

ANSIBLE HANDS-ON

anilsharma6991@gmail.com

Ansible hands-on documentation has been divided into 3 segments

A. Creating Ansible Playbook

B. Creating Ansible Roles

C. Using Ansible Roles in Playbook

◊ Prerequisites:

1. Ansible needs to be installed in master.

2. Connection between Master and Host needs to be set through ssh. For more information refer to the Ansible Installation Documentation

A- Creating Ansible Playbook

This playbook consists of two plays with following tasks:

- ◇ Play 1: Execute a command in host1, Execute a script in host1
- ◇ Play 2: Execute a script in host2, Install nginx in host2
- ◇ Step 1: Create the .yaml file.

```
sudo nano <playbookname>
```

```
ubuntu@ip-172-31-40-83: ~
```

```
ubuntu@ip-172-31-40-83:~$ sudo nano first_playbook.yml
```

Step 2: Add the following content in the .yaml file.

```
---  
-hosts: host1 sudo: yes name: Play 1 tasks:  
-name: Execute command 'Date'  
-command: date  
-name: Execute script on server script: test_script.sh  
-hosts: host2 name: Play 2 sudo: yes tasks:  
-name: Execute script on server script: test_script.sh  
-name: Install nginx  
-apt: name=nginx state=latest
```

- hosts: host1
become: true
name: play1
tasks:
 - name: Execute command 'Date'
command: date
 - name: execute script on server
script: test_script.sh

- hosts: host2
become: true
name: play2
tasks:
 - name: execute script on server
script: test_script.sh
 - name: ensure nginx is at the latest version
apt: name=nginx update_cache=yes state=latest

Step 3: Now to be able to perform “Execute script on server” task we need to have the .sh file (unix/linux shell executables files) in master machine. Create test.sh file as shown.

```
sudo nano <file_name>
```

```
ubuntu@ip-172-31-40-83: ~
```

```
ubuntu@ip-172-31-40-83:~$ sudo nano test_script.sh
```

```
ubuntu@ip-172-31-40-83: ~
```

```
GNU nano 2.9.3
```

```
test_script.sh
```

```
#!/bin/sh
```

```
# This is a comment!
```

```
echo Hello World
```

```
# This is a comment, too!
```

Step 4: Before executing the playbook that we just created we need to have to check for syntax errors.

```
ansible-playbook <playbook> --syntax-check
```

```
ubuntu@ip-172-31-30-9:~$ ansible-playbook first_playbook.yml --syntax-check
playbook: first_playbook.yml
ubuntu@ip-172-31-30-9:~$
```

This means our playbook is syntax error free. Let us move ahead and execute the playbook.

Step 5: To execute the playbook use the following command.

```
sudo ansible-playbook <playbook>
```

```
ubuntu@ip-172-31-40-83: ~  
ubuntu@ip-172-31-40-83:~$ sudo ansible-playbook first_playbook.yml  
  
PLAY [Play 1] *****  
  
TASK [Gathering Facts] *****  
ok: [host1]  
  
TASK [Execute command 'Date'] *****  
changed: [host1]  
  
TASK [Execute script on server] *****  
changed: [host1]  
  
PLAY [Play 2] *****  
  
TASK [Gathering Facts] *****  
ok: [host1]
```

Great! We have successfully created our very first Ansible playbook.

Remember that using playbook we can run the same command repeatedly, but if everything was configured on the first run, then all subsequent runs make no changes

B- Creating Ansible Roles

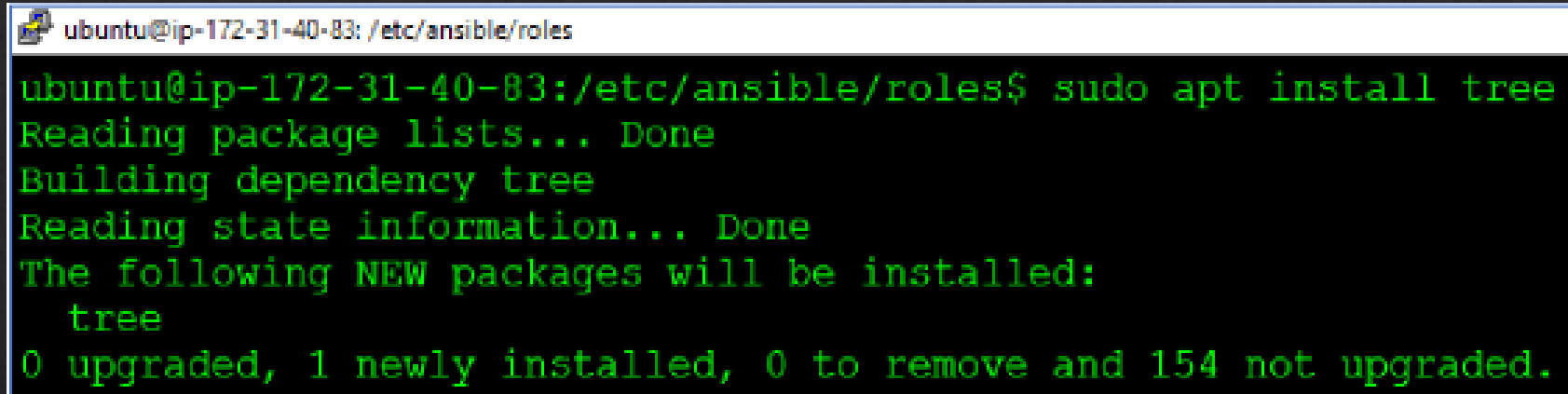
Step 1: Ansible roles should be written inside “/etc/ansible/roles/”. Use the following command to create one Ansible role.

```
sudo ansible-galaxy init <role name>
```

```
ubuntu@ip-172-31-30-9:/etc/ansible/roles$ sudo ansible-galaxy init apache
- Role apache was created successfully
ubuntu@ip-172-31-30-9:/etc/ansible/roles$
```

Step 2: Install tree package using `sudo apt install tree`. Use `tree` command to view structure of the role.

```
sudo apt install tree
```

A terminal window screenshot showing the installation of the 'tree' package. The prompt is 'ubuntu@ip-172-31-40-83: /etc/ansible/roles'. The command 'sudo apt install tree' is entered. The output shows 'Reading package lists... Done', 'Building dependency tree', 'Reading state information... Done', and 'The following NEW packages will be installed: tree'. At the bottom, it says '0 upgraded, 1 newly installed, 0 to remove and 154 not upgraded.'

```
ubuntu@ip-172-31-40-83: /etc/ansible/roles$ sudo apt install tree
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  tree
0 upgraded, 1 newly installed, 0 to remove and 154 not upgraded.
```

Now let us see the structure of the role that we just created using the following command.

```
tree <role name>
```

```
ubuntu@ip-172-31-40-83: /etc/ansible/roles
ubuntu@ip-172-31-40-83:/etc/ansible/roles$ tree apache
apache
├── README.md
├── defaults
│   └── main.yml
├── files
├── handlers
│   └── main.yml
├── meta
│   └── main.yml
├── tasks
│   └── main.yml
├── templates
├── tests
│   ├── inventory
│   └── test.yml
└── vars
    └── main.yml
```

Now we are ready to create the tasks that our roles are supposed to perform.

Step3:Goinsidetaskfolderinsideapachedirectory.Editmain.ymlusingthefollowing command. Make changes as shown. Save and then exit.

```
sudo nano main.yml
```

```
ubuntu@ip-172-31-40-83: /etc/ansible/roles/apache/tasks
```

```
ubuntu@ip-172-31-40-83:/etc/ansible/roles/apache/tasks$ sudo nano main.yml
```

Now we will divide the tasks to be performed into three categories. Install, configure and services. We will create three different .yaml files to reduce the complexity. Include those separate task files in the main.yaml file as shown.

```
---  
# tasks file for apache  
-include: install.yaml  
-include: configure.yaml  
-include: service.yaml
```

```
GNU nano 4.8                                     main.yml
---
# tasks file for apache
- include: install.yml
- include: configure.yml
- include: service.yml
```

Remember that order of the list in yml file matters. So here `install.yml` gets executed first, then `configure.yml` and then `service.yml`.

Step 4: Now inside task folder, create `install.yml` and add the installation tasks to be performed as shown below.

We will install the latest version of `apache2` in the remote machine with the help of `apt` module as shown below.

```
sudo nano install.yml
```

```
- name: install apache2
  apt: name=apache2 update_cache=yes state=latest
  become: true
```

GNU nano 4.8

install.yml

```
- name: install apache2
  apt: name=apache2 update_cache=yes state=latest
  become: true
```


Step 5: Then create configure.yml and add the required configurations that need to be performed on remote machine as shown below.

```
sudo nano configure.yml
```

```
ubuntu@ip-172-31-40-83: /etc/ansible/roles/apache/tasks
```

```
ubuntu@ip-172-31-40-83:/etc/ansible/roles/apache/tasks$ sudo nano configure.yml
```

```
---
#configure apache2.conf and send copy.html file
- name: apache2.conf file
  copy: src=apache2.conf dest=/etc/apache2/
  become: true
  notify:
    - restart apache2 service

- name: send copy.html file
  copy: src=copy.html dest=/home/ubuntu/
  become: true
```

We will configure apache2.conf file in the remote machine and also, we will restart the apache2 service. Then we will send one file from /etc/ansible/roles/apache/files folder to the remote machine. The destination path has been set to /home/ubuntu/ as shown.

```
GNU nano 4.8                                configure.yml
---
#configure apache2.conf and send copy.html file
- name: apache2.conf file
  copy: src=apache2.conf dest=/etc/apache2/
  become: true
  notify:
    - restart apache2 service

- name: send copy.html file
  copy: src=copy.html dest=/home/ubuntu/
  become: true
```

Step 6: Again, inside task folder, create service.yml and add the required configurations that need to be performed on remote machine as shown below.

```
sudo nano service.yml
```

```
ubuntu@ip-172-31-40-83: /etc/ansible/roles/apache/tasks
ubuntu@ip-172-31-40-83:/etc/ansible/roles/apache/tasks$ sudo nano service.yml
```

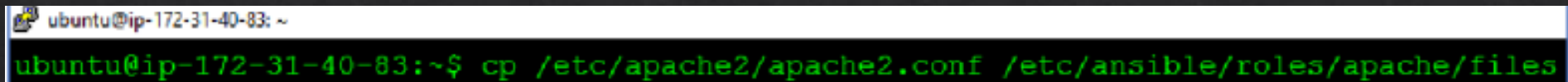
We will configure apache2.conf file in the remote machine

```
---
- name: starting apache2 service
  service: name=apache2 state=started
  become: true
```

```
GNU nano 4.8 service.yml
---
- name: starting apache2 service
  service: name=apache2 state=started
  become: true
```

Step 7: Now go inside files. Store the files that needs to be pushed to the remote machine. Copy the apache2.conf file from /etc/apache2 directory to /etc/ansible/roles/apache/files and create the htmlfile

```
cp /etc/apache2/apache2.conf /etc/ansible/roles/apache/files
```

A terminal window with a black background and green text. The prompt is 'ubuntu@ip-172-31-40-83: ~'. The command 'cp /etc/apache2/apache2.conf /etc/ansible/roles/apache/files' has been entered and executed.

```
ubuntu@ip-172-31-40-83: ~  
ubuntu@ip-172-31-40-83:~$ cp /etc/apache2/apache2.conf /etc/ansible/roles/apache/files
```

Create one html file as well. My dummy html file looks like this.

```
<html>  
  <title> Some File </title>  
  <body> <h1> Copy This File> </h1>  
</body>  
</html>
```

```
ubuntu@ip-172-31-40-83: /etc/ansible/roles/apache/files
GNU nano 2.9.3 copy.html

<html>
  <title> Some File </title>
  <body> <h1> Copy This File> </h1> </body>
</html>
```

Check whether our files are ready or not by using the following command.

```
ls
```

```
ubuntu@ip-172-31-40-83: /etc/ansible/roles/apache/files
ubuntu@ip-172-31-40-83:/etc/ansible/roles/apache/files$ ls
apache2.conf  copy.html
```


Step 8: Go inside handlers and add the action that needs to be performed after notify from configure.yml is executed. Use the following two commands.

```
cd /etc/ansible/roles/apache/handlers/  
sudo nano main.yml
```

```
ubuntu@ip-172-31-40-83: /etc/ansible/roles/apache/handlers  
ubuntu@ip-172-31-40-83:/etc/ansible/roles/apache/handlers$ sudo nano main.yml
```

Add the following content inside handlers file.

```
---  
#handlers file for apache  
- name: restart apache2 service  
  service: name=apache2 state=restarted
```

```
ubuntu@ip-172-31-40-83: /etc/ansible/roles/apache/handlers  
GNU nano 2.9.3 main.yml  
---  
# handlers file for apache  
- name: restart apache2 service  
  service: name=apache2 state=restarted
```


Remember that notify name and handler name should match.

```
GNU nano 4.8                                     configure.yml
---
#configure apache2.conf and send copy.html file
- name: apache2.conf file
  copy: src=apache2.conf dest=/etc/apache2/
  become: true
  notify:
    - restart apache2 service

- name: send copy.html file
  copy: src=copy.html dest=/home/ubuntu/
  become: true
```

```
ubuntu@ip-172-31-40-83: /etc/ansible/roles/apache/handlers
GNU nano 2.9.3                                     main.yml
---
# handlers file for apache
- name: restart apache2 service
  service: name=apache2 state=restarted
```

Step 9: Go inside meta and add information related to the role.

```
cd /etc/ansible/roles/apache/handlers/  
sudo nano main.yml
```

```
ubuntu@ip-172-31-40-83: /etc/ansible/roles/apache/meta  
ubuntu@ip-172-31-40-83:/etc/ansible/roles/apache/meta$ sudo nano main.yml
```

Add author information, role descriptions, company information etc. as shown below.

```
ubuntu@ip-172-31-40-83: /etc/ansible/roles/apache/meta  
GNU nano 2.9.3 main.yml  
  
galaxy_info:  
  author: Intellipaat  
  description: Simple apache role  
  company: Intellipaat  
  
# If the issue tracker for your role is not on github, uncomment the  
# next line and provide a value  
# issue tracker url: http://example.com/issue/tracker
```

Step 10: Go to the `/etc/ansible/` and create one top level `.yaml` file where we can add hosts and roles to be executed. Execute `apache` role on the hosts that is under the group name `servers`, added in the inventory file `/etc/ansible/hosts`.

```
cd /etc/ansible/  
sudo nano site.yaml
```

For more than one hosts following commands can be used.

```
---  
- hosts: host1  
  roles:  
    - apache
```

```
GNU nano 4.8 site.yaml  
---  
- hosts: host1  
  roles:  
    - apache
```

Step 11: Before we execute our top level yml file we will check for syntax errors put our configuration in there as shown below.

```
ansible-playbook <filename.yml> --syntax-check
```

Step 12: Execute the top level .yml file

```
ansible-playbook <filename.yml>
```

```
ubuntu@ip-172-31-40-83: /etc/ansible
```

```
ubuntu@ip-172-31-40-83:/etc/ansible$ ansible-playbook site.yml
```

The output looks like this.

```
PLAY [servers] *****

TASK [Gathering Facts] *****
ok: [host1]
ok: [host2]

TASK [apache : install apache2] *****
ok: [host1]
ok: [host2]

TASK [apache : apache2.conf file] *****
ok: [host1]
ok: [host2]

TASK [apache : send copy.html file] *****
ok: [host1]
ok: [host2]

TASK [apache : starting apache2 service] *****
ok: [host1]
ok: [host2]

PLAY RECAP *****
host1                : ok=5    changed=0    unreachable=0    failed=0
host2                : ok=5    changed=0    unreachable=0    failed=0
```

Congratulations!

You have successfully created Ansible Role.

Now let us see how to use this Ansible role that we've just created along with other tasks in a Ansible Playbook.

C- Using Ansible Roles in Playbook

Step 1: To use ansible roles along with other tasks in playbook use `import_role` and `include_role`. Create one playbook called to execute on the remote machines along with two debug tasks before and after apache role.

```
sudo nano <playbook name>
```

```
ubuntu@ip-172-31-40-83: /etc/ansible
```

```
ubuntu@ip-172-31-40-83:/etc/ansible$ sudo nano playbookrole.yml
```


Add the following .yml file as shown.

```
GNU nano 4.8                                playbookrole.yml
---
- hosts: host1
  become: true
  tasks:
    - debug:
        msg: "before we run our role"
    - import_role:
        name: apache
    - include_role:
        name: apache
    - debug:
        msg: "after we ran our role"
```

```
---
- hosts: host1
  become: true
  tasks:
    - debug:
        msg: "before we run our role"
    - import_role:
        name: apache
    - include_role:
        name: apache
    - debug:
        msg: "after we ran our role"
```

Step 2: Check for syntax error and execute the playbook with roles.

```
ansible-playbook <playbookname> --syntax-check
```

Step 3: Check for syntax error and execute the playbook with roles.

```
ansible-playbook <playbookname>
```

```
ubuntu@ip-172-31-40-83: /etc/ansible
ubuntu@ip-172-31-40-83:/etc/ansible$ ansible-playbook playbookrole.yml
PLAY [servers] *****

TASK [Gathering Facts] *****
ok: [host1]
ok: [host2]

TASK [debug] *****
ok: [host1] => {
  "msg": "before we run our role"
}
ok: [host2] => {
  "msg": "before we run our role"
}

TASK [apache : install apache2] *****
ok: [host1]
ok: [host2]

TASK [apache : apache2.conf file] *****
ok: [host1]
ok: [host2]

TASK [apache : send copy.html file] *****
ok: [host1]
ok: [host2]

TASK [apache : starting apache2 service] *****
ok: [host1]
ok: [host2]
```

Congratulations!

You have successfully integrated Ansible roles with Ansible playbook

Keep learning and Keep Spreading!

anilsharma6991@gmail.com