System Provisioning and Configuration Management

Lab File (2022-2026)

6th Semester

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EXPERIMENT 1

Lab Exercise: Creating Static Host Inventory

Objective: To create a static host inventory for managing and automating infrastructure tasks efficiently across multiple servers using Ansible

Tools required: Ubuntu OS

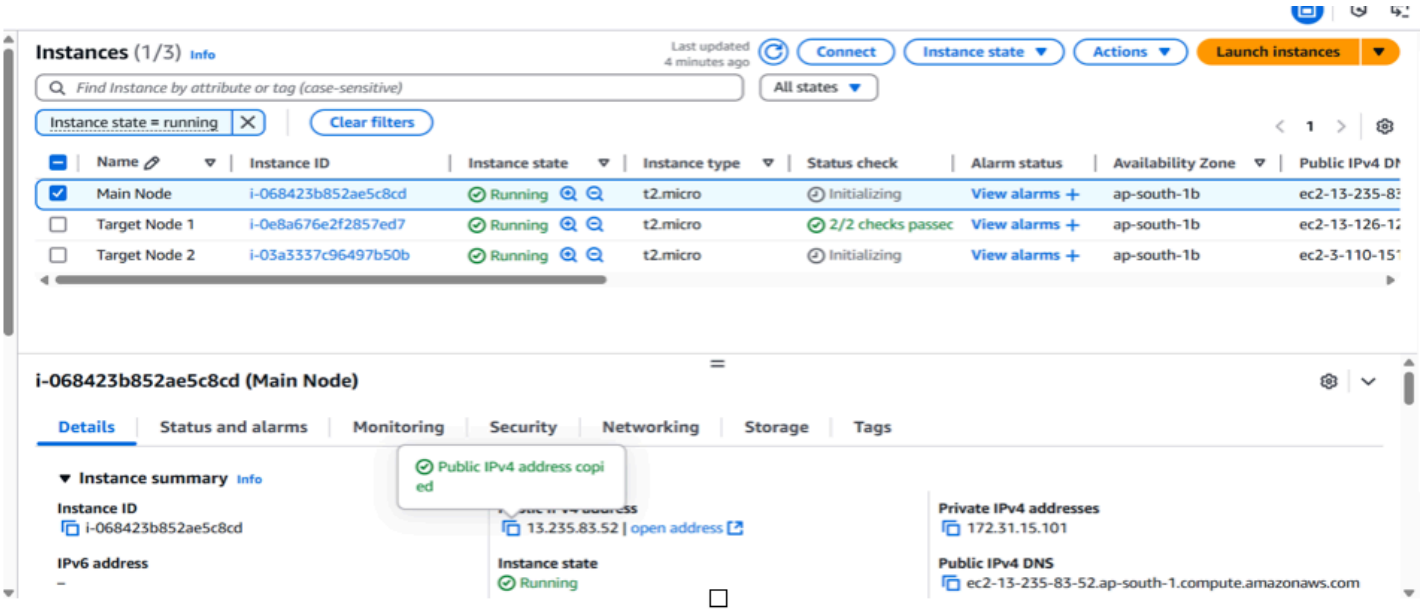
Prerequisites: You need to have Ansible installed to proceed with this demo

Steps to be followed:

1. Generate SSH key pair on the main node
2. Copy the SSH key to the two other nodes
3. Update the inventory or host file with the host IP address
4. Establish connectivity between the hosts specified in the host file and the Ansible server

Step 1: Launch EC2 Instance

1. Go to AWS Console → EC2 → Launch instance
2. OS: **Ubuntu 22.04** or similar
3. Enable port 22 (SSH) in Security Group



→SSH into Your Instance: From the terminal (on your laptop): **ssh -i master_key.pem**

```
:~/ansible$ ssh -i master_key.pem ubuntu@13.235.83.52
t '13.235.83.52 (13.235.83.52)' can't be established.
 is SHA256:+jzyARS+SqHVcC734U4+YwArkTh8xgxIozfuKZRnes0.
y any other names.
o continue connecting (yes/no/[fingerprint])? yes
ded '13.235.83.52' (ED25519) to the list of known hosts.
.2 LTS (GNU/Linux 6.8.0-1024-aws x86_64)

s://help.ubuntu.com
s://landscape.canonical.com
s://ubuntu.com/pro

of Fri Apr 11 10:59:01 UTC 2025

          Processes:             104
f 6.71GB  Users logged in:       0
          IPv4 address for enX0: 172.31.15.101


enance for Applications is not enabled.

d immediately.

ive additional future security updates.
esm or run: sudo pro status


pdates is more than a week old.
s run: sudo apt update
```

→Install Ansible on EC2: Once you're logged into the instance: **sudo apt update**

sudo apt install ansible -y

```
ubuntu@ip-172-31-15-101:~$ sudo apt update
sudo apt install ansible -y
Hit:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:3 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu noble-security InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
59 packages can be upgraded. Run 'apt list --upgradable' to see them.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
ansible is already the newest version (9.2.0+dfsg-0ubuntu5).
0 upgraded, 0 newly installed, 0 to remove and 59 not upgraded.
ubuntu@ip-172-31-15-101:~$ 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
ubuntu@ip-172-31-15-101:~$
```

Step 2: Generate SSH key pair on the main node

2.1 Use the following command to generate the SSH key on the Ansible server: **ssh-keygen**

```
ubuntu@ip-172-31-15-101:~$ ssh-keygen
Generating public/private ed25519 key pair.
Enter file in which to save the key (/home/ubuntu/.ssh/id_ed25519):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/ubuntu/.ssh/id_ed25519
Your public key has been saved in /home/ubuntu/.ssh/id_ed25519.pub
The key fingerprint is:
SHA256:O6sUwJE9gI6sQviDoenBJT/3zazobUgtmX1Qv4E+p/A ubuntu@ip-172-31-15-101
The key's randomart image is:
+--[ED25519 256]--+
|    .o+          |
|   ....o  .      |
|oo  o  .. o      |
|++.. . . . o     |
|==+   * S   o    |
|*ooo * = = o     |
|o ..+ = X +      |
| .   ooo E       |
|    .oo+o        |
+----[SHA256]-----+
ubuntu@ip-172-31-15-101:~$
```

Step 3: Copy the SSH key to the other two nodes

1. Use the following command to copy the public key to a file named **authorized_keys** in localhost: **cat .ssh/id_rsa.pub >> .ssh/authorized_keys**

```
cat: /home/ubuntu/.ssh/id_rsa.pub: No such file or directory
ubuntu@ip-172-31-15-101:~$ cat ~/.ssh/id_ed25519.pub >> ~/.ssh/authorized_keys
ubuntu@ip-172-31-15-101:~$ cd ~/.ssh
```

2. Run the following command to go to the **.ssh** directory of the Ansible server: **cd .ssh**

```
ubuntu@ip-172-31-15-101:~$ cd ~/.ssh
ubuntu@ip-172-31-15-101:~/.ssh$
```

3. Run the following command to copy the public key to another node that will connect to the Ansible server: **ssh-copy-id username@ip -p 22**

```
ubuntu@ip-172-31-15-101:~/.ssh$ ssh-copy-id ec2-user@13.126.129.191
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/ubuntu/.ssh/id_ed25519.pub"
The authenticity of host '13.126.129.191 (13.126.129.191)' can't be established.
ED25519 key fingerprint is SHA256:BrmKD58kUAA+piAxA22FJHoMfURXiadC9X7+vcK5fzI.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install the new keys
ec2-user@13.126.129.191: Permission denied (publickey).
ubuntu@ip-172-31-15-101:~/.ssh$ ssh-copy-id ec2-user@3.110.151.86
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/ubuntu/.ssh/id_ed25519.pub"
The authenticity of host '3.110.151.86 (3.110.151.86)' can't be established.
ED25519 key fingerprint is SHA256:Zxt9P3e11iJsw4T8O5MixhmW5QiwLNcq1J8JSM6TFow.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install the new keys
ec2-user@3.110.151.86: Permission denied (publickey).
ubuntu@ip-172-31-15-101:~/.ssh$
```

Note: You must use a **username@ip** with your node and IP username, which are provided in the lab credential.

4. Execute the following command to exit the **.ssh** directory of the Ansible server: **cd**

```
ubuntu@ip-172-31-15-101:~/.ssh$ cd
ubuntu@ip-172-31-15-101:~$
```

Step 4: Update the inventory or host file with the host IP address

1. Use the following command to open the Ansible inventory file and add the host localhost to it: **sudo vi /etc/ansible/hosts**

```
ubuntu@ip-172-31-15-101:~$ sudo mkdir -p /etc/ansible
ubuntu@ip-172-31-15-101:~$ sudo touch /etc/ansible/hosts
ubuntu@ip-172-31-15-101:~$ sudo vi /etc/ansible/hosts
```

2. When the file opens, add the three lines of code below to the end of the file:

   [dbbservers]

   localhost:22

   172.31.5.76:22

```
ubuntu@ip-172-31-15-101:
[dbbservers]
localhost
13.126.129.191
3.110.151.86
```

Step 5: Establish connectivity between the hosts specified in the host file and the Ansible server

Note: Press **esc**, then write **:wq** and press **enter** to save the file.

1. Run the following command to copy the public key to another node that will connect to the Ansible server: **ansible -m ping dbbservers**

```
ubuntu@ip-172-31-15-101:~$ ansible -m ping dbbservers
localhost | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3"
    },
    "changed": false,
    "ping": "pong"
}
3.110.151.86 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3"
    },
    "changed": false,
    "ping": "pong"
}
13.126.129.191 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3"
    },
    "changed": false,
    "ping": "pong"
}
ubuntu@ip-172-31-15-101:~$
```

5.2 Use the following command to check the number of hosts in the host file: **ansible all --list-hosts**

```
ubuntu@ip-172-31-15-101:~$ ansible all --list-hosts
  hosts (3):
    13.126.129.191
    3.110.151.86
    localhost
ubuntu@ip-172-31-15-101:~$
```

By following these steps, you have successfully created a static host inventory for managing and automating infrastructure tasks efficiently across multiple servers using Ansible.