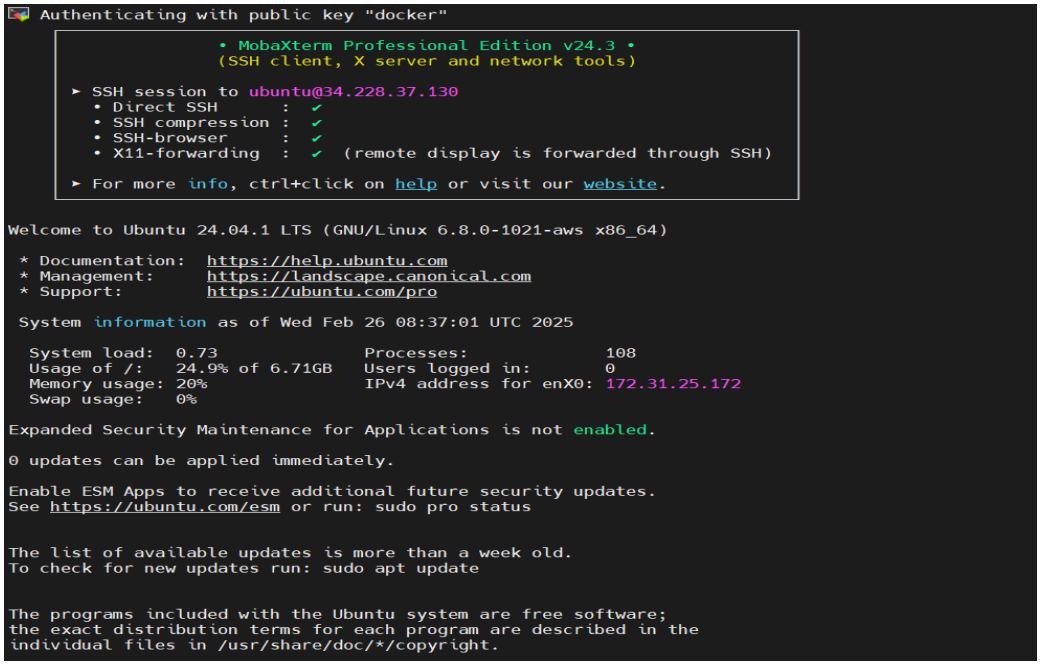
This is my master node.



This is my ansible slave 1 node



This is my ansible slave 2 node



Now We need to Install Ansible on Master Instance (ansible master)

sudo apt update

```
ubuntu@ip-172-31-18-74:~/.ssh$ sudo apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:4 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Packages [15.0 MB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe Translation-en [5982 kB]
Get:7 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [634 kB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Components [3871 kB]
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 c-n-f Metadata [301 kB]
Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 Packages [269 kB]
Get:11 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse Translation-en [118 kB]
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 Components [35.0 kB]
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 c-n-f Metadata [8328 B]
Get:14 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [881 kB]
Get:15 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main Translation-en [199 kB]
Get:16 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 Components [151 kB]
Get:17 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packages [1025 kB]
Get:18 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe Translation-en [256 kB]
Get:19 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Components [363 kB]
Get:20 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe amd64 c-n-f Metadata [19.9 kB]
Get:21 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Packages [680 kB]
Get:22 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/restricted Translation-en [135 kB]
Get:23 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Components [212 B]
Get:24 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Packages [23.4 kB]
Get:25 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/multiverse Translation-en [5308 B]
Get:26 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Components [940 B]
Get:27 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 c-n-f Metadata [552 B]
Get:28 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/main amd64 Components [208 B]
Get:29 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/main amd64 c-n-f Metadata [112 B]
Get:30 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/universe amd64 Packages [14.2 kB]
Get:31 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/universe Translation-en [12.1 kB]
Get:32 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/universe amd64 Components [20.0 kB]
Get:33 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/universe amd64 c-n-f Metadata [1104 B]
Get:34 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/restricted amd64 Components [216 B]
Get:35 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/restricted amd64 c-n-f Metadata [116 B]
Get:36 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/multiverse amd64 Components [212 B]
Get:37 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports/multiverse amd64 c-n-f Metadata [116 B]
Get:38 http://security.ubuntu.com/ubuntu noble-security/main Translation-en [121 kB]
Get:39 http://security.ubuntu.com/ubuntu noble-security/main amd64 Components [8948 B]
Get:40 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [815 kB]
```

sudo apt install software-properties-common

```
ubuntu@ip-172-31-18-74:~/.ssh$ sudo apt install software-properties-common
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
software-properties-common is already the newest version (0.99.49.1).
software-properties-common set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 106 not upgraded.
ubuntu@ip-172-31-18-74:~/.ssh$ sudo add-apt-repository --yes --update ppa:ansible/ansible
Repository: 'Types: deb
URIs: https://ppa.launchpadcontent.net/ansible/ansible/ubuntu/
Suites: noble
Components: 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 to deploy and updat
e 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.
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu noble-security InRelease
Get:5 https://ppa.launchpadcontent.net/ansible/ansible/ubuntu noble InRelease [17.8 kB]
Get:6 https://ppa.launchpadcontent.net/ansible/ansible/ubuntu noble/main amd64 Packages [776 B]
Get:7 https://ppa.launchpadcontent.net/ansible/ansible/ubuntu noble/main Translation-en [472 B]
Fetched 19.1 kB in 1s (19.8 kB/s)
Reading package lists... Done
```

sudo add-apt-repository --yes --update ppa:ansible/ansible

```
ubuntu@ip-172-31-18-74:~/.ssh$ sudo add-apt-repository --yes --update ppa:ansible/ansible
Repository: 'Types: deb
URIs: https://ppa.launchpadcontent.net/ansible/ansible/ubuntu/
Suites: noble
Components: 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 to deploy and updat
e 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.
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu noble-security InRelease
Get:5 https://ppa.launchpadcontent.net/ansible/ansible/ubuntu noble InRelease [17.8 kB]
Get:6 https://ppa.launchpadcontent.net/ansible/ansible/ubuntu noble/main amd64 Packages [776 B]
Get:7 https://ppa.launchpadcontent.net/ansible/ansible/ubuntu noble/main Translation-en [472 B]
Fetched 19.1 kB in 1s (19.8 kB/s)
Reading package lists... Done
```

sudo apt install ansible

```
ubuntu@ip-172-31-18-74:~/.ssh$ sudo apt install ansible
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  ansible-core python3-kerberos python3-nacl python3-ntlm-auth python3-paramiko python3-requests-ntlm python3-resolvelib python3-winrm python3-xmltodict sshpass
Suggested packages:
  python-nacl-doc python3-gssapi python3-invoke
The following NEW packages will be installed:
  ansible ansible-core python3-kerberos python3-nacl python3-ntlm-auth python3-paramiko python3-requests-ntlm python3-resolvelib python3-winrm python3-xmltodict
  sshpass
0 upgraded, 11 newly installed, 0 to remove and 106 not upgraded.
Need to get 19.2 MB of archives.
After this operation, 213 MB 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 noble/universe amd64 python3-resolvelib all 1.0.1-1 [25.7 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 python3-kerberos amd64 1.1.14-3.1build9 [21.2 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 python3-nacl amd64 1.5.0-4build1 [57.9 kB]
Get:4 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 python3-ntlm-auth all 1.5.0-1 [21.3 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 python3-paramiko all 2.12.0-2ubuntu4.1 [137 kB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 python3-requests-ntlm all 1.1.0-3 [6308 B]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 python3-xmltodict all 0.13.0-1 [13.4 kB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 python3-winrm all 0.4.3-2 [31.9 kB]
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 sshpass amd64 1.09-1 [11.7 kB]
Get:10 https://ppa.launchpadcontent.net/ansible/ansible/ubuntu noble/main amd64 ansible-core all 2.17.9-1ppa~noble [1016 kB]
Get:11 https://ppa.launchpadcontent.net/ansible/ansible/ubuntu noble/main amd64 ansible all 10.7.0-1ppa~noble [17.8 MB]
Fetched 19.2 MB in 41s (465 kB/s)
Selecting previously unselected package python3-resolvelib.
(Reading database ... 70610 files and directories currently installed.)
Preparing to unpack .../00-python3-resolvelib_1.0.1-1_all.deb ...
Unpacking python3-resolvelib (1.0.1-1) ...
Selecting previously unselected package ansible-core.
Preparing to unpack .../01-ansible-core_2.17.9-1ppa~noble_all.deb ...
Unpacking ansible-core (2.17.9-1ppa~noble) ...
Selecting previously unselected package ansible.
Preparing to unpack .../02-ansible_10.7.0-1ppa~noble_all.deb ...
Unpacking ansible (10.7.0-1ppa~noble) ...
Selecting previously unselected package python3-kerberos.
Preparing to unpack .../03-python3-kerberos_1.1.14-3.1build9_amd64.deb ...
Unpacking python3-kerberos (1.1.14-3.1build9) ...
```

After install the ansible we need to check the version.

ansible --version

```
ubuntu@ip-172-31-18-74:~/.ssh$ ansible --version
ansible [core 2.17.9]
  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 = 3.12.3 (main, Nov  6 2024, 18:32:19) [GCC 13.2.0] (/usr/bin/python3)
  jinja version = 3.1.2
  libyaml = True
ubuntu@ip-172-31-18-74:~/.ssh$
```

Now we need to create a connection b/w master and slaves1,slave2

for the connection, we need to generate a keypair in master and pasting the keypair will help us to connect with slave1,slave2

ssh-keygen (ansible master)

key will be saved in :

/home/ubuntu/.ssh/id_rsa.pub

```
ubuntu@ip-172-31-18-74:~$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/ubuntu/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/ubuntu/.ssh/id_rsa
Your public key has been saved in /home/ubuntu/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:tI6et//SmZdMIcEhtVeiXZJp0GcXblJFWXgx8K95gig ubuntu@ip-172-31-18-74
The key's randomart image is:
+---[RSA 3072]----+
|          .o+=+X%|
|           .o+X**|
|         .   o+oB.|
|        . .   ..+ .|
|         S     . ..|
|        o    . ..o |
|       . E ...=+..|
|      . .... + +o |
|       o..o.o..   |
+----[SHA256]-----+
```

Ansible Master

```
ubuntu@ip-172-31-18-74:~/.ssh$ cat id_rsa.pub
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQDCu+01Jj7SlwWWq4zOJV7dbr7IIxdmDw1WqaYN/bfZKvJ/8WBFkaK+oGPY6sH9qME+Rz63BdRiMjPyYPkCy2jyx4bqd3Ki/pv05uENsQYQykLL+CZKdkc6ChgUXXXbGMGa
VyrbEDmBIoi+lUDyTjtZ0P8TxnU8k3dUieelOCXzwSMSgJQJLlJxJ0BAu++71AvC4RtC/aC1tHZb85NjCdY3Feu/lnZEYOeDpQd9XksrhsQowYf6SUDjwVRPZLPHFl6m23lVdPLlg+o04qPmL92BPFVM5X5SIBccTgk6zyG2
E98vc60K3bi4xTs3pz09y2mX2lWdm57fmUT0qnm+FdpZnWSuTydxa4upAbzq5Sa0A4OlB8Fr1wXk2v6oUcypz03T24RjeXHh190EA+XtCUCH6k02FtuPF9mwMHGHPfShqm/OztI17YwW2gKUUTYMqOkO5PLw+8ur9MLHPpmo
3/H8PcplQlOsdt8qNNl6e3qGgSVNfPXAC0iQPZ2r3t8i7tU= ubuntu@ip-172-31-18-74
```

Ansible Slave 1

```
ubuntu@ip-172-31-23-185:~/.ssh$ cat authorized_keys
```

Ansible Slave 2

```
ubuntu@ip-172-31-25-172:~/.ssh$ cat authorized_keys
```

we need to add the slave Private-IP into the ansible host file

path of the ansible host file: cd /etc/ansible/

```
master $ cd /etc/ansible/
master $ ll
total 20
drwxr-xr-x   3 root root 4096 Feb 26 06:51 ./
drwxr-xr-x 109 root root 4096 Feb 26 06:51 ../
-rw-r--r--   1 root root  614 Feb 25 16:59 ansible.cfg
-rw-r--r--   1 root root 1175 Feb 25 16:59 hosts
drwxr-xr-x   2 root root 4096 Feb 25 16:59 roles/
master $
```

After Run This Command

sudo nano hosts.We need to grouping the server.

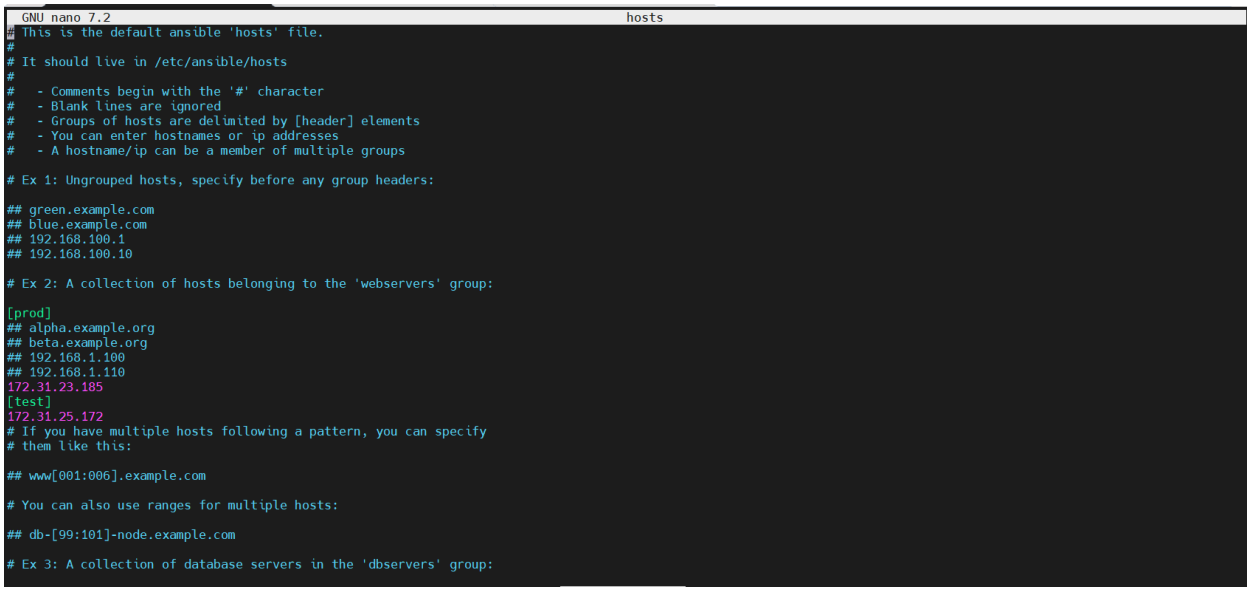
[prod]

172.31.23.185

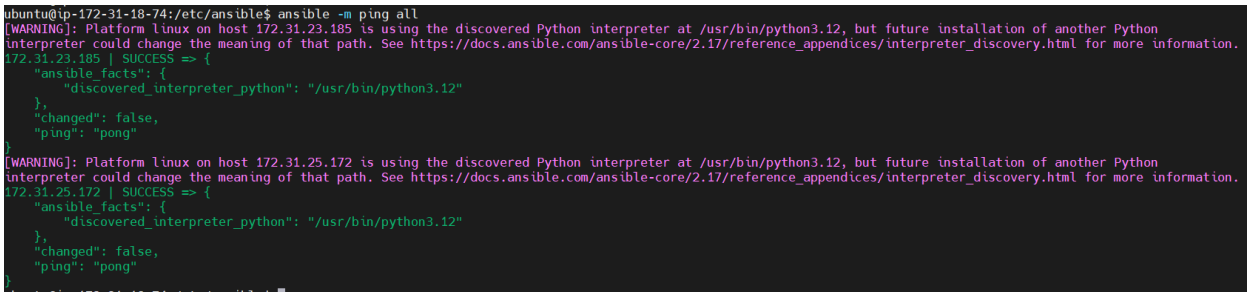
[test]

172.31.25.172

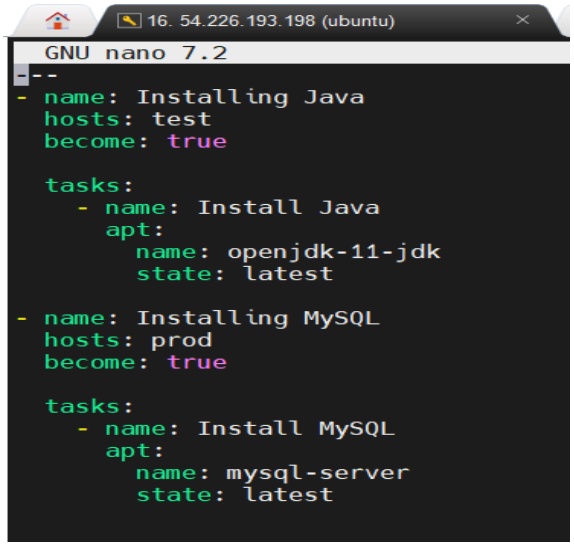
NOTE:-If you want to add more any of server in this prod and test section just add the ip address.



to check whether the connection is successful or not



After Done we need to create the one yaml file so this yaml file helps to install java and my sql server.we need to mention what need to be give task.so in my case I want to install java in test and install mysql in prod so need to define in yaml file like this.



Sudo nano play1.yaml

In Yaml File when writing we need to define first line like this ---

This is the Ansible Basic Templates yaml written like this.

- name:

hosts:

become:

tasks:

- name:

apt:

name:

state:

- name:

hosts:

become:

tasks:

- name:

apt:

name:

state:

So this is the assigned as per above mentioned task to ansible below.this is yaml file I have mentioned 2 task.

1.Install java in test machine

2.install mysql in prod machine

```
---
- name: Installing Java
hosts: test
become: true

tasks:
- name: Install Java
apt:
name: openjdk-11-jdk
state: latest

- name: Installing MySQL
hosts: prod
become: true

tasks:
- name: Install MySQL
apt:
name: mysql-server
state: latest
```

Now Need To save code in play1.yaml

this file is used for installing Java in Salve 1 which is test as the group name and MySQL and Slave 2 which is prod as the group name.

```
ubuntu@ip-172-31-18-74:/etc/ansible$ ansible-playbook play1.yaml

PLAY [Installing Java] *********************************************************************************************************************************************************

TASK [Gathering Facts] *********************************************************************************************************************************************************
[WARNING]: Platform linux on host 172.31.25.172 is using the discovered Python interpreter at /usr/bin/python3.12, but future installation of another Python
interpreter could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.17/reference_appendices/interpreter_discovery.html for more information.
ok: [172.31.25.172]

TASK [Install Java] ************************************************************************************************************************************************************
changed: [172.31.25.172]

PLAY [Installing MySQL] ********************************************************************************************************************************************************

TASK [Gathering Facts] *********************************************************************************************************************************************************
[WARNING]: Platform linux on host 172.31.23.185 is using the discovered Python interpreter at /usr/bin/python3.12, but future installation of another Python
interpreter could change the meaning of that path. See https://docs.ansible.com/ansible-core/2.17/reference_appendices/interpreter_discovery.html for more information.
ok: [172.31.23.185]

TASK [Install MySQL] ***********************************************************************************************************************************************************
changed: [172.31.23.185]

PLAY RECAP *********************************************************************************************************************************************************************
172.31.23.185              : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
172.31.25.172              : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0

ubuntu@ip-172-31-18-74:/etc/ansible$
```

2. On slave 1 install Java

```
ubuntu@ip-172-31-25-172:~/.ssh$ java --version
openjdk 11.0.26 2025-01-21
OpenJDK Runtime Environment (build 11.0.26+4-post-Ubuntu-1ubuntu124.04)
OpenJDK 64-Bit Server VM (build 11.0.26+4-post-Ubuntu-1ubuntu124.04, mixed mode, sharing)
ubuntu@ip-172-31-25-172:~/.ssh$
```

3.On slave 2 install mysql

```
ubuntu@ip-172-31-23-185:~/.ssh$ mysql --version
mysql  Ver 8.0.41-0ubuntu0.24.04.1 for Linux on x86_64 ((Ubuntu))
ubuntu@ip-172-31-23-185:~/.ssh$
```