Ansible Hands-On Guide: Setting Up NGINX & Apache via Playbook

What is Ansible?

Ansible is an **open-source automation tool** used for:

- Configuration management
- Application deployment
- Task automation
- IT infrastructure provisioning

It helps system administrators automate repetitive tasks and manage multiple machines from a single server (called the **control node**).

Why Ansible?

- **Simple and powerful**: Uses easy-to-read YAML files
- **Agentless**: No software needed on target machines — just SSH
- **Idempotent**: Tasks run only if needed — safe to repeat
- **Fast and lightweight**: Doesn't use heavy resources
- **Open-source and widely supported**
- **Easy integration** with cloud, containers, DevOps pipelines

It reduces manual effort, increases reliability, and helps in managing many systems consistently.

How Ansible Works?

1. **Install Ansible** on one system (called the **control node**).
2. Prepare a list of remote machines (**managed nodes**) in an inventory file.
3. Use **SSH** to connect from the control node to the managed nodes.
4. Write **playbooks** in YAML to define what tasks should be done.
5. When a playbook is run, Ansible:
    - Connects to each managed node via SSH
    - Executes the defined tasks using **modules**
    - Ensures tasks are applied in the desired state (install packages, copy files, restart services, etc.)

Example:

- You want to install Apache on 10 servers → Write a playbook → Run it from the control node → Apache is installed on all 10 machines in one shot.

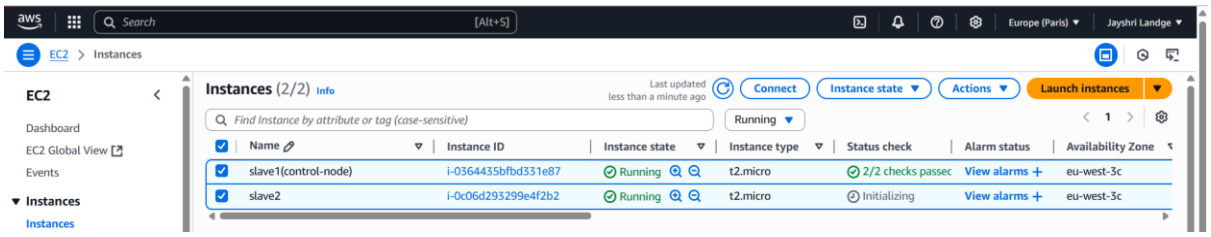
Prerequisites:

- 2 AWS EC2 Instances (Ubuntu-based)
    - Control Node (e.g., slave1)
    - Managed Node (e.g., slave2)
- SSH key pair access
- Ansible installed on control node only
- Python installed on managed node (slave2)

Step-by-Step Implementation

Step 1: Launch EC2 Instances

- Launch **two Ubuntu instances**:
    - slave1 → Control node
    - slave2 → Managed node
- Configure Security Group:
    - Open **Port 22 (SSH)**
    - Open **Port 80 (HTTP)**

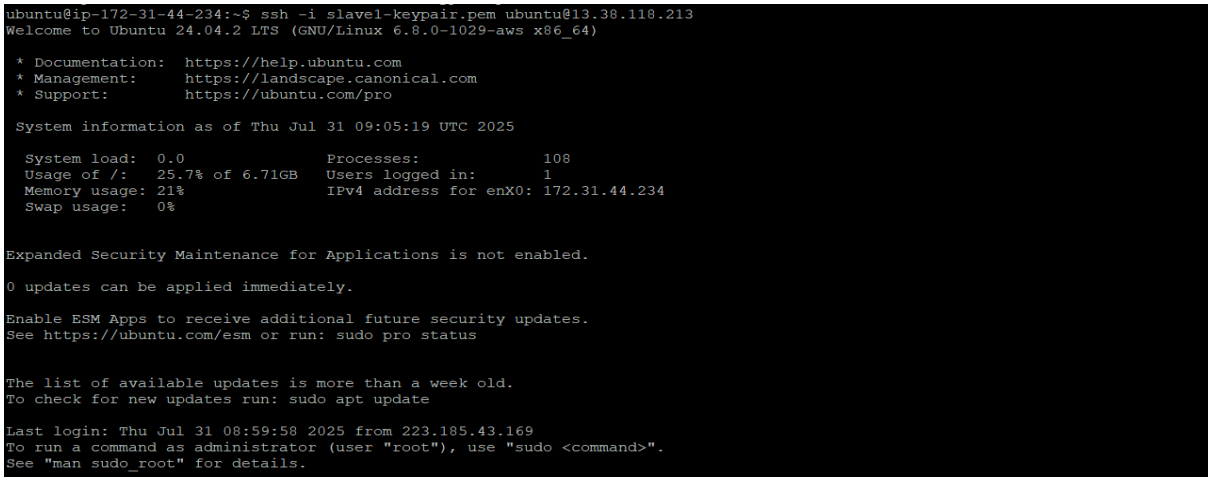


Screenshot 1: AWS EC2 dashboard showing running instances.

Step 2: Access Your EC2 Instances

SSH into **Control Node (slave1)**:

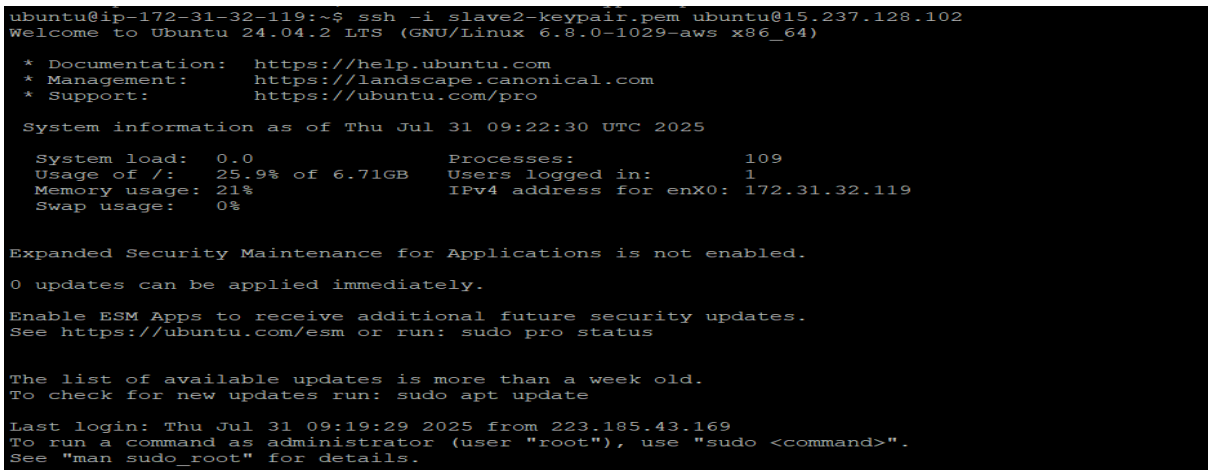
ssh -i "your-key.pem" ubuntu@<slave1-public-ip>



Screenshot 2: SSH-Connected-to-Slave1

Optional: SSH into **slave2** and install Python (required for Ansible):

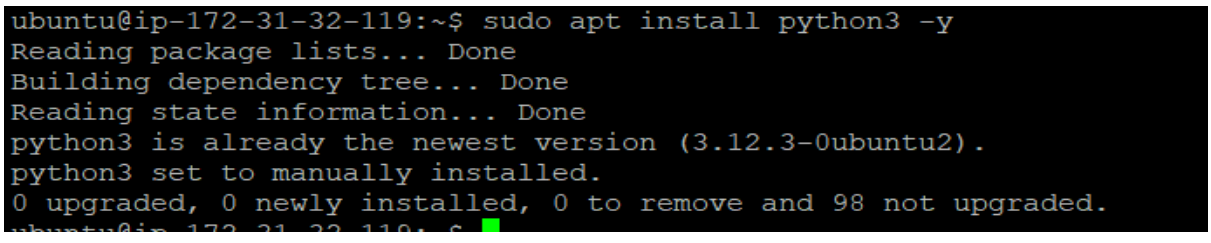
ssh -i "your-key.pem" ubuntu@<slave2-public-ip>



Screenshot 3: SSH-Connected-to-Slave2

sudo apt update

sudo apt install python3 -y



Screenshot 4: Python installation on slave2.

Step 3: Install Ansible on Control Node

sudo apt update

sudo apt install ansible -y

Check version:

ansible --version

```
ubuntu@ip-172-31-44-234:~$ ansible --version
ansible [core 2.16.3]
  config file = None
  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, Feb  4 2025, 14:48:35) [GCC 13.3.0] (/usr/bin/python3)
  jinja version = 3.1.2
  libyaml = True
```

Screenshot 5: Ansible version output.

Step 4: Enable Passwordless SSH Access

On **slave1**:

ssh-keygen -t rsa

```
ubuntu@ip-172-31-44-234:~$ 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:XVTjE7NkfanEeqzapl0AYUKyHmqnPVwn0qp6YwiDFzY ubuntu@ip-172-31-44-234
The key's randomart image is:
+---[RSA 3072]----+
|     ..o o  o.B..|
|      o o .. * *o|
|     o   .  = = .|
|  E o o  ..o + . |
|.. = + +S...o    |
|+ o = + o  ..    |
|.o.. =    o  .   |
| . +. .  ..o.    |
| .+..    .o.     |
+----[SHA256]-----+
```

Screenshot 6: Generate-SSH-RSA-Key

cat ~/.ssh/id_rsa.pub

On **slave2**:

mkdir -p ~/.ssh

vim ~/.ssh/authorized_keys

Paste the key here

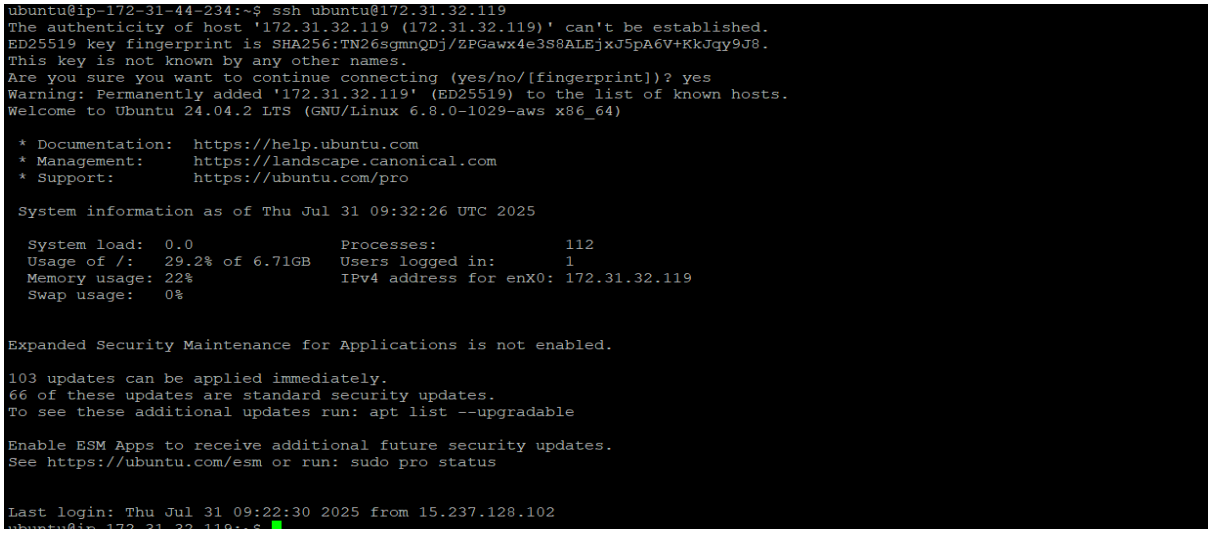
chmod 600 ~/.ssh/authorized_keys

On **slave1:**

Test login:

ssh ubuntu@<slave2-ip>

✅ Should log in **without a password**.



Screenshot 7: Successful SSH login

Step 5: Configure Ansible Inventory

Edit the inventory file:

sudo vim /etc/ansible/hosts

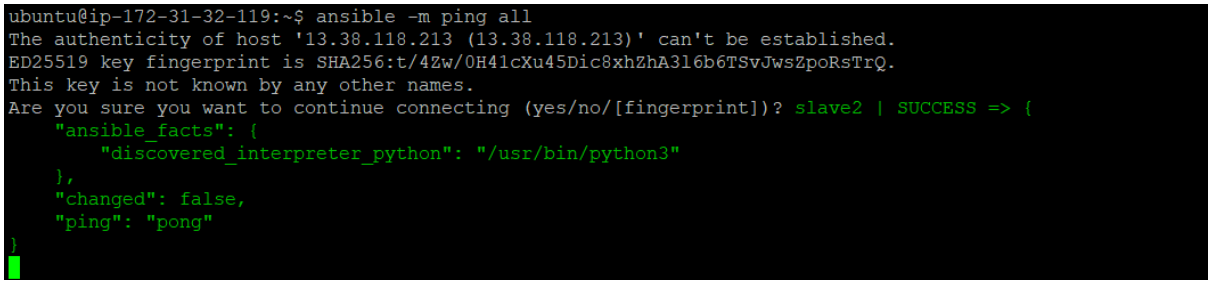
Add:

slave1 ansible_host=<IP-of-slave1> ansible_user=ubuntu

slave2 ansible_host=<IP-of-slave2> ansible_user=ubuntu

Test connectivity:

ansible -m ping all



Screenshot 8: “pong” response

Step 6: Create Ansible Project Directory & Script

mkdir ~/ansible

cd ~/ansible

Create the **hello.sh** script:

nano hello.sh

Paste:

#!/bin/bash

echo "Welcome" > /var/www/html/index.html

Make executable:

chmod +x hello.sh

```
ubuntu@ip-172-31-32-119:~/ansible$ nano hello.sh
ubuntu@ip-172-31-32-119:~/ansible$ chmod +x hello.sh
ubuntu@ip-172-31-32-119:~/ansible$ cat hello.sh
#!/bin/bash
echo "Welcome" > /var/www/html/index.html
ubuntu@ip-172-31-32-119:~/ansible$
```

Screenshot 9: Script file & permissions

Step 7: Write the Ansible Playbook

nano play.yml

```
---
- hosts: slave1
  become: yes
  name: Install Nginx on Slave1
  tasks:
    - name: Install NGINX
      apt:
        name: nginx
        state: latest
- hosts: slave2
  become: yes
  name: Install Apache & Deploy Script on Slave2
  tasks:
    - name: Install Apache Web Server
      apt:
        name: apache2
```

state: latest

- name: Add Hello World web page

script: hello.sh

```
ubuntu@ip-172-31-32-119:~/ansible$ nano play.yml
ubuntu@ip-172-31-32-119:~/ansible$ cat play.yml
---
- hosts: slave1
  become: yes
  name: Install Nginx on Slave1
  tasks:
    - name: Install NGINX
      apt:
        name: nginx
        state: latest

- hosts: slave2
  become: yes
  name: Install Apache & Deploy Script on Slave2
  tasks:
    - name: Install Apache Web Server
      apt:
        name: apache2
        state: latest

    - name: Add Hello World web page
      script: hello.sh
```

Screenshot 10: YAML playbook

Step 8: Run the Playbook

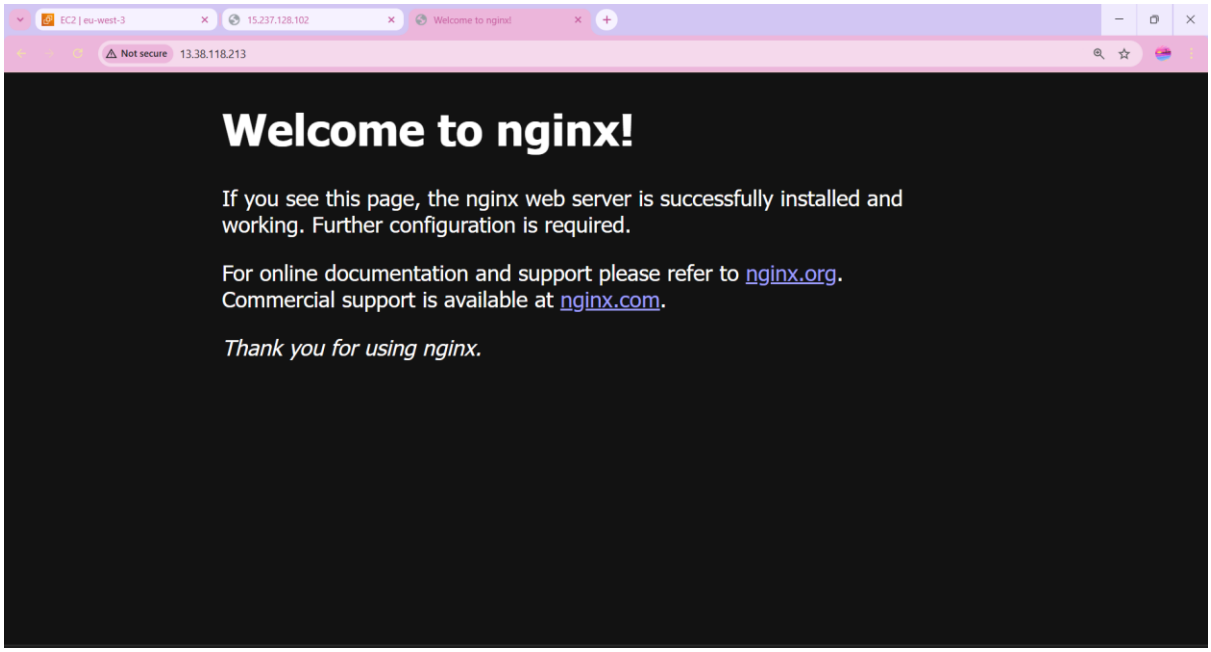
ansible-playbook play.yml

```
ubuntu@ip-172-31-44-234:~/ansible$ ansible-playbook play.yml

PLAY [Install Nginx on Slave1] ************************************************************************************************************************************************************************************

TASK [Gathering Facts] ********************************************************************************************************************************************************************************************
ok: [slave1]

TASK [Install NGINX] **********************************************************************************************************************************************************************************************
changed: [slave1]

PLAY [Install Apache & Deploy Script on Slave2] *******************************************************************************************************************************************************************

TASK [Gathering Facts] ********************************************************************************************************************************************************************************************
ok: [slave2]

TASK [Install Apache Web Server] **********************************************************************************************************************************************************************************
changed: [slave2]

TASK [Add Hello World web page] ***********************************************************************************************************************************************************************************
changed: [slave2]

PLAY RECAP ********************************************************************************************************************************************************************************************************
slave1                     : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
slave2                     : ok=3    changed=2    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

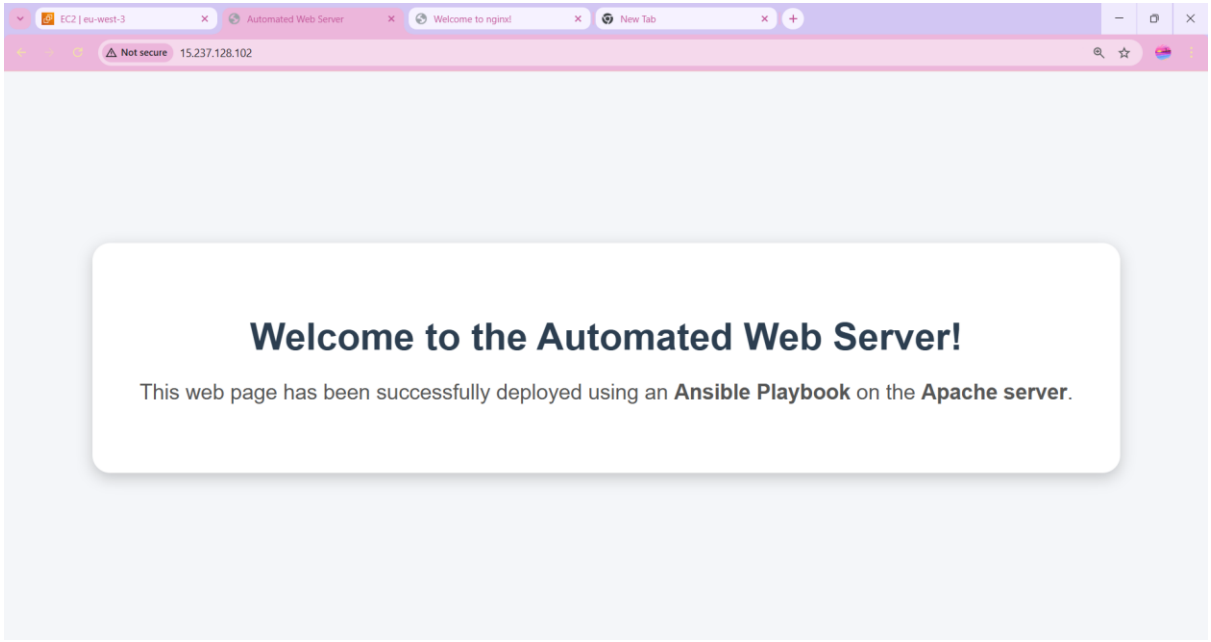
Screenshot 11: Playbook run showing NGINX & Apache installation.

Step 9: Validate in Browser

- Open http://<slave1-public-ip> → **Welcome to NGINX**
- Open http://<slave2-public-ip> → Welcome to the automated Web Server



Screenshot 12: Browser output of slave1



Screenshot 13: Browser output of slave2

Optional: Uninstall Apache

ssh ubuntu@<slave2-ip>

sudo apt-get purge apache2 -y

Conclusion

This hands-on lab showcased how **Ansible simplifies automation** by installing and configuring multiple web servers in a single step.

What I learned & achieved:

- Installed **NGINX on Slave1** and **Apache on Slave2** via playbook
- Used the **script module** to deploy a custom hello.sh page
- Set up **passwordless SSH** (agentless architecture in action)
- Strengthened my **Infrastructure as Code (IaC)** and **DevOps skills**

Ansible made it **fast, repeatable, and reliable** — a perfect real-world example of automation in action.