How to Use Ansible Modules for System Administration Tasks – Part 6

James Kiarie | Last Updated: December 6, 2019 | Read Time: 8 mins | Ansible | Leave a comment

In this **Part 6** of Ansible Series, we have covered a few Ansible modules in the past topics, we will now go deeper and discover additional modules that are helpful in performing a number of system administration tasks.

You will get a basic idea of each module and look at the options available for accomplishing certain tasks.

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1. Managing Software Packages and Repositories in Ansible

When installing packages on Linux systems, different distributions come with different package managers. For **RedHat** distributions, we have yum & dnf while for **Debian** flavors, there's apt.

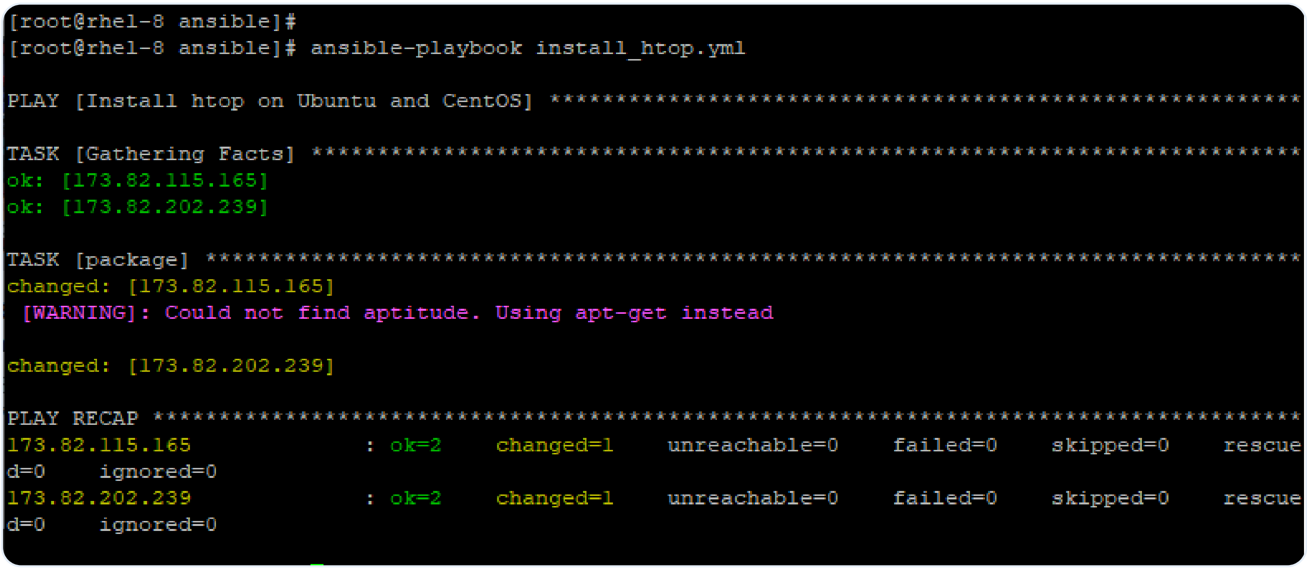
Ansible comes with a module called **package**, which eliminates the need for using different package managers for different systems. It automatically uses the corresponding package manager of the host system, thereby making work easier.

Install Software Packages

For example, to install htop in a group of **hosts** comprising both **Debian** & **RedHat** distros use the **package** module as shown in the **install_htop.yml** playbook below.

```
---
- name: Install htop on Ubuntu and CentOS
  hosts: all
  tasks:

- package:
         name: htop
         state: installed
```



```
[root@rhel-8 ansible]#
[root@rhel-8 ansible]# ansible-playbook install_htop.yml

PLAY [Install htop on Ubuntu and CentOS] *********************************************************

TASK [Gathering Facts] ***************************************************************************
ok: [173.82.115.165]
ok: [173.82.202.239]

TASK [package] ***********************************************************************************
changed: [173.82.115.165]
 [WARNING]: Could not find aptitude. Using apt-get instead

changed: [173.82.202.239]

PLAY RECAP ***************************************************************************************
173.82.115.165             : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescue
d=0    ignored=0
173.82.202.239             : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescue
d=0    ignored=0
```

Install Software Using Ansible Package Module

NOTE: Package names may differ from one operating system to another. For example, we have **httpd** in **Redhat** distributions and **Apache2** for **Debian/Ubuntu** systems all of which denote the Apache webserver. Therefore, extra caution should be taken when passing these packages. Usually, it's best to use variables or conditional statements.

2. Managing Services Using Ansible

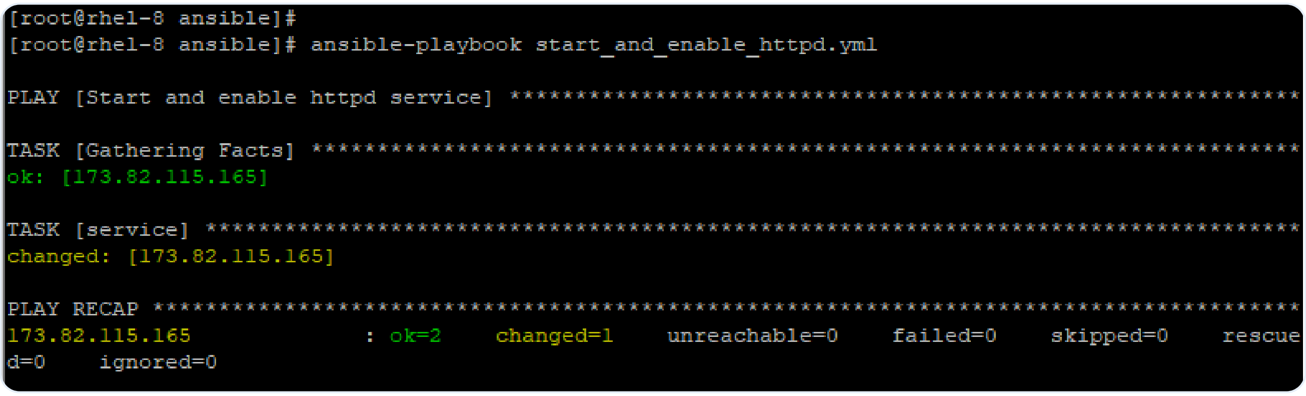
Next, we have a **service** module, which is used for managing services on Linux systems. It's used to start, stop or restart a service. You can also use it to enable a service so that when a system boots, it automatically starts the service.

Start and Enable a Service

For example, to start & enable Apache webserver on **RHEL 8**, use the service as shown.

```
---
- name: Start and enable httpd service
  hosts: webservers
  tasks:

- service:
         name: httpd
         state: started
            enabled: yes
```



```
[root@rhel-8 ansible]#
[root@rhel-8 ansible]# ansible-playbook start_and_enable_httpd.yml

PLAY [Start and enable httpd service] ************************************************************

TASK [Gathering Facts] ***************************************************************************
ok: [173.82.115.165]

TASK [service] ***********************************************************************************
changed: [173.82.115.165]

PLAY RECAP ***************************************************************************************
173.82.115.165             : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescue
d=0    ignored=0
```

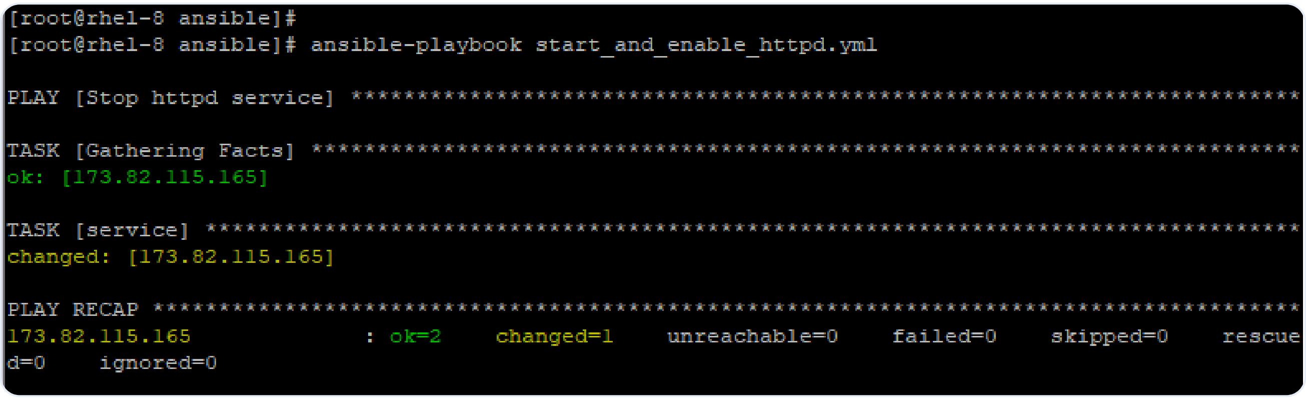
Manage Services with Ansible

Stop a Service

To stop **httpd** service, pass the **stopped** attribute.

```
---
- name: Stop httpd service
  hosts: webservers
  tasks:

- service:
         name: httpd
         state: stopped
```



```
[root@rhel-8 ansible]#
[root@rhel-8 ansible]# ansible-playbook start_and_enable_httpd.yml

PLAY [Stop httpd service] ************************************************************************

TASK [Gathering Facts] ***************************************************************************
ok: [173.82.115.165]

TASK [service] ***********************************************************************************
changed: [173.82.115.165]

PLAY RECAP ***************************************************************************************
173.82.115.165             : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescue
d=0    ignored=0
```

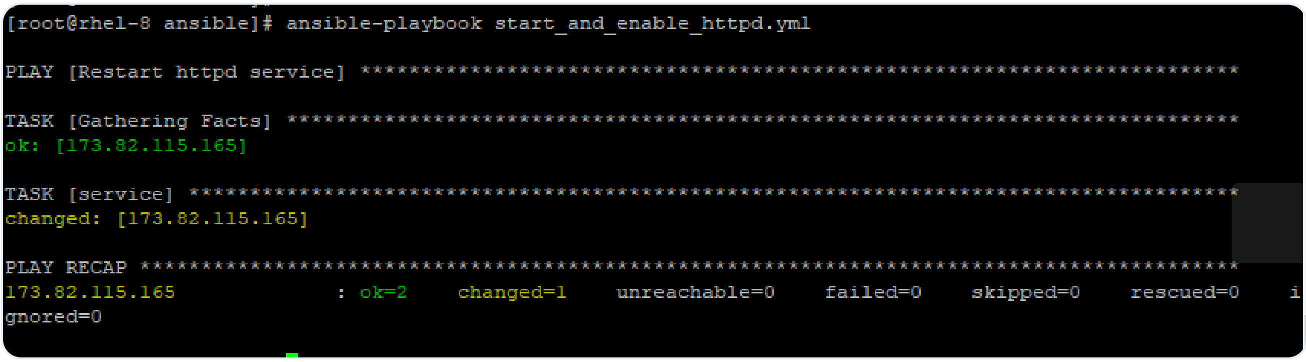
Stop Service with Ansible

Restart a Service

To restart **httpd** service, pass the **restarted** attribute.

```
---
- name: Restart httpd service
  hosts: webservers
  tasks:

- service:
         name: httpd
         state: restarted
```



```
[root@rhel-8 ansible]# ansible-playbook start_and_enable_httpd.yml

PLAY [Restart httpd service] *********************************************************************

TASK [Gathering Facts] ***************************************************************************
ok: [173.82.115.165]

TASK [service] ***********************************************************************************
changed: [173.82.115.165]

PLAY RECAP ***************************************************************************************
173.82.115.165             : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescued=0    i
gnored=0
```

Restart Service with Ansible

3. Managing Firewall with Ansible

Another important task system administrators undertake is the management of the firewall. In Ansible playbooks, this has been made much easier with **firewalld** and **ufw** modules. You can configure the firewall to allow or block a port or service or even a source address.

Let’s jump in and have a look at a few examples:

Open/block Port 80 in firewalld

```
---
- name: Allow port 80
  hosts: webservers
  tasks:

   -firewalld:
        port: 80/tcp
     permanent: yes
     state: enabled
```

In the playbook above, port 80 is allowed across the firewall.

The option `permanent: yes` enforces the firewall rule and makes it persistent across reboots. However, this rule does not apply immediately. It only comes into effect after a reboot. To enforce the rule immediately, use the option `immediate: yes`.

To specify the addresses allowed, use the **source:0.0.0.0/0** statement.

```
- firewalld:
    source: 192.168.0.0/24
    zone: public
    state: enabled
```

To specify a range of ports to be allowed to use the port option as follows:

```
- firewalld:
    port: 213-567/udp
    permanent: yes
    state: enabled
```

To block the port change the state option to **disabled** as shown:

```
-firewalld:
        port: 80/tcp
     permanent: yes
     state: disabled
```

Add/Block a Service in firewalld

Apart from adding/blocking a port, you can also apply the same rules to a service. And it's quite simple. Just use the **service** module and append the service to be added and ensure that the state option is set to **enabled**.

```
- firewalld:
    service: https
    permanent: true
    state: enabled
```

To block the service set the **state** option to **disabled**.

```
- firewalld:
    service: https
    permanent: true
    state: disabled
```

4. Archiving Files or Folders with Ansible

Archiving refers to the compression of a file or folder to a format that is easily portable and smaller in size. Ansible ships with a module called **archive**. Compressing a file is about as easy as it gets. All that is required is to specify the source path of the file and the destination of the compressed file.

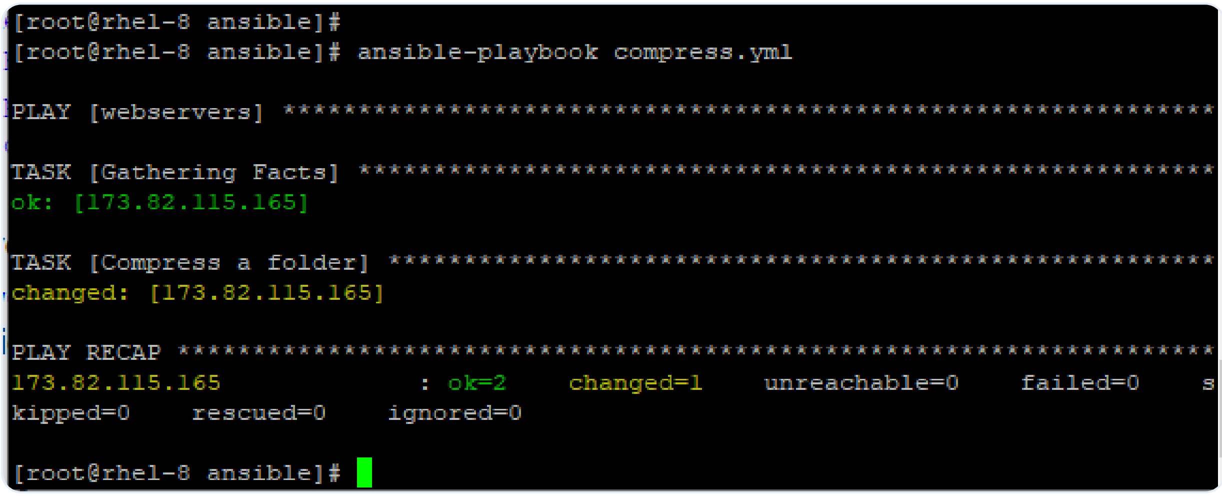
Compress a Directory

Consider a playbook **compress.yml** below.

```
---
- hosts: webservers
  tasks:

    • name: Compress a folder
archive:
        path: /opt/data/web
        dest: /tmp/web.gz
```

The above playbook compresses the **/opt/data/web** directory and saves it to **/tmp/web.gz**.



```
[root@rhel-8 ansible]#
[root@rhel-8 ansible]# ansible-playbook compress.yml

PLAY [webservers] ***************************************************************

TASK [Gathering Facts] **********************************************************
ok: [173.82.115.165]

TASK [Compress a folder] ********************************************************
changed: [173.82.115.165]

PLAY RECAP **********************************************************************
173.82.115.165             : ok=2    changed=1    unreachable=0    failed=0    s
kipped=0    rescued=0    ignored=0

[root@rhel-8 ansible]#
```

Create Archive with Ansible

Compress a Directory with Format

The default compression format is `.gz`, however, this can be specified using the format attribute. Sample the next Playbook.

```
---
- hosts: webservers
```

```
  Tasks:

  - name: Create a zip archive
    archive:
     path: /opt/data/web
     dest: /tmp/web
     format: zip
```

The playbook above compresses **/opt/data/web** directory to **/tmp/web.zip**.

Uncompress a File

You can also uncompress a compressed file using the **unarchive** attribute. Consider the playbook below.

```
---
- hosts: webservers
  tasks:

 - name:Uncompress /tmp/web.gz to/opt directory  on Ansible controller
   unarchive:
     src: /tmp/web.bz2
     dest: /opt/
```

The playbook above uncompresses the file **/opt/data/web.gz** to **/opt** on the Ansible controller.

Uncompress a File on Remote Node

To specify the remote source system use the `remote_src=yes` option.

```
---
- hosts: webservers
  tasks:

 - name:Uncompress /tmp/web.bz2 to/opt on remote host
   unarchive:
     src: /tmp/web.bz2
     dest: /opt/
     remote_src=yes
```

The playbook above uncompresses the file **/tmp/web.bz2** on the remote node to the **/opt/** directory.

5. Schedule Tasks with Ansible

The cron **module** helps in scheduling jobs in Ansible Playbooks.

Create a Scheduled Task

Consider the playbook below.

```
---
- hosts: webservers
  tasks:

 - name: Create a scheduled task
   cron:
     name: Run employee attendance
     job: sh /opt/scripts/attendace.sh

     month: 4
     day: 5
     hour: 17
     minute: 00
```

The playbook runs the attendance script on April 5th at 5:00 pm.

Schedule a Script on Specific Date

If you want to schedule this script to run only if the 5th day of April is a Monday, then use the weekday: 1 attribute. 0 denotes Sunday and 6 denotes Saturday according to cron notation.

```
month: 4
day: 5
hour: 17
minute: 00
weekday: 1
```

An **asterisk (*)** in any of these fields indicates any value.

Run a Job on a Date

To run the job on April 5th at 5:00 pm no matter what the weekday is, use the time parameters as shown.

```
month: 4
day: 5
hour: 17
minute: 00
weekday: *
```

Execute a Job on Specific Day on Every Month

To execute the cron job on the 5th day of every month at 5:00 pm use the settings below.

```
month: *
day: 5
hour: 17
minute: 00
weekday: *
```

Execute a Job on Daily

To execute the cron job daily at 5:00 pm set the time settings as shown:

```
month: *
day: *
```

```
hour: 17
minute: 00
weekday: *
```

Execute a Job on Every 5 Hours

To execute the cron job every 5 hours, use the step value `*/5` as shown.

```
month: *
day: *
hour: */5
minute: *
weekday: *
```

6. Manage Users and Groups with Ansible

You can also manage users and groups inside Ansible playbooks quite effortlessly.

Create a New User

To create a new user, use the **user** module as shown.

```
---
- hosts: webservers
  tasks:

 - name: Create a new user
   user:
     name: Jack
```

You can also add additional options such as UID, groups.

```
- name: Create a new user
   user:
      name: Jack
      comment: Jack Peters
```

```
          uid:   1002
      group: administrators
      shell:  /bin/bash
```

Remove a User

To remove the user, use the `remove: yes` statement.

```
- name: Remove the user 'Jack'
  user:
    name: Jack
    state: absent
    remove: yes
```

Create a New Group

To create a new group, use the **group** module.

```
- name: Create a group
  group:
    name: developers
```

7. Create Files and Directories with Ansible

To create files of directories, use the **file** module.

Create a New Directory

For example, to create a new directory.

```
---
- hosts: webservers
  tasks:

  - name: Create a new directory
    file:
     path: /opt/app
     state: directory
```

You can add other attributes such as owner, group and file permissions.

```
- hosts: webservers
  tasks:

  - name: Create a new directory
    file:
     path: /opt/web
     state: directory
     owner: www-data
     group: www-data
     mode: 0644
```

Additionally, you can create directories recursively using the **recurse: yes** statement.

```
---
- hosts: webservers
  tasks:

  - name: Create directories recursively
    file:
     path: /opt/web/app
     state: directory
     owner: www-data
     group: www-data
     mode: 0644
recurse: yes
```

Create a File

To create a file, use the `state: touch` option.

```
---
- hosts: webservers
  tasks:

  - name: Create a new file
    file:
     path: /opt/web/index.html
     state: touch
owner: www-data
     group: www-data
     mode: 0644
```

8. Managing Storage with Ansible

The **lvg** module is used to configure LVM volumes and groups.

Create an LVM Volume Group

Consider the playbook below:

```
---
- hosts: webservers
  tasks:
    • name: Create lVM volume group
lvg:
 vg: vg1
 pvs: /dev/sda1
 pesize: 32
```

This creates a volume group on top of `/dev/sda1` partition with a physical extent size of 32 MB.

Once created, use the **lvol** module to create a logical volume as shown

Create a Logical Volume

```
---
    - hosts: webservers
      tasks:

       - name: Create lVM volume
    lvol:
    vg: vg1
    lv: lvol1
    pvs: /dev/sda1
```

9. Managing File Systems with Ansible

To create a file system on a block device, use the **filesystem** module.

Create a Filesystem

The playbook below creates the filesystem type of **xfs** on the block volume.

```
---
    - hosts: webservers
      tasks:

       - name: Create a filesystem
         filesystem:

           fstype: xfs
           dev: /dev/vg1/lvol1
```

Mount a Filesystem

You can next proceed to mount the block volume using the **mount** module as shown in the playbook below:

```
---
    - hosts: webservers
      tasks:
        - name: Mount a filesystem
          mount:

            fstype: xfs
            src: /dev/vg1/lvol1
            path: /opt/web
            state: mounted
```

Conclusion

This concludes the topic. We have covered various system administration tasks that can be accomplished by specific built-in modules in Ansible Playbooks.

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James Kiarie

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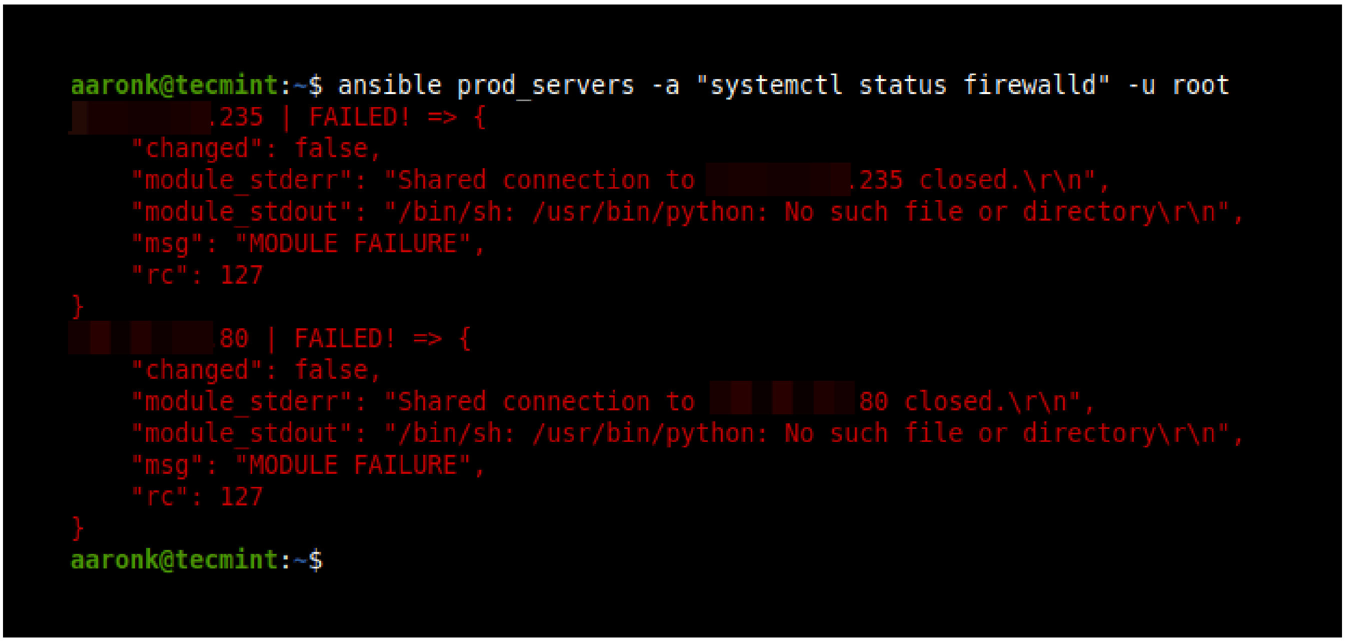

```
aaronk@tecmint:~$ ansible prod_servers -a "systemctl status firewalld" -u root
[redacted].235 | FAILED! => {
    "changed": false,
    "module_stderr": "Shared connection to [redacted].235 closed.\r\n",
    "module_stdout": "/bin/sh: /usr/bin/python: No such file or directory\r\n",
    "msg": "MODULE FAILURE",
    "rc": 127
}
[redacted]80 | FAILED! => {
    "changed": false,
    "module_stderr": "Shared connection to [redacted]80 closed.\r\n",
    "module_stdout": "/bin/sh: /usr/bin/python: No such file or directory\r\n",
    "msg": "MODULE FAILURE",
    "rc": 127
}
aaronk@tecmint:~$
```

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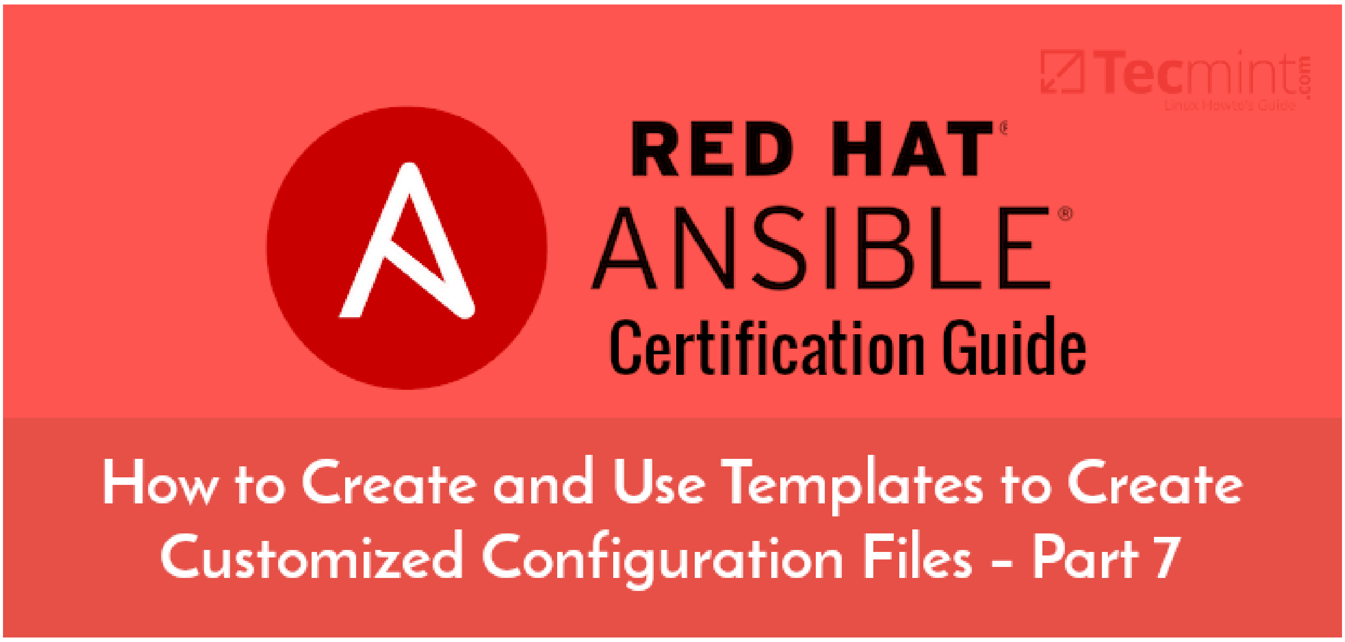
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