Mini-Project: Simple Automation Using Ansible

In this Mini-Project, I implemented configuration management technology using an Ansible and running a simple service, Apache. And I'll install it on 2 slaves at once. So, what are they?

Configuration Management

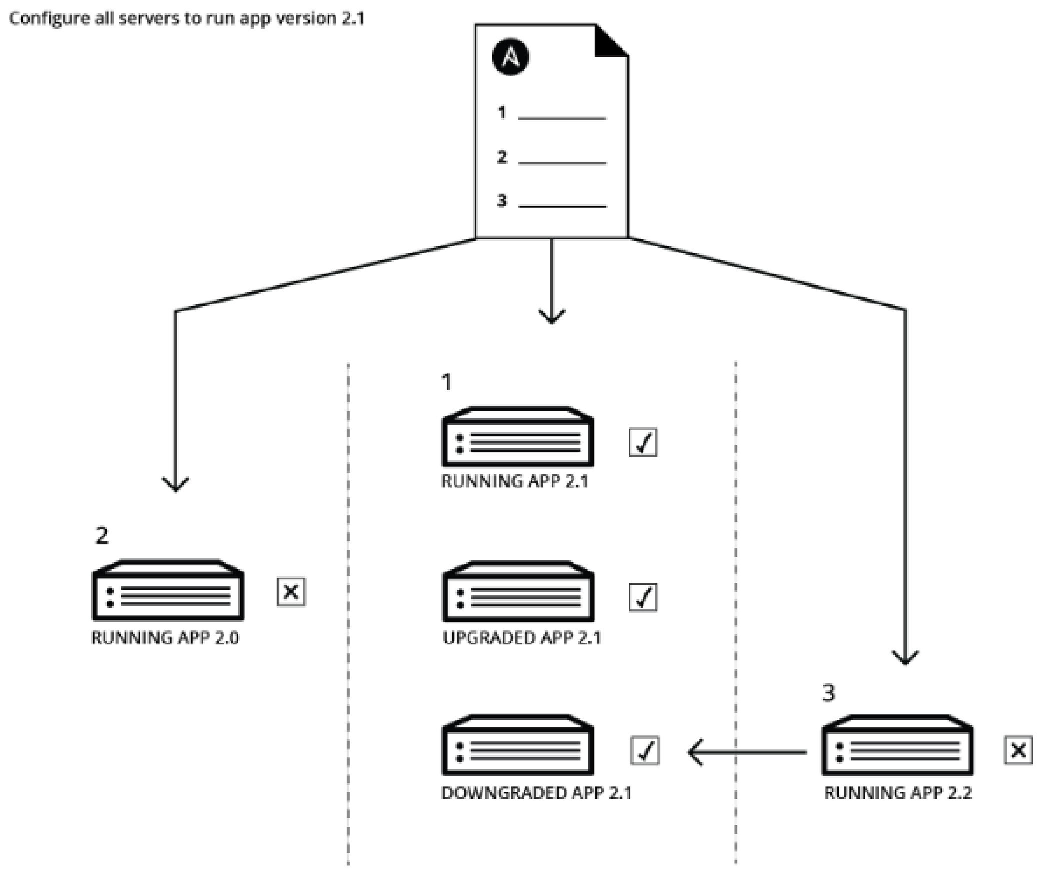
Configuration management systems are designed to make controlling large numbers of servers easy for administrators and operations teams. They allow controlling many different systems in an automated way from one central location.

Ansible

Ansible is an open-source software provisioning, configuration management, and application-deployment tool. It includes its own declarative language to describe system configuration.

Ansible is the simplest solution for configuration management available. It's designed to be minimal in nature, consistent, secure and highly reliable, with an extremely low learning curve for administrators, developers, and IT managers.

How Does Ansible Work?



Ansible works by configuring client machines from a computer that has the Ansible components installed and configured.

It communicates over normal SSH channels to retrieve information from remote machines, issue commands, and copy files. Because of this, an Ansible system does not require any additional software to be installed on the client computers.

This is one way that Ansible simplifies the administration of servers. Any server that has an SSH port exposed can be brought under

Ansible's configuration umbrella, regardless of what stage it is at in its life cycle. This means that any computer that you can administer through SSH, you can also administer through Ansible.

Configuration files are mainly written in the YAML data serialization format due to its expressive nature and its similarity to popular markup languages. Ansible can interact with hosts either through command-line tools or its configuration scripts, which are known as Playbooks.

Apache

Apache web server is a popular open-source HTTP web server tool that is widely used for the deployment of webpages. It can be installed in any operating system.

Step 1 — Installing Ansible

To begin using Ansible as a means of managing your various servers, you need to install the Ansible software on at least one machine as a master.

To get the latest version of Ansible for Ubuntu, you can add the project's PPA (personal package archive) to your system. Before doing this, you should first ensure that you have the package installed.

- Update package

```
# apt update
```

- Install a few prerequisite packages

```
# apt install software-properties-common
```

- Add the Ansible PPA (personal package archive)

```
# apt-add-repository ppa:ansible/ansible
```

- Update the package with the newly added repo

```
# apt update
```

- Install Ansible

```
# apt install ansible
```

Step 2 — Configuring Ansible Hosts

- Access key

As mentioned previously, Ansible primarily communicates with client computers through SSH. While it certainly has the ability to handle password-based SSH authentication, using SSH keys can help to keep things simple. But, the slaves here using EC2 Instances, so we use a keypair that has applied on to connect over SSH.

- Install a prerequisite packages

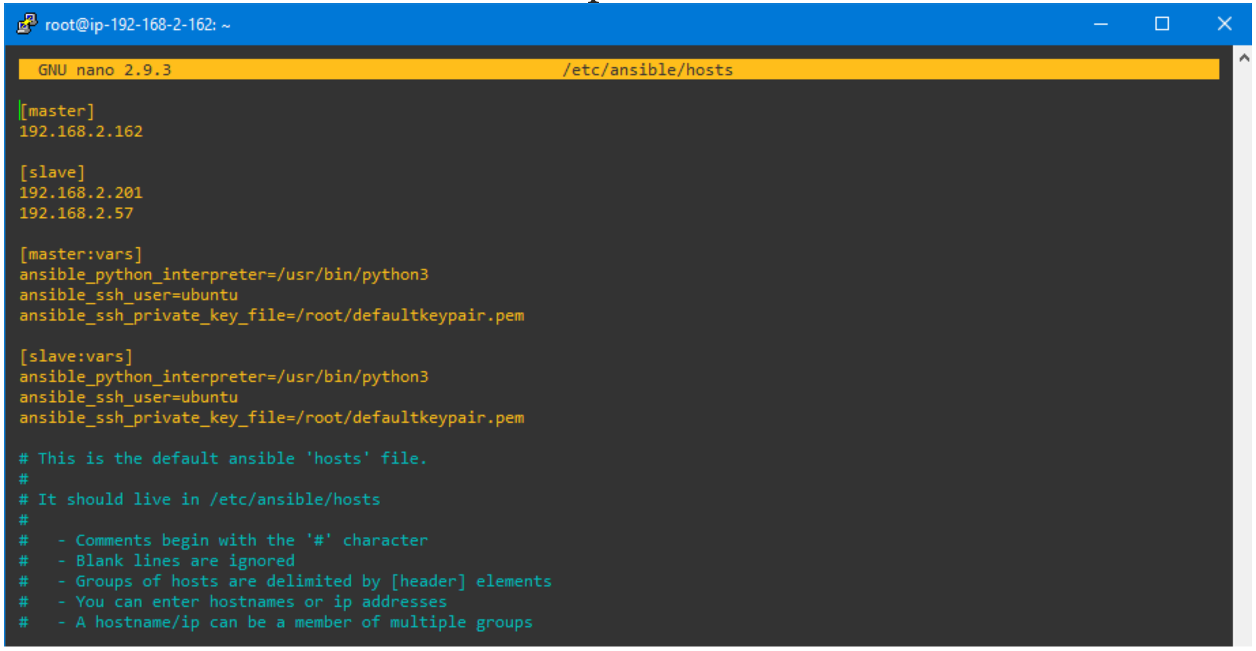
```
# apt update
# apt install python
```

Because Ansible uses a python interpreter to run its modules, we need to install Python 2 on the host in order for Ansible to communicate with it. Repeat this process for each server you intend to control with your Ansible server.

- Adding client

```
# nano /etc/ansible/hosts
```

Ansible keeps track of all of the servers that it knows about through a ***hosts*** file. We need to set up this file first before we can begin to communicate with our other computers.



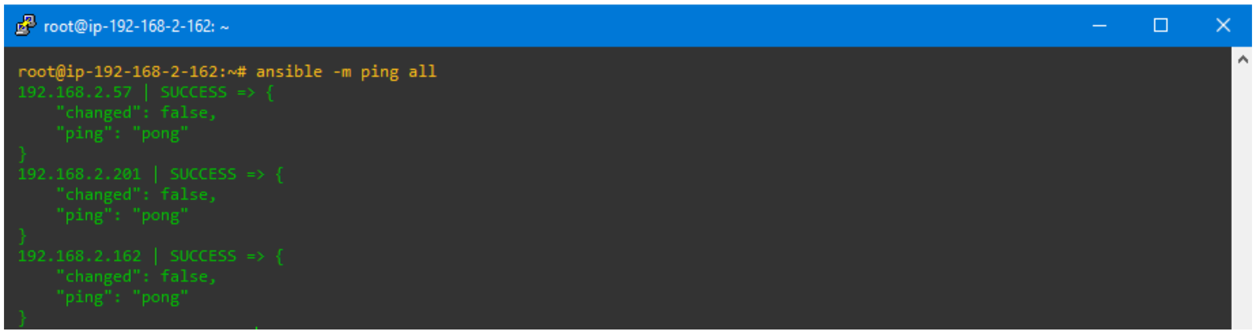
```
  GNU nano 2.9.3                                   /etc/ansible/hosts

[master]
192.168.2.162

[slave]
192.168.2.201
192.168.2.57

[master:vars]
ansible_python_interpreter=/usr/bin/python3
ansible_ssh_user=ubuntu
ansible_ssh_private_key_file=/root/defaultkeypair.pem

[slave:vars]
ansible_python_interpreter=/usr/bin/python3
ansible_ssh_user=ubuntu
ansible_ssh_private_key_file=/root/defaultkeypair.pem

# This is the default ansible 'hosts' file.
#
# It should live in /etc/ansible/hosts
#
#   - Comments begin with the '#' character
#   - Blank lines are ignored
#   - 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
```

And then add the following line above. It means that we have 2 groups named ***master*** that is installed Ansible and ***slave*** that have no services. There are vars that mean ubuntu as a user which will be connected by the master because the direct connection as a root user is not allowed. And don't forget the access key, I used the same key on all machine to make it easier.

- Check connection

```
# ansible -m ping all
```

Now that we have our hosts set up and enough configuration details to allow us to successfully connect to our hosts, we can try out our very first command.



```
root@ip-192-168-2-162:~# ansible -m ping all
192.168.2.57 | SUCCESS => {
    "changed": false,
    "ping": "pong"
}
192.168.2.201 | SUCCESS => {
    "changed": false,
    "ping": "pong"
}
192.168.2.162 | SUCCESS => {
    "changed": false,
    "ping": "pong"
}
```

And done! the slaves have been connected with the master now.

Step 3 — Make an Automation

- Make a directory

```
# mkdir /ansible
# cd /ansible
```

This directory is used to store some files for starting new automation. And make sure we already on that directory after it.

- Create a sample web page

```
# nano index.html
```

Fill in web content as needed and then name the file with index.html. But I'll fill it with:

```
<!DOCTYPE html>
<html>
<body>  <h1>IT WORKS!</h1>
  <h2>Now you’re running webserver from simple
automation</h2></body>
</html>
```

- Create a Playbooks

Playbooks are YAML files containing a series of directives to automate the provisioning of a server.

YAML relies on indentation to serialize data structures. For that reason, when writing playbooks and especially when copying examples, you need to be extra careful to maintain the correct indentation.

```
# nano playbook.yml
```

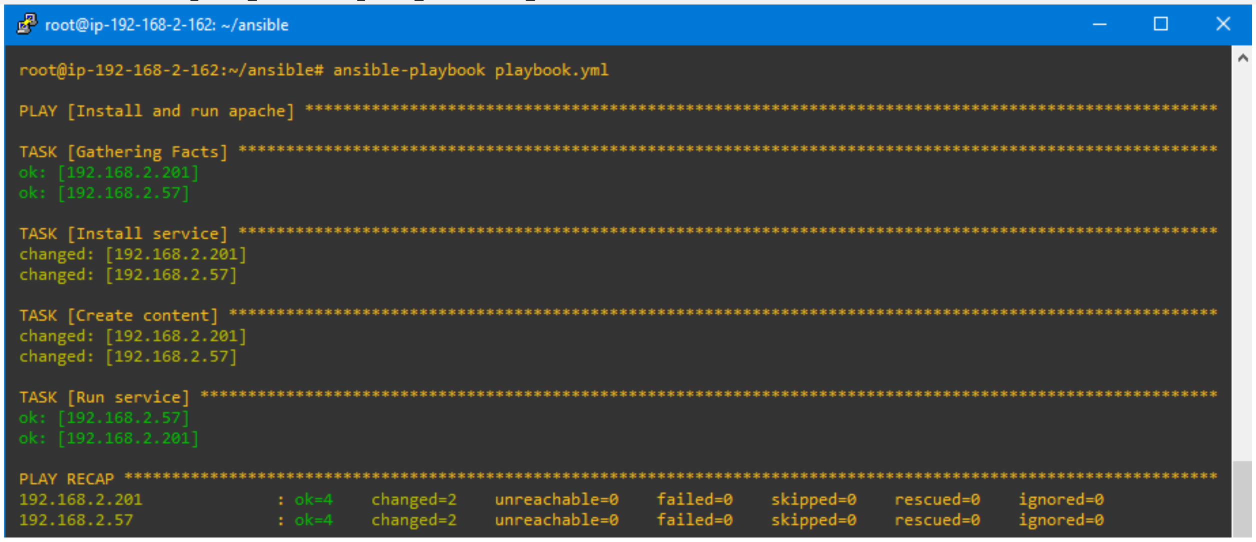
The name for the playbooks file does not need to be considered, the most important is the format of the playbooks file, which is .yaml or .yml.

```
---
- name: Install and run apache
  hosts: slave
  become: true
  become_user: root
  gather_facts: true
  tasks:

    - name: Install service
      yum:
        name: apache2
        state: latest    - name: Create content
      template:
        src: index.html
        dest: /var/www/html/index.html    - name: Run service
      service:
        name: apache2
        state: started
```

And here I'll create simple playbooks for our 2 slaves that containing the command for changing user to root because we gonna install a package which is Apache2, copying the web page that we have been made to the directory of web server, and then restarting the Apache2.

- Let's automate!

```
# ansible-playbook playbook.yml
```



root@ip-192-168-2-162: ~/ansible

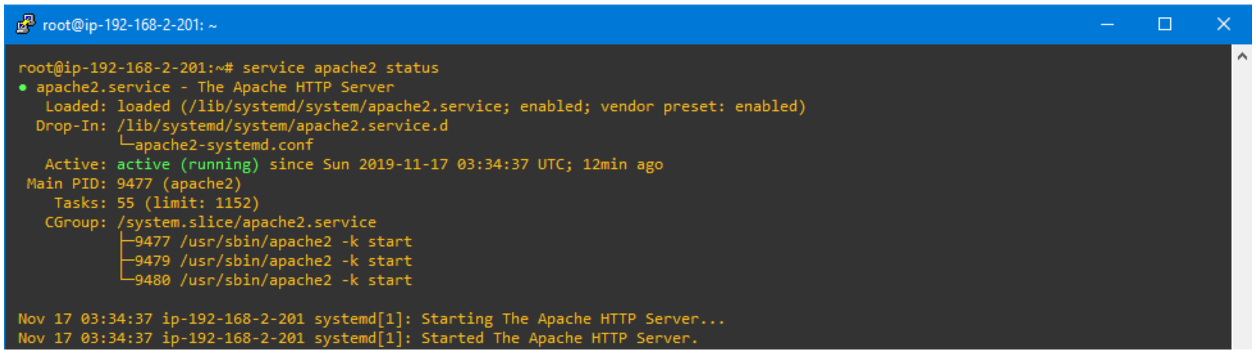
```
root@ip-192-168-2-162:~/ansible# ansible-playbook playbook.yml

PLAY [Install and run apache] ***************************************************************************************

TASK [Gathering Facts] **********************************************************************************************
ok: [192.168.2.201]
ok: [192.168.2.57]

TASK [Install service] **********************************************************************************************
changed: [192.168.2.201]
changed: [192.168.2.57]

TASK [Create content] ***********************************************************************************************
changed: [192.168.2.201]
changed: [192.168.2.57]

TASK [Run service] **************************************************************************************************
ok: [192.168.2.57]
ok: [192.168.2.201]

PLAY RECAP **********************************************************************************************************
192.168.2.201              : ok=4    changed=2    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
192.168.2.57               : ok=4    changed=2    unreachable=0    failed=0    skipped=0    rescued=0    ignored=0
```

It took a few minutes to run those tasks on the slaves.

Step 3 — See the Result

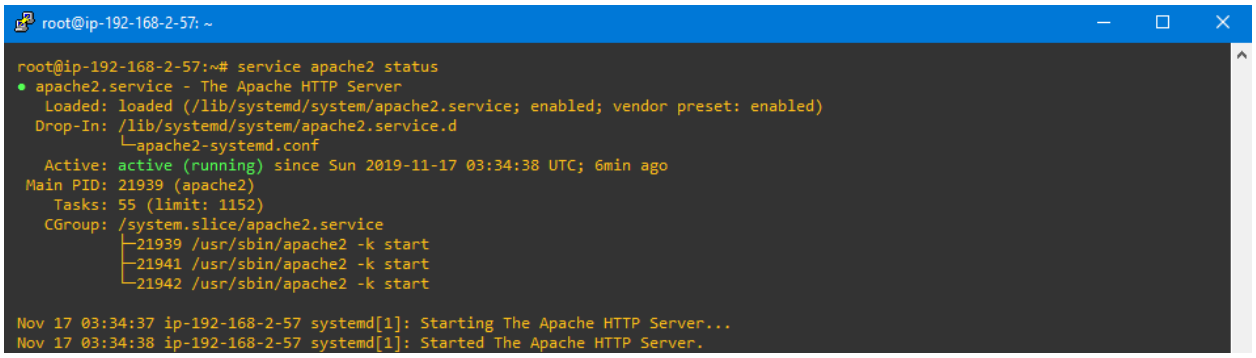
- Check the installations

```
# service apache2 status
```



root@ip-192-168-2-201: ~

```
root@ip-192-168-2-201:~# service apache2 status
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: enabled)
  Drop-In: /lib/systemd/system/apache2.service.d
           └─apache2-systemd.conf
   Active: active (running) since Sun 2019-11-17 03:34:37 UTC; 12min ago
 Main PID: 9477 (apache2)
    Tasks: 55 (limit: 1152)
   CGroup: /system.slice/apache2.service
           ├─9477 /usr/sbin/apache2 -k start
           ├─9479 /usr/sbin/apache2 -k start
           └─9480 /usr/sbin/apache2 -k start

Nov 17 03:34:37 ip-192-168-2-201 systemd[1]: Starting The Apache HTTP Server...
Nov 17 03:34:37 ip-192-168-2-201 systemd[1]: Started The Apache HTTP Server.
```



root@ip-192-168-2-57: ~

```
root@ip-192-168-2-57:~# service apache2 status
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: enabled)
  Drop-In: /lib/systemd/system/apache2.service.d
           └─apache2-systemd.conf
   Active: active (running) since Sun 2019-11-17 03:34:38 UTC; 6min ago
 Main PID: 21939 (apache2)
    Tasks: 55 (limit: 1152)
   CGroup: /system.slice/apache2.service
           ├─21939 /usr/sbin/apache2 -k start
           ├─21941 /usr/sbin/apache2 -k start
           └─21942 /usr/sbin/apache2 -k start

Nov 17 03:34:37 ip-192-168-2-57 systemd[1]: Starting The Apache HTTP Server...
Nov 17 03:34:38 ip-192-168-2-57 systemd[1]: Started The Apache HTTP Server.
```

- Check the Apache2 service