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Activity 7: Managing Files and Creating Roles in Ansible

1. **Objectives:**

1.1 Manage files in remote servers

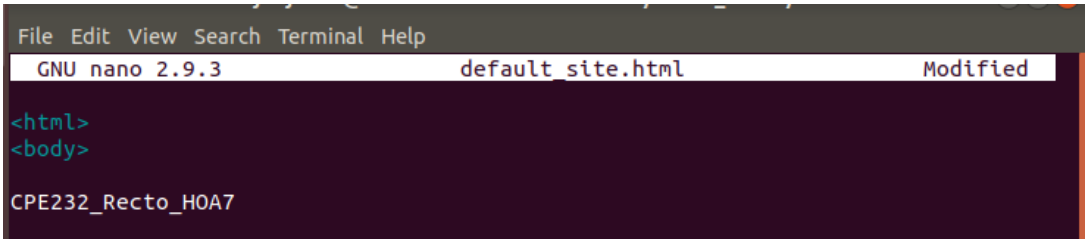
1.2 Implement roles in ansible

2. **Discussion**:

In this activity, we look at the concept of copying a file to a server. We are going to create a file into our git repository and use Ansible to grab that file and put it into a particular place so that we could do things like customize a default website, or maybe install a default configuration file. We will also implement roles to consolidate plays.

Task 1: Create a file and copy it to remote servers

1. Using the previous directory we created, create a directory, and named it "*files*." Create a file inside that directory and name it "*default_site.html*." Edit the file and put basic HTML syntax. Any content will do, as long as it will display text later. Save the file and exit.



2. Edit the *site.yml* file and just below the *web_servers* play, create a new file to copy the default html file for site:

```
- name: copy default html file for site

  tags: apache, apache2, httpd
  copy:
    src: default_site.html
    dest: /var/www/html/index.html
    owner: root
    group: root
    mode: 0644
```

```
 GNU nano 2.9.3                        site.yml                              Modified

    when: ansible_distribution == "CentOS"

  - name: copy default html file for site

    tags: apache, apache2, httpd
    copy:
      src: default_site.html
      dest: /var/www/html/index.html
      owner: root
      group: root
      mode: 0644
```

3. Run the playbook *site.yml*. Describe the changes.

```
TASK [copy default html file for site] ************************************
*
changed: [192.168.56.115]
changed: [192.168.56.113]
changed: [192.168.56.116]
```

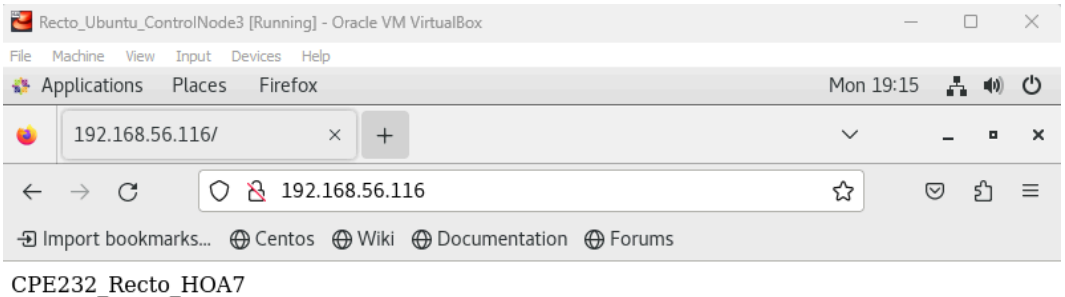
```
PLAY RECAP ********************************************************************
*
192.168.56.113             : ok=5    changed=1    unreachable=0    failed=0
192.168.56.114             : ok=5    changed=1    unreachable=0    failed=0
192.168.56.115             : ok=5    changed=1    unreachable=0    failed=0
192.168.56.116             : ok=8    changed=1    unreachable=0    failed=0

jonjeous@localmachine-VirtualBox:~/Recto_HOA7$
```

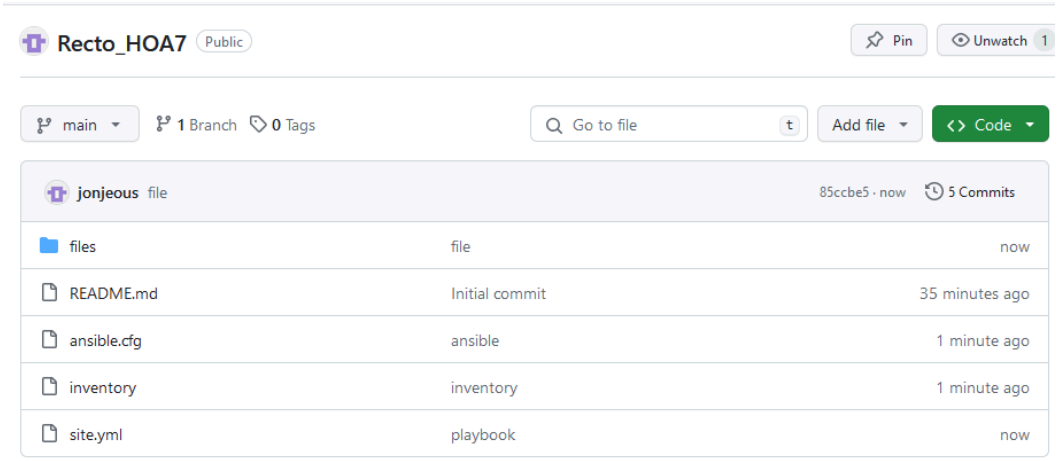
4. Go to the remote servers (*web_servers*) listed in your inventory. Use cat command to check if the index.html is the same as the local repository file (*default_site.html*). Do both for Ubuntu and CentOS servers. On the CentOS server, go to the browser and type its IP address. Describe the output.

```
jonjeous@server1-VirtualBox:~$ cat /var/www/html/index.html
<html>
<body>

CPE232_Recto_HOA7
jonjeous@server1-VirtualBox:~$
```



5. Sync your local repository with GitHub and describe the changes.



Task 2: Download a file and extract it to a remote server

1. Edit the site.yml. Just before the web_servers play, create a new play:

```
- hosts: workstations
  become: true
  tasks:

  - name: install unzip
    package:
    name: unzip

  - name: install terraform
    unarchive:
    src: https://releases.hashicorp.com/terraform/0.12.28/terraform_0.12.2$
    dest: /usr/local/bin
    remote_src: yes
    mode: 0755
    owner: root
    group: root
```

```
- hosts: workstations
  become: true
  tasks:

  - name: install unzip
    package:
      name: unzip

  - name: install terraform
    unarchive:
        src: https://releases.hashicorp.com/terraform/0.12.28/terraform_0.12.2$
        dest: /usr/local/bin
        remote_src: yes
        mode: 0755
        owner: root
        group: root
```

2. Edit the inventory file and add workstations group. Add any Ubuntu remote server. Make sure to remember the IP address.

```
  GNU nano 2.9.3                    inventory                         Modified

[web_servers]
192.168.56.113 #Server1
192.168.56.115 #Server2
192.168.56.116 #CentOS

[db_servers]
192.168.56.114 #ManagedNode


[file_servers]
192.168.56.116 #centOS



[workstations]
192.168.56.114 #ManagedNode
192.168.56.113 #Server1
```

3. Run the playbook. Describe the output.

```
PLAY [workstations] ************************************************************
*

TASK [Gathering Facts] *********************************************************
*
ok: [192.168.56.114]
ok: [192.168.56.113]

TASK [install unzip] ***********************************************************
*
ok: [192.168.56.114]
ok: [192.168.56.113]

TASK [install terraform] *******************************************************
*
changed: [192.168.56.113]
changed: [192.168.56.114]
```

```
PLAY RECAP *********************************************************************
*
192.168.56.113             : ok=8    changed=1    unreachable=0    failed=0
192.168.56.114             : ok=8    changed=2    unreachable=0    failed=0
192.168.56.115             : ok=5    changed=0    unreachable=0    failed=0
192.168.56.116             : ok=8    changed=0    unreachable=0    failed=0

jonjeous@localmachine-VirtualBox:~/Recto_HOA7$
```

4. On the Ubuntu remote workstation, type terraform to verify installation of terraform. Describe the output.

```
jonjeous@localmachine-VirtualBox:~/Recto_HOA7$ terraform --version
Terraform v0.12.28

Your version of Terraform is out of date! The latest version
is 1.7.4. You can update by downloading from https://www.terraform.io/downloads
.html
jonjeous@localmachine-VirtualBox:~/Recto_HOA7$
```

Task 3: Create roles

1. Edit the site.yml. Configure roles as follows: (make sure to create a copy of the old site.yml file because you will be copying the specific plays for all groups)

```
---
- hosts: all
  become: true
  pre_tasks:

  - name: update repository index (CentOS)
    tags: always
    dnf:
      update_cache: yes
    changed_when: false
    when: ansible_distribution == "CentOS"
  - name: install updates (Ubuntu)
    tags: always
    apt:
      update_cache: yes
    changed_when: false
    when: ansible_distribution == "Ubuntu"

- hosts: all
  become: true
  roles:
    -  base

- hosts: workstations
  become: true
  roles:
    - workstations

- hosts: web_servers
  become: true
  roles:
    - web_servers

- hosts: db_servers
  become: true
  roles:
    - db_servers

- hosts: file_servers
  become: true
  roles:
    - file_servers
```

Save the file and exit.

2. Under the same directory, create a new directory and name it roles. Enter the roles directory and create new directories: base, web_servers, file_servers,

db_servers and workstations. For each directory, create a directory and name it tasks.

```
jonjeous@localmachine-VirtualBox:~/Recto_HOA7/roles$ mkdir base web_servers fil
e_servers db_servers workstations
jonjeous@localmachine-VirtualBox:~/Recto_HOA7/roles$ ls
base  db_servers  file_servers  web_servers  workstations
jonjeous@localmachine-VirtualBox:~/Recto_HOA7/roles$ cd base
jonjeous@localmachine-VirtualBox:~/Recto_HOA7/roles/base$ mkdir tasks
jonjeous@localmachine-VirtualBox:~/Recto_HOA7/roles/base$ cd ..
jonjeous@localmachine-VirtualBox:~/Recto_HOA7/roles$ cd db_servers
jonjeous@localmachine-VirtualBox:~/Recto_HOA7/roles/db_servers$ mkdir tasks
jonjeous@localmachine-VirtualBox:~/Recto_HOA7/roles/db_servers$ cd ..
jonjeous@localmachine-VirtualBox:~/Recto_HOA7/roles$ cd file_servers
jonjeous@localmachine-VirtualBox:~/Recto_HOA7/roles/file_servers$ mkdir tasks
jonjeous@localmachine-VirtualBox:~/Recto_HOA7/roles/file_servers$ cd ..
jonjeous@localmachine-VirtualBox:~/Recto_HOA7/roles$ cd web_server
bash: cd: web_server: No such file or directory
jonjeous@localmachine-VirtualBox:~/Recto_HOA7/roles$ cd web_servers
jonjeous@localmachine-VirtualBox:~/Recto_HOA7/roles/web_servers$ mkdir tasks
jonjeous@localmachine-VirtualBox:~/Recto_HOA7/roles/web_servers$ cd ..
jonjeous@localmachine-VirtualBox:~/Recto_HOA7/roles$ cd workstations
jonjeous@localmachine-VirtualBox:~/Recto_HOA7/roles/workstations$ mkdir tasks
jonjeous@localmachine-VirtualBox:~/Recto_HOA7/roles/workstations$
```

3. Go to tasks for all directory and create a file. Name it main.yml. In each of the tasks for all directories, copy and paste the code from the old site.yml file. Show all contents of main.yml files for all tasks.

```
  GNU nano 6.2                          main.yml *
# base
---
- name: install updates (CentOS)
  tags: always
  yum:
    name: '*'
  when: ansible_distribution == "CentOS"

- name: install updates (Ubuntu)
  tags: always
  apt:
    upgrade: dist
    update_cache: yes
  when: ansible_distribution == "Ubuntu"
```

```
 GNU nano 6.2                          main.yml *
#db_servers
---
- name: install mariadb package (CentOS)
  tags: centos, db, mariadb
  yum:
    name: mariadb-server
    state: latest
  when: ansible_distribution == "CentOS"

- name: install mariadb package (Ubuntu)
  tags: db, mariadb, ubuntu
  apt:
    name: mariadb-server
    state: latest
  when: ansible_distribution == "Ubuntu"

- name: "Mariadb- Restarting/Enabling"
  service:
    name: mariadb
    state: restarted
```

```
 GNU nano 6.2                          main.yml *
#file_servers
---
- name: install samba package
  tags: samba
  package:
    name: samba
    state: latest
```

```
 GNU nano 6.2                          main.yml *
#web_servers
---
- name: install apache and php for Ubuntu
  tags: apache, apache2, ubuntu
  apt:
    name:
      - apache2
      - libapache2-mod-php
    state: latest
    update_cache: yes
  when: ansible_distribution == "Ubuntu"

- name: install apache and php for CentOS
  tags: apache, centos, httpd
  yum:
    name:
      - httpd
      - php
    state: latest
    update_cache: yes
```

```
  GNU nano 6.2                          main.yml *
#workstations
---
- name: install unzip
  package:
    name: unzip

- name: install terraform
  unarchive:
    src: https://releases.hashicorp.com/terraform/0.12.28/terraform_0.12.28_lin>
    dest: /usr/local/bin
    remote_src: yes
    mode: 0755
    owner: root
    group: root
```

```
jonjeous@localmachine-VirtualBox:~/Recto_HOA7$ tree roles
roles
├── base
│   └── tasks
│       └── main.yml
├── db_servers
│   └── tasks
│       └── main.yml
├── file_servers
│   └── tasks
│       └── main.yml
├── web_servers
│   └── tasks
│       └── main.yml
└── workstations
    └── tasks
        └── main.yml

10 directories, 5 files
jonjeous@localmachine-VirtualBox:~/Recto_HOA7$
```

4. Run the site.yml playbook and describe the output.

```
jonjeous@localmachine-VirtualBox:~/Recto_HOA7$ ansible-playbook --ask-become-pas
s site1.yml
BECOME password:

PLAY [all] *********************************************************************

TASK [Gathering Facts] *********************************************************
ok: [192.168.56.119]
ok: [192.168.56.118]
ok: [192.168.56.116]
ok: [192.168.56.117]

TASK [update repository index (CentOS)] ****************************************
skipping: [192.168.56.118]
skipping: [192.168.56.119]
skipping: [192.168.56.116]
ok: [192.168.56.117]

TASK [install updates (Ubuntu)] ************************************************
skipping: [192.168.56.117]
ok: [192.168.56.118]
ok: [192.168.56.119]
ok: [192.168.56.116]
```

```
PLAY [all] *********************************************************************

TASK [Gathering Facts] *********************************************************
ok: [192.168.56.119]
ok: [192.168.56.118]
ok: [192.168.56.117]
ok: [192.168.56.116]

TASK [base : update repository index (CentOS)] *********************************
skipping: [192.168.56.118]
skipping: [192.168.56.119]
skipping: [192.168.56.116]
ok: [192.168.56.117]

TASK [base : install updates (Ubuntu)] *****************************************
skipping: [192.168.56.117]
ok: [192.168.56.118]
ok: [192.168.56.119]
ok: [192.168.56.116]
```

```
PLAY [workstations] ************************************************************

TASK [Gathering Facts] *********************************************************
ok: [192.168.56.116]
ok: [192.168.56.118]

TASK [workstations : install unzip] ********************************************
ok: [192.168.56.118]
ok: [192.168.56.116]

TASK [workstations : install terraform] ****************************************
ok: [192.168.56.116]
ok: [192.168.56.118]

PLAY [web_servers] *************************************************************

TASK [Gathering Facts] *********************************************************
ok: [192.168.56.118]
ok: [192.168.56.119]
ok: [192.168.56.117]
```

```
TASK [web_servers : install apache and php for Ubuntu] *************************
skipping: [192.168.56.117]
ok: [192.168.56.118]
ok: [192.168.56.119]

TASK [web_servers : install apache and php for CentOS] *************************
skipping: [192.168.56.118]
skipping: [192.168.56.119]
ok: [192.168.56.117]

TASK [web_servers : start httpd (CentOS)] **************************************
skipping: [192.168.56.118]
skipping: [192.168.56.119]
ok: [192.168.56.117]

TASK [web_servers : copy default html file for site] ***************************
ok: [192.168.56.118]
ok: [192.168.56.119]
ok: [192.168.56.117]
```

```
PLAY [db_servers] ***********************************************************

TASK [Gathering Facts] ******************************************************
ok: [192.168.56.116]

TASK [db_servers : install mariadb package (CentOS)] ************************
skipping: [192.168.56.116]

TASK [db_servers : install mariadb package (Ubuntu)] ************************
ok: [192.168.56.116]

TASK [db_servers : Mariadb- Restarting/Enabling] *****************************
changed: [192.168.56.116]

PLAY [file_servers] *********************************************************

TASK [Gathering Facts] ******************************************************
ok: [192.168.56.117]
```

```
TASK [file_servers : install samba package] **********************************
ok: [192.168.56.117]

PLAY RECAP ******************************************************************
192.168.56.116             : ok=10   changed=1    unreachable=0    failed=0    s
kipped=3    rescued=0    ignored=0
192.168.56.117             : ok=10   changed=0    unreachable=0    failed=0    s
kipped=3    rescued=0    ignored=0
192.168.56.118             : ok=10   changed=0    unreachable=0    failed=0    s
kipped=4    rescued=0    ignored=0
192.168.56.119             : ok=7    changed=0    unreachable=0    failed=0    s
kipped=4    rescued=0    ignored=0

jonjeous@localmachine-VirtualBox:~/Recto_HOA7$
```

Running the site.yml playbook executes tasks including updating repositories, installing updates, and role-specific configurations on target hosts, with Ansible providing a detailed summary of the execution.

Reflections:

Answer the following:

1. What is the importance of creating roles?
   - Creating roles in Ansible is important because it helps organize and reuse code, makes playbooks easier to read and maintain, allows for customization, and simplifies collaboration among team members working on infrastructure automation projects.
2. What is the importance of managing files?
   - Managing files is important because it helps keep things organized, makes it easy to find information when needed, prevents data from getting messed up or lost, allows people to work together smoothly, and ensures that important information is backed up and can be recovered if something goes wrong. It also helps keep things secure, reduces clutter, and makes digital spaces cleaner and more efficient.

https://github.com/jonjeous/Recto_HOA7.git