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Assignment No. 6

Aim:

Write an ansible-playbook to install nginx on target servers.

Theory:

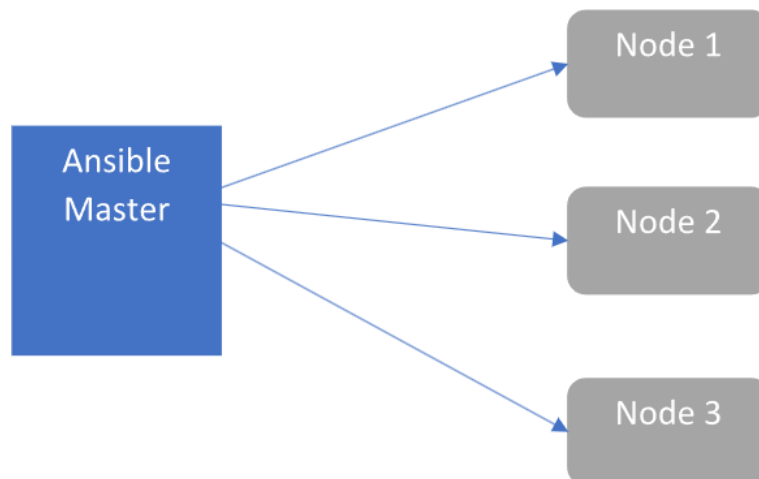
☐ **What is YAML :**

1. YAML Ain't Markup Language (YAML) is a data serialization language that is consistently listed as one of the most popular programming languages.
2. It's often used as a format for configuration files, but its object serialization abilities make it a viable replacement for languages like JSON.
3. YAML has broad language support and maps easily into native data structures.
4. It's also easy for humans to read, which is why it's a good choice for configuration.

□ **Introduction to ansible:**

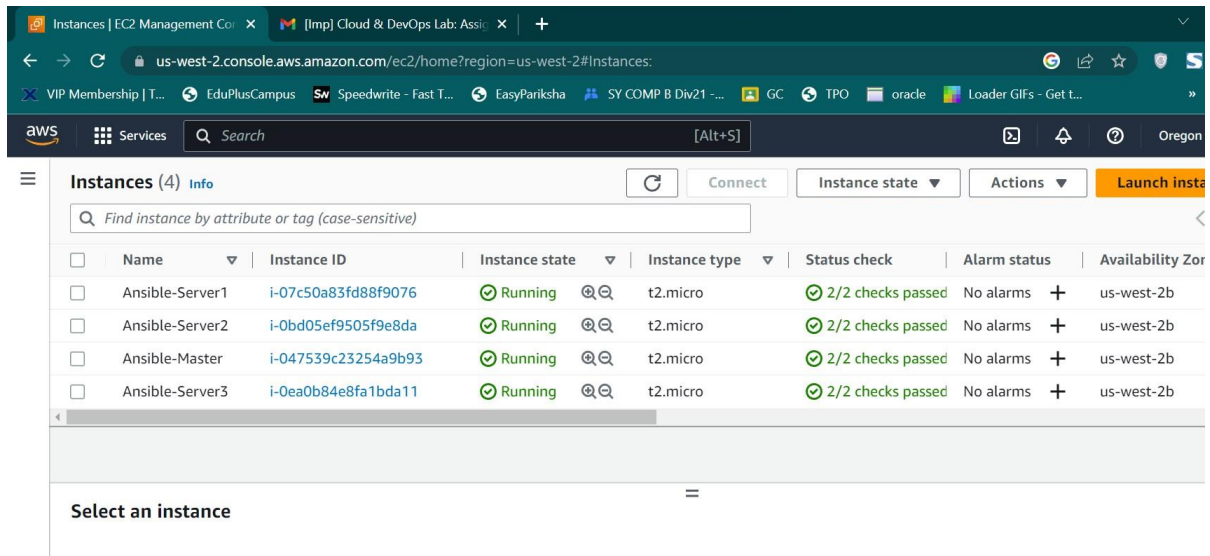
1. Ansible is an open source, command-line IT automation software application written in Python.
2. It can configure systems, deploy software, and orchestrate advanced workflows to support application deployment, system updates, and more.
3. Ansible's main strengths are simplicity and ease of use.
4. It also has a strong focus on security and reliability, featuring minimal moving parts.
5. It uses OpenSSH for transport (with other transports and pull modes as alternatives), and uses a human-readable language that is designed for getting started quickly without a lot of training.

□ **Architecture:**



Steps:

Step 1: Create 4 ec2 instances of Ubuntu machine.



Step 2: Connect to “Ansible-Master” server.

Step 3: Write following command: **sudo apt update**

```
aws Services Search [Alt+S]
ubuntu@ip-172-31-25-133:~$ sudo apt update
Hit:1 http://us-west-2.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://us-west-2.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Get:3 http://us-west-2.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [108 kB]
Hit:4 http://security.ubuntu.com/ubuntu jammy-security InRelease
Get:5 http://us-west-2.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [990 kB]
Get:6 http://us-west-2.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [744 kB]
Get:7 http://us-west-2.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [899 kB]
Get:8 http://us-west-2.ec2.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 Packages [24.1 kB]
Fetched 2883 kB in 1s (2656 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
4 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

Step 4: Install ansible using command: **sudo apt install ansible**

```
aws Services Search
ubuntu@ip-172-31-25-133:~$ sudo apt install ansible
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
ansible is already the newest version (2.10.7+merged+base+2.10.8+dfsg-1).
0 upgraded, 0 newly installed, 0 to remove and 4 not upgraded.
```

Step 5: Check the version of ansible using command: **ansible --version**

```
ubuntu@ip-172-31-30-33:~$ ansible --version
Command 'ansible' not found, but can be installed with:
sudo apt install ansible-core # version 2.12.0-1ubuntu0.1, or
sudo apt install ansible      # version 2.10.7+merged+base+2.10.8+dfsg-1
ubuntu@ip-172-31-30-33:~$
```

Step 6: update remaining all hosts i.e. Ansible-Server1, Ansible-Server2, Ansible-Server3 using command : **sudo apt-get update**

```
ubuntu@ip-172-31-22-184:~$ sudo apt-get update
Hit:1 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:2 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:3 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:4 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:5 http://security.ubuntu.com/ubuntu jammy-security
Get:6 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:7 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:8 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:9 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:10 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:11 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:12 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:13 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:14 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:15 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:16 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:17 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:18 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
```

i-0753b3fd7b1c7ee38 (Ansible-Server3)

PublicIPs: 34.216.21.131 PrivateIPs: 172.31.22.184

```
ubuntu@ip-172-31-20-121:~$ sudo apt-get update
Hit:1 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:2 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:3 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:4 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:5 http://security.ubuntu.com/ubuntu jammy-security
Get:6 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:7 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:8 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:9 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:10 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:11 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:12 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:13 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:14 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:15 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:16 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:17 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Get:18 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
```

i-05b8ed5a2fc706173 (Ansible-Server2)

PublicIPs: 54.218.74.2 PrivateIPs: 172.31.20.121

```
ubuntu@ip-172-31-30-33:~$ sudo apt-get update
Hit:1 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Hit:2 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Hit:3 http://us-west-2.ec2.archive.ubuntu.com/ubuntu
Hit:4 http://security.ubuntu.com/ubuntu jammy-security
Reading package lists... Done
ubuntu@ip-172-31-30-33:~$
```

i-082d597aaf504a3 (Ansible-Server1)

PublicIPs: 34.219.49.112 PrivateIPs: 172.31.30.33

Step 7: Generate a ssh key on **Ansible-master** using command :

ssh-keygen

```
aws Services Search
ubuntu@ip-172-31-25-133:~$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/ubuntu/.ssh/id_rsa):
/home/ubuntu/.ssh/id_rsa already exists.
Overwrite (y/n)? y
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:Qfibs5FlvMLogCvVZx8yXl3RARjd6qVQRliSBWMgOec ubuntu@ip-172-31-25-133
The key's randomart image is:
+---[RSA 3072]-----+
|      .oo.=B+.  .|
|      +o..+o. ...|
|      =.  = . .|
|      E.o * . .|
|      oS* + o ..|
|      o o o + o .|
```

i-0a8c661be5f150436 (Ansible-Master)

PublicIPs: 52.35.10.37 PrivateIPs: 172.31.25.133

Step 8: copy the public key which is in .ssh folder into “authorized keys” on **ansible-server1** using commands:

ls ~/.ssh

cat ~/.ssh/id_rsa.pub

```
ubuntu@ip-172-31-25-133:~$ ls ~/.ssh
authorized_keys  id_rsa  id_rsa.pub  known_hosts
ubuntu@ip-172-31-25-133:~$ cat ~/.ssh/id_rsa.pub
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQgQCco3uuIirLGFb80KmU8SaGa2SgW4QKkElwrGDb8GCy3rSdRSYHD/kiI7kcsvNAQ0meU0U3WRYtXhMWRBU6RZbCc9+pBYDGA522sI+vJGHKqJl
1WYPikWdliJkrJg3pooF2Ivnp3FFnPyQpX9q0FT1nNiB+S5pfu0yZmpi/e4ADjTyzhVcEzvn8dj/JtSx9A7B0QN2yHKGcNhG5nrI9ZNSJPq79X6Rds3O2uUH88hhRsiBM9ZM/GJ4biIeUF/QQ
KZ+O13YJfIqoh3sR3WhZlU7vzOWJpp2LeB016wIUM6lovCYEPGwOMuQLK9o+YiiUicnVZFbGK29SB9tCYQ3LXkQ48e5NzJl1j1QFTKZOWirZNL+gar2TnHW1CtKHxuQAAGA86xt34QrIPTx413
djla0AdsOzctQQRx6HUVX6ysAtPpIh1FBp/c9MBCRG/Wln92k/RmUPnIB9DIDqvsuglw9Jx+2xBloB08scxP9x+bUffK07K96vuOAoHqbrf7gac= ubuntu@ip-172-31-25-133
```



Step 9: Now login to **Ansible-master** and try to connect to ansible server1 using command: **ssh ubuntu@private-ip of ansible-server1**

```
aws Services Search [Alt+S]
ubuntu@ip-172-31-25-133:~$ ssh ubuntu@172.31.30.33
Welcome to Ubuntu 22.04.2 LTS (GNU/Linux 5.19.0-1022-aws x86_64)

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

System information as of Sun Apr  9 16:15:39 UTC 2023

System load:  0.0               Processes:            99
Usage of /:   29.0% of 7.57GB    Users logged in:     1
Memory usage: 26%              IPv4 address for eth0: 172.31.30.33
Swap usage:   0%

* Introducing Expanded Security Maintenance for Applications.
  Receive updates to over 25,000 software packages with your
  Ubuntu Pro subscription. Free for personal use.
```

i-0a8c661be5f150436 (Ansible-Master)

PublicIPs: 52.35.10.37 PrivateIPs: 172.31.25.133

```
* Introducing Expanded Security Maintenance for Applications.
  Receive updates to over 25,000 software packages with your
  Ubuntu Pro subscription. Free for personal use.

https://ubuntu.com/aws/pro

Expanded Security Maintenance for Applications is not enabled.

4 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

Last login: Sun Apr  9 16:08:36 2023 from 18.237.140.165
ubuntu@ip-172-31-30-33:~$
```

i-0a8c661be5f150436 (Ansible-Master)

PublicIPs: 52.35.10.37 PrivateIPs: 172.31.25.133

Create a playbook on Ansible-master:

Step 1: connect to “Ansible-Master”

Step 2: create a new folder “ansible-project” using command :

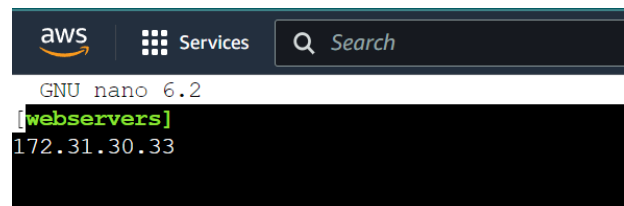
mkdir ansible-project

Step 3:

```
ubuntu@ip-172-31-25-133:~$ cd ansible-project
```

```
ubuntu@ip-172-31-25-133:~/ansible-project$ nano inventory
```

Step 4: write a private IP of “Ansible-server1” into inventory:

A screenshot of the nano text editor interface. At the top, there is a header bar with the AWS logo, a 'Services' button, and a search bar. Below the header, the text 'GNU nano 6.2' is visible. The main content area shows the word '[webservers]' in green, followed by the IP address '172.31.30.33' on the next line.

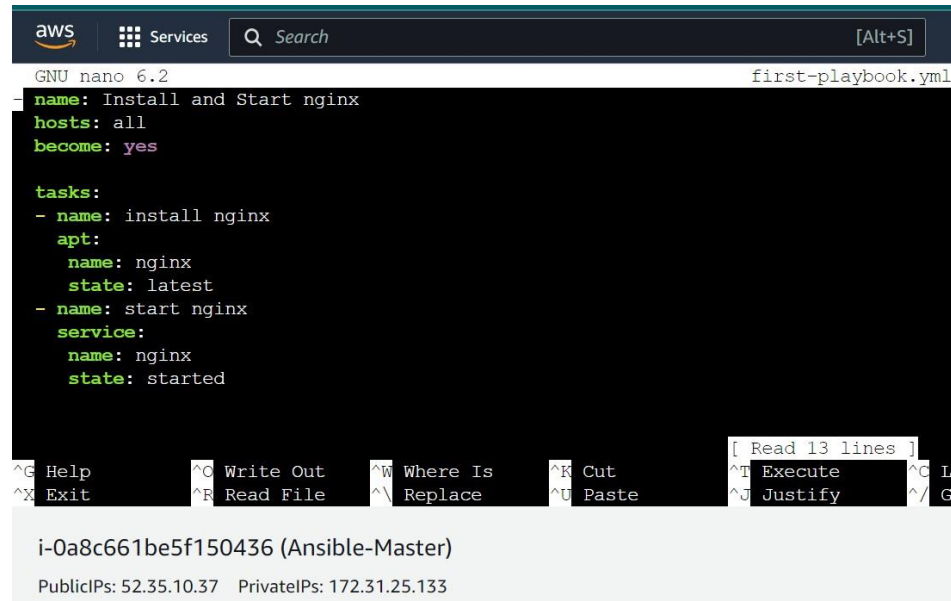
```
aws Services Search
GNU nano 6.2
[webservers]
172.31.30.33
```


Install Nginx and Start Nginx:

Step 1: Create a new file called “first-playbook.yml”

```
ubuntu@ip-172-31-25-133:~/ansible-project$ nano first-playbook.yml
```

Step 2: write foll code in “first-playbook.yml”:



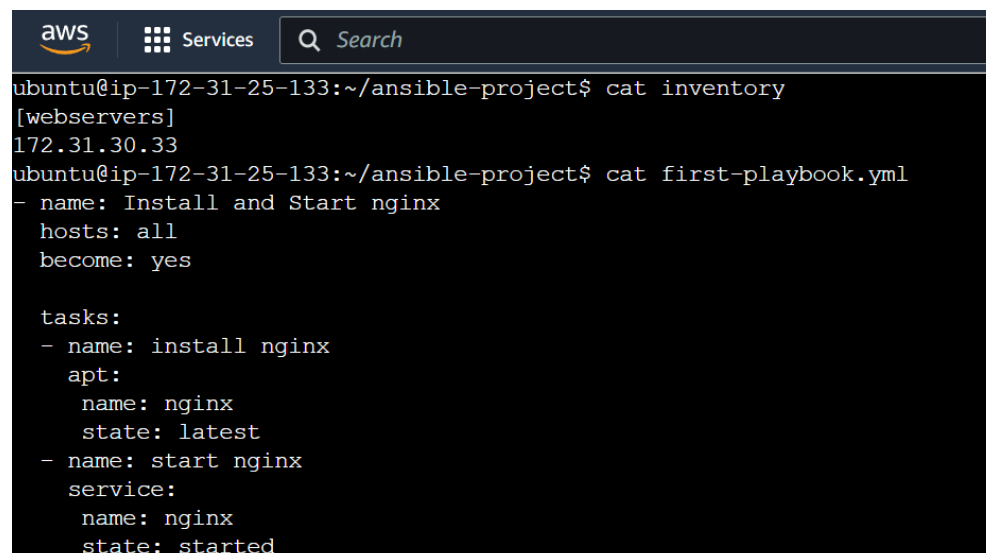
The screenshot shows a terminal window with the AWS logo and 'Services' menu at the top. The terminal title is 'first-playbook.yml'. The content of the file is as follows:

```
GNU nano 6.2 first-playbook.yml
name: Install and Start nginx
hosts: all
become: yes

tasks:
- name: install nginx
  apt:
    name: nginx
    state: latest
- name: start nginx
  service:
    name: nginx
    state: started
```

At the bottom, there is a status bar with the ID 'i-Oa8c661be5f150436 (Ansible-Master)' and IP addresses: 'PublicIPs: 52.35.10.37 PrivateIPs: 172.31.25.133'. A menu bar at the bottom of the editor shows various shortcuts like ^G Help, ^O Write Out, etc.

Contents in **inventory** and **first-playbook.yml** file:



The screenshot shows a terminal window with the AWS logo and 'Services' menu. The terminal title is 'first-playbook.yml'. The content of the file is as follows:

```
ubuntu@ip-172-31-25-133:~/ansible-project$ cat inventory
[webservers]
172.31.30.33
ubuntu@ip-172-31-25-133:~/ansible-project$ cat first-playbook.yml
- name: Install and Start nginx
  hosts: all
  become: yes

  tasks:
  - name: install nginx
    apt:
      name: nginx
      state: latest
  - name: start nginx
    service:
      name: nginx
      state: started
```

Ansible-playbook -i inventory first-playbook.yml

i-0a8c661be5f150436 (Ansible-Master)
PublicIPs: 52.35.10.37 PrivateIPs: 172.31.25.133

Step 4: connect to **ansible-server1**

i-082d597aafef504a3 (Ansible-Server1)
PublicIPs: 35.87.198.93 PrivateIPs: 172.31.30.33