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Course/Section: CPE31S4	Date Submitted: 10/3/25
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Activity 6: Targeting Specific Nodes and Managing Services

1. **Objectives:**

1.1 Individualize hosts

1.2 Apply tags in selecting plays to run

1.3 Managing Services from remote servers using playbooks

2. **Discussion**:

In this activity, we try to individualize hosts. For example, we don't want apache on all our servers, or maybe only one of our servers is a web server, or maybe we have different servers like database or file servers running different things on different categories of servers and that is what we are going to take a look at in this activity.

We also try to manage services that do not automatically run using the automations in playbook. For example, when we install web servers or httpd for CentOS, we notice that the service did not start automatically.

Requirement:

In this activity, you will need to create another Ubuntu VM and name it Server 3. Likewise, you need to activate the second adapter to a host-only adapter after the installations. Take note of the IP address of the Server 3. Make sure to use the command *ssh-copy-id* to copy the public key to Server 3. Verify if you can successfully SSH to Server 3.

Task 1: Targeting Specific Nodes

1. Create a new playbook and named it site.yml. Follow the commands as shown in the image below. Make sure to save the file and exit.

```
---

- hosts: all
  become: true
  tasks:

  - name: install apache and php for Ubuntu servers
    apt:
      name:
        - apache2
        - libapache2-mod-php
      state: latest
      update_cache: yes
    when: ansible_distribution == "Ubuntu"

  - name: install apache and php for CentOS servers
    dnf:
      name:
        - httpd
        - php
      state: latest
    when: ansible_distribution == "CentOS"
```

```
 GNU nano 2.9.3                    site.yml

---

- hosts: all
  become: true
  tasks:

  - name: install apache and php for Ubuntu servers
    apt:
      name:
        - apache2
        - libapache2-mod-php
      state: latest
      update_apache: yes
    when: ansible_distribution == "Ubuntu"

  - name: install apache and php for CentOS servers
    dnf:
      name:
        - httpd
        - php
      state: latest
    when: ansible_distribution == "CentOS
```

2. Edit the inventory file. Remove the variables we put in our last activity and group according to the image shown below:

```
[web_servers]
192.168.56.120
192.168.56.121

[db_servers]
192.168.56.122


[file_servers]
192.168.56.123
```

```
 GNU nano 2.9.3                    Inventory.ini

[web_servers]
192.168.56.101
192.168.56.102

[db_servers]
192.168.56.103

[file_servers]
192.168.56.109
```

Make sure to save the file and exit.

Right now, we have created groups in our inventory file and put each server in its own group. In other cases, you can have a server be a member of multiple groups, for example you have a test server that is also a web server.

3. Edit the *site.yml* by following the image below:

```
---

- hosts: all
  become: true
  pre_tasks:

  - name: install updates (CentOS)
    dnf:
      update_only: yes
      update_cache: yes
    when: ansible_distribution == "CentOS"

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


- hosts: web_servers
  become: true
  tasks:

  - name: install apache and php for Ubuntu servers
    apt:
      name:
        - apache2
        - libapache2-mod-php
      state: latest
    when: ansible_distribution == "Ubuntu"

  - name: install apache and php for CentOS servers
    dnf:
      name:
        - httpd
        - php
      state: latest
    when: ansible_distribution == "CentOS"
```

```
 GNU nano 2.9.3                    site.yml                         Modified

---

- hosts: all
  become: true
  pre_ tasks:

  - name: install updates (CentOS)
    dnf:
      update_only:yes
      update_cache: yes
    when ansible_distribution == "CentOS"

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

- hosts: web_servers
  become: true
  tasks:

  - name: install apache and php for Ubuntu servers
```

```
  - name: install apache and php for Ubuntu servers
    apt:
      name:
        - apache2
        - libapache2-mod-php
      state: latest
    when:  ansible_distribution == "Ubuntu"

  - name: install apache and php for CentOS servers
    dnf:
      name:
        - httpd
        - php
```

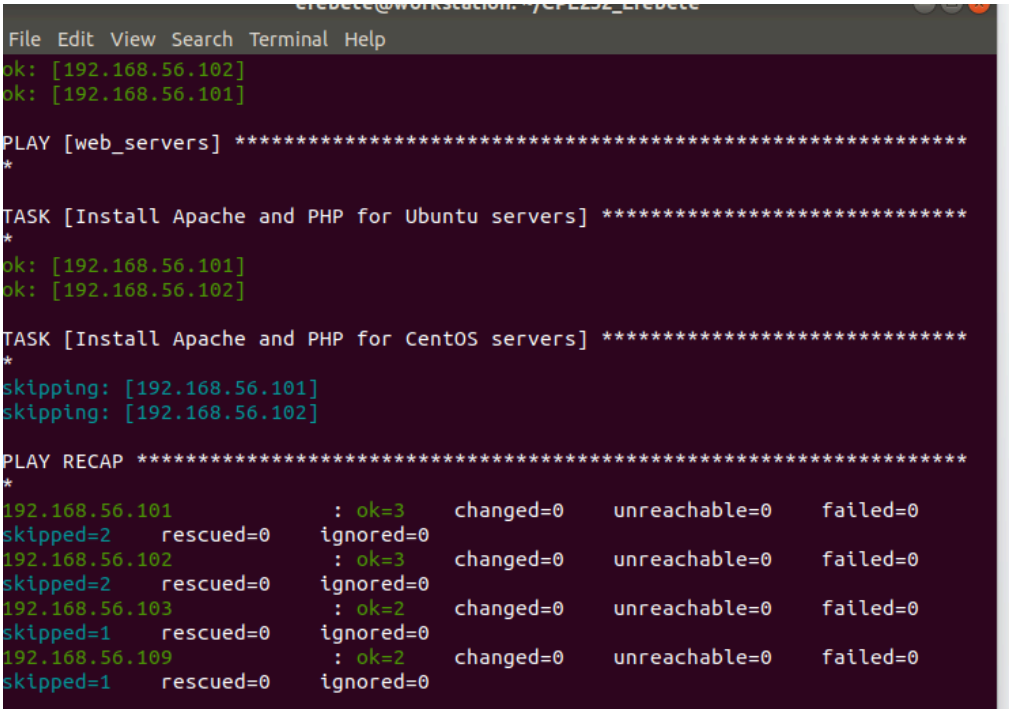
```
        - php
      state: latest
    when: ansible_distribution == "CentOS"
```

Make sure to save the file and exit.

The *pre-tasks* command tells the ansible to run it before any other thing. In the *pre-tasks*, CentOS will install updates while Ubuntu will upgrade its distribution package. This will run before running the second play, which is targeted at

web_servers. In the second play, apache and php will be installed on both Ubuntu servers and CentOS servers.

Run the *site.yml* file and describe the result.



- it install all needed for ubuntu server and for cent os based on the code given above.

4. Let's try to edit again the *site.yml* file. This time, we are going to add plays targeting the other servers. This time we target the *db_servers* by adding it on the current *site.yml*. Below is an example: (Note add this at the end of the playbooks from task 1.3.

```
- hosts: db_servers
  become: true
  tasks:

  - name: install mariadb package (CentOS)
    yum:
      name: mariadb-server
      state: latest
    when: ansible_distribution == "CentOS"

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

  - name: install mariadb packege (Ubuntu)
    apt:
      name: mariadb-server
      state: latest
    when: ansible_distribution == "Ubuntu"
```

Make sure to save the file and exit.

```
TASK [Gathering Facts] *********************************************
*
ok: [192.168.56.103]

TASK [Install MariaDB package (CentOS)] ****************************
*
skipping: [192.168.56.103]

TASK [Install MariaDB package (Ubuntu)] ****************************
*
changed: [192.168.56.103]

TASK [Restart and enable MariaDB service] **************************
*
changed: [192.168.56.103]

PLAY RECAP *********************************************************
*
192.168.56.101             : ok=3    changed=0    unreachable=0    failed=
skipped=2    rescued=0    ignored=0
192.168.56.102             : ok=3    changed=0    unreachable=0    failed=
skipped=2    rescued=0    ignored=0
192.168.56.103             : ok=5    changed=2    unreachable=0    failed=
skipped=2    rescued=0    ignored=0
192.168.56.109             : ok=2    changed=0    unreachable=0    failed=
skipped=1    rescued=0    ignored=0

erebete@workstation:~/CPE232_Erebete$
```

Run the *site.yml* file and describe the result.

.- It looks like all are installed and already restarted and also the maria db is installed.

5. Go to the remote server (Ubuntu) terminal that belongs to the db_servers group and check the status for mariadb installation using the command: *systemctl status mariadb.* Do this on the CentOS server also.

   Describe the output.

```
● mariadb.service - MariaDB 10.5 database server
     Loaded: loaded (/usr/lib/systemd/system/mariadb.service; enabled; preset:
     Active: active (running) since Fri 2025-09-19 16:12:46 PST; 2min 27s ago
       Docs: man:mariadbd(8)
             https://mariadb.com/kb/en/library/systemd/
    Process: 15619 ExecStartPre=/usr/libexec/mariadb-check-socket (code=exited,
    Process: 15642 ExecStartPre=/usr/libexec/mariadb-prepare-db-dir mariadb.ser
    Process: 15697 ExecStartPost=/usr/libexec/mariadb-check-upgrade (code=exite
   Main PID: 15677 (mariadbd)
     Status: "Taking your SQL requests now..."
      Tasks: 8 (limit: 64794)
     Memory: 67.0M
        CPU: 285ms
     CGroup: /system.slice/mariadb.service
             └─15677 /usr/libexec/mariadbd --basedir=/usr

Sep 19 16:12:46 vbox systemd[1]: Starting MariaDB 10.5 database server...
Sep 19 16:12:46 vbox mariadb-prepare-db-dir[15642]: Database MariaDB is probabl
Sep 19 16:12:46 vbox mariadb-prepare-db-dir[15642]: If this is not the case, ma
Sep 19 16:12:46 vbox systemd[1]: Started MariaDB 10.5 database server.
```

- It shows here that mariadb is active and running

6. Edit the *site.yml* again. This time we will append the code to configure installation on the *file_servers* group. We can add the following on our file.

```
- hosts: file_servers
  become: true
  tasks:

  - name: install samba package
    package:
      name: samba
      state: latest
```

Make sure to save the file and exit.

Run the *site.yml* file and describe the result.

```
192.168.56.103             : ok=5    changed=2    unreachable=0    failed=0    s
kipped=2    rescued=0    ignored=0
192.168.56.106             : ok=4    changed=0    unreachable=0    failed=0    s
kipped=2    rescued=0    ignored=0
192.168.56.109             : ok=4    changed=0    unreachable=0    failed=0    s
kipped=1    rescued=0    ignored=0
192.168.56.117             : ok=5    changed=1    unreachable=0    failed=0    s
kipped=2    rescued=0    ignored=0
192.168.56.118             : ok=4    changed=0    unreachable=0    failed=0    s
kipped=2    rescued=0    ignored=0
```

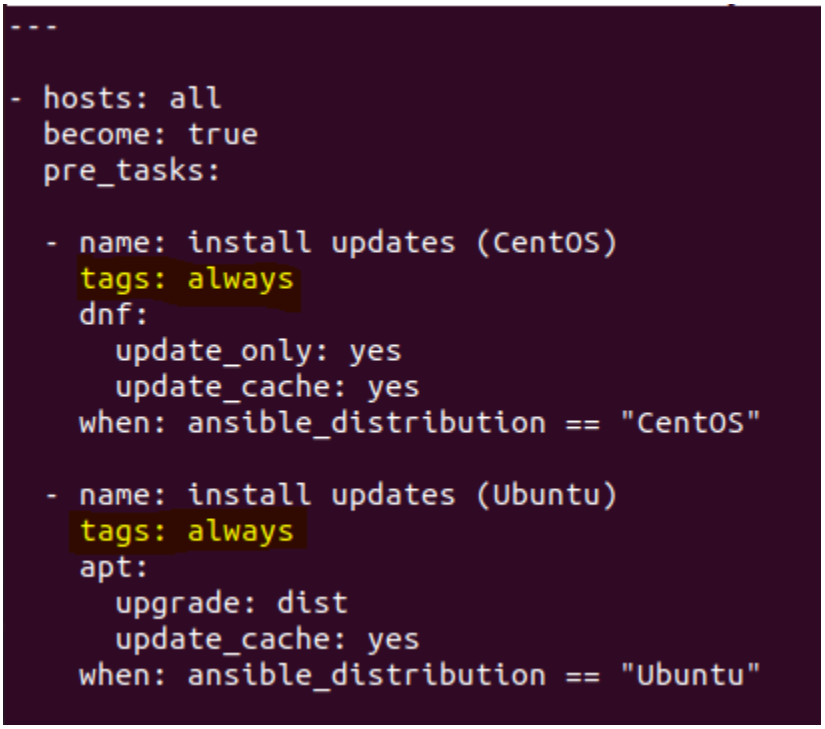
- It shows that it was change on both ubuntu and cent os

The testing of the *file_servers* is beyond the scope of this activity, and as well as our topics and objectives. However, in this activity we were able to show that we can target hosts or servers using grouping in ansible playbooks.

Task 2: Using Tags in running playbooks

In this task, our goal is to add metadata to our plays so that we can only run the plays that we want to run, and not all the plays in our playbook.

1. Edit the *site.yml* file. Add tags to the playbook. After the name, we can place the tags: *name_of_tag*. This is an arbitrary command, which means you can use any name for a tag.



```
---

- hosts: all
  become: true
  pre_tasks:

  - name: install updates (CentOS)
    tags: always
    dnf:
      update_only: yes
      update_cache: yes
    when: ansible_distribution == "CentOS"

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

```
- hosts: web_servers
  become: true
  tasks:

  - name: install apache and php for Ubuntu servers
    tags: apache,apache2,ubuntu
    apt:
      name:
        - apache2
        - libapache2-mod-php
      state: latest
    when: ansible_distribution == "Ubuntu"

  - name: install apache and php for CentOS servers
    tags: apache,centos,httpd
    dnf:
      name:
        - httpd
        - php
      state: latest
    when: ansible_distribution == "CentOS"
```

```
- hosts: db_servers
  become: true
  tasks:

  - name: install mariadb package (CentOS)
    tags: centos, db,mariadb
    dnf:
      name: mariadb-server
      state: latest
    when: ansible_distribution == "CentOS"

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

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

- hosts: file_servers
  become: true
  tasks:

  - name: install samba package
    tags: samba
    package:
      name: samba
      state: latest
```

Make sure to save the file and exit.

```yaml
- name: install update (Centos)
  tags: always
  dnf:
    update_only: yes
    update_cache: yes
  when: ansible_distribution == "CentOS"

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

```yaml
- hosts: webservers
  become: true
  tasks:

  - name: install apache and php for Ubuntu servers
    tags: apache,apache2,ubuntu
    apt:
      name:
        - apache2
        - libapache2-mod-php
      state: latest
      update_cache: yes
    when: ansible_distribution == "Ubuntu"
```

```yaml
- name: install apache and php for CentOS servers
  tags: apache,centos,httpd
  dnf:
    name:
      - httpd
      - php
    state: latest
  when: ansible_distribution == "CentOS"
```

```yaml
- hosts: dbserver
  become: true
  tasks:

  - name: install mariadb package (CentOS)
    tags: centos, db,mariadb
    dnf:
      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"
```

```
- hosts: fileserver
  become: true
  tasks:

  - name: install samba package
    tags: samba
    package:
      name: samba
      state: latest
```

Run the *site.yml* file and describe the result.

```
PLAY RECAP *********************************************************************************************************
192.168.56.103             : ok=5    changed=2    unreachable=0    failed=0    skipped=2    rescued=0    ig
192.168.56.106             : ok=4    changed=1    unreachable=0    failed=0    skipped=2    rescued=0    ig
192.168.56.109             : ok=4    changed=1    unreachable=0    failed=0    skipped=1    rescued=0    ig
192.168.56.117             : ok=5    changed=2    unreachable=0    failed=0    skipped=2    rescued=0    ig
192.168.56.118             : ok=4    changed=1    unreachable=0    failed=0    skipped=2    rescued=0    ig
```

2. On the local machine, try to issue the following commands and describe each result:

2.1 *ansible-playbook --list-tags site.yml*

```
playbook: site.yml

  play #1 (all): all    TAGS: []
      TASK TAGS: [always]

  play #2 (webservers): webservers      TAGS: []
      TASK TAGS: [apache, apache2, centos, httpd, ubuntu]

  play #3 (dbserver): dbserver  TAGS: []
      TASK TAGS: [centos, db, mariadb, ubuntu]

  play #4 (fileserver): fileserver      TAGS: []
      TASK TAGS: [samba]
```

2.2 *ansible-playbook --tags centos --ask-become-pass site.yml*

```
PLAY RECAP *********************************************************************************************************
192.168.56.103             : ok=3    changed=0    unreachable=0    failed=0    skipped=2    rescued=0    ignored=0
192.168.56.106             : ok=3    changed=0    unreachable=0    failed=0    skipped=2    rescued=0    ignored=0
192.168.56.109             : ok=3    changed=0    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0
192.168.56.117             : ok=4    changed=0    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0
192.168.56.118             : ok=3    changed=0    unreachable=0    failed=0    skipped=2    rescued=0    ignored=0
```

2.3 *ansible-playbook --tags db --ask-become-pass site.yml*

```
PLAY RECAP *********************************************************************************************************
192.168.56.103             : ok=4    changed=0    unreachable=0    failed=0    skipped=2    rescued=0    ignored=0
192.168.56.106             : ok=3    changed=0    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0
192.168.56.109             : ok=3    changed=0    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0
192.168.56.117             : ok=4    changed=0    unreachable=0    failed=0    skipped=2    rescued=0    ignored=0
192.168.56.118             : ok=3    changed=0    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0
```

2.4 *ansible-playbook --tags apache --ask-become-pass site.yml*

```
PLAY RECAP *********************************************************************************************************
192.168.56.103             : ok=3    changed=0    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0
192.168.56.106             : ok=4    changed=0    unreachable=0    failed=0    skipped=2    rescued=0    ignored=0
192.168.56.109             : ok=3    changed=0    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0
192.168.56.117             : ok=3    changed=0    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0
192.168.56.118             : ok=4    changed=0    unreachable=0    failed=0    skipped=2    rescued=0    ignored=0
```

2.5 *ansible-playbook --tags “apache,db” --ask-become-pass site.yml*

```
PLAY RECAP *********************************************************************************************************
192.168.56.103             : ok=4    changed=0    unreachable=0    failed=0    skipped=2    rescued=0    ignored=0
192.168.56.106             : ok=4    changed=0    unreachable=0    failed=0    skipped=2    rescued=0    ignored=0
192.168.56.109             : ok=3    changed=0    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0
192.168.56.117             : ok=4    changed=0    unreachable=0    failed=0    skipped=2    rescued=0    ignored=0
192.168.56.118             : ok=4    changed=0    unreachable=0    failed=0    skipped=2    rescued=0    ignored=0
```

Task 3: Managing Services

1. Edit the file site.yml and add a play that will automatically start the httpd on CentOS server.

```
- name: install apache and php for CentOS servers
  tags: apache,centos,httpd
  dnf:
    name:
      - httpd
      - php
    state: latest
  when: ansible_distribution == "CentOS"

- name: start httpd (CentOS)
  tags: apache, centos,httpd
  service:
    name: httpd
    state: started
  when: ansible_distribution == "CentOS"
```

Figure 3.1.1
Make sure to save the file and exit.

You would also notice from our previous activity that we already created a module that runs a service.

```
- hosts: db_servers
  become: true
  tasks:

  - name: install mariadb package (CentOS)
    tags: centos, db,mariadb
    dnf:
      name: mariadb-server
      state: latest
    when: ansible_distribution == "CentOS"

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

Figure 3.1.2

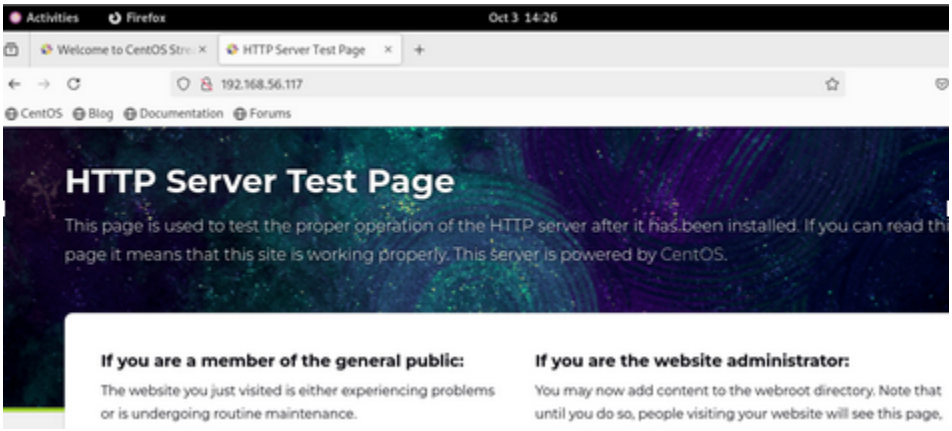
```
- name: start httpd (CentOS)
  tags: apache,centos,httpd
  service:
    name: httpd
    state: started
  when: ansible_distribution == "CentOS"
```

This is because in CentOS, installed packages' services are not run automatically. Thus, we need to create the module to run it automatically.

2. To test it, before you run the saved playbook, go to the CentOS server and stop the currently running httpd using the command *sudo systemctl stop httpd*. When prompted, enter the sudo password. After that, open the browser and enter the CentOS server's IP address. You should not be getting a display because we stopped the httpd service already.
3. Go to the local machine and this time, run the *site.yml* file. Then after running the file, go again to the CentOS server and enter its IP address on the browser. Describe the result.

```
PLAY RECAP *********************************************************************************************************
192.168.56.103             : ok=5    changed=1    unreachable=0    failed=0    skipped=2    rescued=0    ignored=0
192.168.56.106             : ok=4    changed=0    unreachable=0    failed=0    skipped=3    rescued=0    ignored=0
192.168.56.109             : ok=4    changed=0    unreachable=0    failed=0    skipped=1    rescued=0    ignored=0
192.168.56.117             : ok=5    changed=1    unreachable=0    failed=0    skipped=2    rescued=0    ignored=0
192.168.56.118             : ok=4    changed=0    unreachable=0    failed=0    skipped=3    rescued=0    ignored=0
```

To automatically enable the service every time we run the playbook, use the command *enabled: true* similar to Figure 7.1.2 and save the playbook.



Reflections:

Answer the following:

1. What is the importance of putting our remote servers into groups?
   - It is important because it allows for easier management, targeted configuration, and scalable automation across different environments or roles.
2. What is the importance of tags in playbooks?

- It is important because it provides precise control by letting you run or skip specific tasks, making playbooks more flexible, efficient, and easier to debug.

3. Why do think some services need to be managed automatically in playbooks?
   - It is because it ensures consistency, reduces human error, and enables fast, reliable recovery or deployment across systems.