

# Ansible Helec

---

## 3. Installation et utilisation d'Ansible

sous la vm packer debian accessible sous moodle, on recupere le script d'ansible.

```
git pull https://github.com/pushou/tp3automatisation.git/
```

Puis on lance le script create-cont.sh qui va nous generer un espace de travail complet pour ansible.

```
./create-cont.sh
```

## 4 Prise en main d'Ansible

on va verifier avec la commande ansible et le module ping que les cibles sont vivantes

```
ansible -m ping debian
```

```
/home/ansible> ansible -m ping debian 27/04/2024 16:23:58
debian-2 | SUCCESS => {
  "ansible_facts": {
    "discovered_interpreter_python": "/usr/bin/python3"
  },
  "changed": false,
  "ping": "pong"
}
debian-0 | SUCCESS => {
  "ansible_facts": {
    "discovered_interpreter_python": "/usr/bin/python3"
  },
  "changed": false,
```

Les collection ansible-galaxy :

```
ansible-galaxy collection list
```

```

/home/ansible> ansible-galaxy collection list 27/04/2024 16:38:18

# /root/.ansible/collections/ansible_collections
Collection      Version
-----
nokia.srlinux    0.4.0

# /usr/local/lib/python3.11/dist-packages/ansible_collections
Collection      Version
-----
amazon.aws       7.4.0
ansible.netcommon 5.3.0
ansible.posix    1.5.4
ansible.utils    2.12.0
ansible.windows  2.3.0
arista.eos       6.2.2
awx.awx          23.9.0
azure.azcollection 1.19.0
check_point.mgmt 5.2.3
chocolatey.chocolatey 1.5.1
cisco.aci        2.8.0
cisco.asa        4.0.3
cisco.dnac       6.13.1
cisco.intersight 2.0.7

```

```

debian-2 | CHANGED | rc=0 >>
lo                UNKNOWN          127.0.0.1/8 ::1/128
eth0@if59         UP                172.30.0.2/16 fe80::42:acff:fe1e:2/64
debian-3 | CHANGED | rc=0 >>
lo                UNKNOWN          127.0.0.1/8 ::1/128
eth0@if61         UP                172.31.0.2/16 fe80::42:acff:fe1f:2/64
debian-4 | CHANGED | rc=0 >>
lo                UNKNOWN          127.0.0.1/8 ::1/128
eth0@if63         UP                192.168.16.2/20 fe80::42:c0ff:fea8:1002/64
rocky-1 | CHANGED | rc=0 >>
lo                UNKNOWN          127.0.0.1/8 ::1/128
eth0@if47         UP                172.19.0.2/16 fe80::42:acff:fe13:2/64
rocky-0 | CHANGED | rc=0 >>
lo                UNKNOWN          127.0.0.1/8 ::1/128
eth0@if45         UP                172.18.0.2/16 fe80::42:acff:fe12:2/64
rocky-2 | CHANGED | rc=0 >>
lo                UNKNOWN          127.0.0.1/8 ::1/128
eth0@if49         UP                172.20.0.2/16 fe80::42:acff:fe14:2/64
rocky-3 | CHANGED | rc=0 >>
lo                UNKNOWN          127.0.0.1/8 ::1/128
eth0@if51         UP                172.21.0.2/16 fe80::42:acff:fe15:2/64
rocky-4 | CHANGED | rc=0 >>
lo                UNKNOWN          127.0.0.1/8 ::1/128
eth0@if53         UP                172.22.0.2/16 fe80::42:acff:fe16:2/64

```

ansible utilise le protocole ssh on peut donc se connecter aux conteneurs avec la commande ssh

```

ssh debian-0 # de 0 a 4
ssh rocky-0

```

```

vultr.cloud      1.12.1
vyos.vyos        4.1.0
wti.remote       1.0.5
/home/ansible> ssh debian-0
The authenticity of host 'debian-0 (172.28.0.2)' can't be established.
ED25519 key fingerprint is SHA256:JgnIgxUy3Thy96pVoWwDitPu8DagVFLPlxyhiYPtiS8.
This host key is known by the following other names/addresses:
  ~/.ssh/known_hosts:1: [hashed name]
  ~/.ssh/known_hosts:2: [hashed name]
  ~/.ssh/known_hosts:3: [hashed name]
  ~/.ssh/known_hosts:4: [hashed name]
  ~/.ssh/known_hosts:5: [hashed name]
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'debian-0' (ED25519) to the list of known hosts.
Linux debian-0 6.1.0-20-amd64 #1 SMP PREEMPT_DYNAMIC Debian 6.1.85-1 (2024-04-11) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Sat Apr 27 16:36:05 2024 from 172.28.0.1
root@debian-0:~#

```

1. on va utiliser l'option `host_key_checking=false` du fichier `ansible.cfg` pour éviter les warnings désagréable

2. on utilise ensuite `ansible-console` pour lancer la commande :

```
ansible-console
```

```
ip -br a
```

3. Le protocole réseau utilisé par ansible et le protocole ssh

4. Analyser le fonctionnement de la commande ansible avec l'option `-vvv`. Que pouvez vous en déduire du fonctionnement d'Ansible ? expliquer comment Ansible peut être "agentless"?

`-vvv` permet d'afficher le multi debug

Création d'un groupe container qui regroupe tout les containers actuelle :

```

ansible-inventory --list all
ansible-navigator

```

```
    "ansible_port": 3223,  
    "ansible_ssh_private_key_file": "~/ssh/id_ed25519"  
  },  
  "rocky-4": {  
    "ansible_host": "127.0.0.1",  
    "ansible_port": 3224,  
    "ansible_ssh_private_key_file": "~/ssh/id_ed25519"  
  }  
}  
},  
"all": {  
  "children": [  
    "ungrouped",  
    "linux",  
    "eos"  
  ]  
},  
"debian": {  
  "hosts": [  
    "debian-0",  
    "debian-1",  
    "debian-2",  
    "debian-3",  
    "debian-4"  
  ]  
}
```

le groupe ungrouped regroupe tout les noeuds sans groupe.

## 4.2 Installation d'apache via les modules dnf et apt ansible core :

1. Sur 2 des conteneurs créer installez un serveur web apache2 et Centos a l'aide de la commande ansible et des modules Ansible de gestion des paquets apt et dnf. Le package s'appelle httpd sous Centos.

```
ansible -m apt -a "name=apache2 state=present" debian-0  
ansible -m dnf -a "name=httpd state=present" rocky-0
```

```

/home/ansible> ansible -m apt -a "name=apache2 state=present" debian-0 27/04/2024 16:52:05
debian-0 | CHANGED => {
  "ansible_facts": {
    "discovered_interpreter_python": "/usr/bin/python3"
  },
  "cache_update_time": 1714229837,
  "cache_updated": false,
  "changed": true,
  "stderr": "debconf: delaying package configuration, since apt-utils is not installed\n",
  "stderr_lines": [
    "debconf: delaying package configuration, since apt-utils is not installed"
  ],
  "stdout": "Reading package lists...\nBuilding dependency tree...\nReading state information...\nThe following additional packages will be installed:\n apache2-bin apache2-data apache2-utils libapr1 libaprutil1\n libaprutil1-dbd-sqlite3 libaprutil1-ldap ssl-cert\nSuggested packages:\n apache2-doc apache2-suexec-pristine | apache2-suexec-custom www-browser\nThe following NEW packages will be installed:\n apache2 apache2-bin apache2-data apache2-utils libapr1 libaprutil1\n libaprutil1-dbd-sqlite3 libaprutil1-ldap ssl-cert\n0 upgraded, 9 newly installed, 0 to remove and 7 not upgraded.\nNeed to get 2203 kB of archives.\nAfter this operation, 7844 kB of additional disk space will be used.\nGet:1 http://deb.debian.org/debian bookworm/main amd64 libapr1 amd64 1.7.2-3 [102 kB]\nGet:2 http://deb.debian.org/debian bookworm/main amd64 libaprutil1 amd64 1.6.3-1 [87.8 kB]\nGet:3 http://deb.debian.org/debian bookworm/main amd64 libaprutil1-dbd-sqlite3 amd64 1.6.3-1 [13.6 kB]\nGet:4 http://deb.debian.org/debian bookworm/main amd64 libaprutil1-ldap amd64 1.6.3-1 [11.8 kB]\nGet:5 http://deb.debian.org/debian-security bookworm-security/main amd64 apache2-bin amd64 2.4.59-1~deb12u1 [1380 kB]\nGet:6 http://deb.debian.org/debian-security bookworm-security/main amd64 apache2-data all 2.4.59-1~deb12u1 [160 kB]\nGet:7 http://deb.debian.org/debian-security bookworm-security/main amd64 apache2-utils amd64 2.4.59-1~deb12u1 [207 kB]\nGet:8 http://deb.debian.org/debian-security bookworm-security/main amd64 apache2 amd64 2.4.59-1~deb12u1 [220
/home/ansible> ansible -m dnf -a "name=httpd state=present" rocky-0 27/04/2024 16:57:24
rocky-0 | CHANGED => {
  "ansible_facts": {
    "discovered_interpreter_python": "/usr/bin/python3"
  },
  "changed": true,
  "msg": "",
  "rc": 0,
  "results": [
    "Installed: apr-util-bdb-1.6.1-23.el9.x86_64",
    "Installed: apr-util-1.6.1-23.el9.x86_64",
    "Installed: mod_lua-2.4.57-5.el9.x86_64",
    "Installed: httpd-tools-2.4.57-5.el9.x86_64",
    "Installed: libbrotli-1.0.9-6.el9.x86_64",
    "Installed: httpd-2.4.57-5.el9.x86_64",
    "Installed: httpd-filesystem-2.4.57-5.el9.noarch",
    "Installed: mailcap-2.1.49-5.el9.noarch",
    "Installed: rocky-logos-httpd-90.15-2.el9.noarch",
    "Installed: mod_http2-1.15.19-5.el9_3.1.x86_64",
    "Installed: apr-1.7.0-12.el9_3.x86_64",
    "Installed: httpd-core-2.4.57-5.el9.x86_64",
    "Installed: apr-util-openssl-1.6.1-23.el9.x86_64"
  ]
}
/home/ansible> | 27/04/2024 16:58:58

```

2. Le playbook suivant installera Apache et PHP, un fichier info.php et qui démarrera le serveur web Apache sur vos containers Debian.

```

---
- hosts: debian-0
  tasks:
    - name: Installer Apache
      ansible.builtin.apt:
        name: apache2
        state: present
        update_cache: true

    - name: Installer Php7
      ansible.builtin.apt:
        name: libapache2-mod-php8.2

```

```
state: present

- name: Démarrer le service Apache
ansible.builtin.service:
  name: apache2
  state: started
  enabled: true

- name: Copier le fichier phpinfo
ansible.builtin.copy:
  src: info.php
  dest: /var/www/html/index.php
  owner: www-data
  group: www-data
  mode: 0664
```

Pour l'intégrer il faut écrire

```
ansible-playbook apache.yml
```

3. Avant de le lancer avec la commande `ansible-playbook`, vérifiez le bon enchaînement des tâches avec les options `--check` et `--diff` (pas d'exécution réelle), `--list-hosts`, `--list-tasks` de la commande `ansible-playbook`. Testez aussi la conformité de votre playbook avec le "linteur" `ansible-lint`

```
ansible-playbook apache.yml --check --diff
ansible-playbook apache.yml --list-hosts
ansible-playbook apache.yml --list-tasks
ansible-lint apache.yml
```

```

    "Installed: httpd-2.4.57-5.el9.x86_64",
    "Installed: httpd-filesystem-2.4.57-5.el9.noarch",
    "Installed: mailcap-2.1.49-5.el9.noarch",
    "Installed: rocky-logos-httpd-90.15-2.el9.noarch",
    "Installed: mod_http2-1.15.19-5.el9_3.1.x86_64",
    "Installed: apr-1.7.0-12.el9_3.x86_64",
    "Installed: httpd-core-2.4.57-5.el9.x86_64",
    "Installed: apr-util-openssl-1.6.1-23.el9.x86_64"
  ]
}
/home/ansible> ansible-playbook apache.yml --check --diff 27/04/2024 16:58:58
ERROR! the playbook: apache.yml could not be found
/home/ansible> ansible-playbook apache.yml --list-hosts 1 27/04/2024 17:07:03
ERROR! the playbook: apache.yml could not be found
/home/ansible> touch apache.yml 1 27/04/2024 17:07:12
/home/ansible> ansible-playbook apache.yml --check --diff 27/04/2024 17:07:22
ERROR! Empty playbook, nothing to do: /home/ansible/apache.yml
/home/ansible> ansible-playbook apache.yml --list-hosts 4 27/04/2024 17:07:24
ERROR! Empty playbook, nothing to do: /home/ansible/apache.yml
/home/ansible> ansible-playbook apache.yml --list-tasks 4 27/04/2024 17:07:28
ERROR! Empty playbook, nothing to do: /home/ansible/apache.yml
/home/ansible> ansible-lint apache.yml 4 27/04/2024 17:07:37

Passed: 0 failure(s), 0 warning(s) on 1 files. Last profile that met the validation criteria was 'production'.
/home/ansible> | 27/04/2024 17:07:50

```

```

/home/ansible> ansible-playbook apache.yml --list-hosts 2 27/04/2024 18:10:17

playbook: apache.yml

  play #1 (debian-0): debian-0  TAGS: []
    pattern: ['debian-0']
    hosts (1):
      debian-0
/home/ansible> ansible-playbook apache.yml --list-tasks 27/04/2024 18:20:18

playbook: apache.yml

  play #1 (debian-0): debian-0  TAGS: []
    tasks:
      Installer Apache  TAGS: []
      Installer Php7    TAGS: []
      Démarrer le service Apache  TAGS: []
      Copier le fichier phpinfo TAGS: []
      Reload Apache     TAGS: []
/home/ansible> | 27/04/2024 18:20:24

```

```

/home/ansible> ansible-lint apache.yml 27/04/2024 18:20:24
WARNING Listing 8 violation(s) that are fatal
name[play]: All plays should be named.
apache.yml:2

yaml[indentation]: Wrong indentation: expected 6 but found 7
apache.yml:6

yaml[indentation]: Wrong indentation: expected 6 but found 7
apache.yml:12

yaml[indentation]: Wrong indentation: expected 6 but found 7
apache.yml:17

yaml[indentation]: Wrong indentation: expected 6 but found 7
apache.yml:23

yaml[octal-values]: Forbidden implicit octal value "0664"
apache.yml:27

args[module]: Unsupported parameters for (basic.py) module: tags. Supported parameters include: arguments, enabled, name, pattern, runlevel, sleep, state (args). (warning)
apache.yml:29 Task/Handler: Reload Apache

yaml[indentation]: Wrong indentation: expected 6 but found 7

```

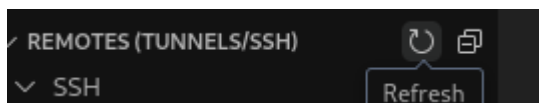
1. Créer une tâche nommée "reload" qui "reload" le server web 10. Tagué cette tâche "relance" puis utilisez le tag pour n'exécuter que cette tâche dans le playbook.

```

---
- hosts: debian
  tasks:
  - name: Reload Apache
    ansible.builtin.service:
      name: apache2
      state: reloaded
      tags: relance

```

```
ansible-playbook apache.yml --tags relance
```



5. A quoi servent les tags "never" et "always" (testez) ?

never et always sont des tags qui permettent de ne jamais exécuter une tâche ou de toujours l'exécuter.

```

ansible-playbook apache.yml --tags never
ansible-playbook apache.yml --tags always

```

```

/home/ansible> ansible-playbook apache.yml --tags never
27/04/2024 18:25:04

PLAY [debian-0] *****

TASK [Gathering Facts] *****
ok: [debian-0]

PLAY RECAP *****
debian-0 : ok=1 changed=0 unreachable=0 failed=0 skipped=0 rescued=0 ignored=0

/home/ansible> ansible-playbook apache.yml --tags always
27/04/2024 18:25:14

PLAY [debian-0] *****

TASK [Gathering Facts] *****
ok: [debian-0]

PLAY RECAP *****
debian-0 : ok=1 changed=0 unreachable=0 failed=0 skipped=0 rescued=0 ignored=0

/home/ansible> |
27/04/2024 18:26:14

```

6. Lister les faits à l'aide du module setup. A quoi servent ces faits ?

```
ansible -m setup debian-0
```



```
1/1 + + +
Tilix: bastien_fedora@desktop-31amj9f1~

specific_tasks ▾

PLAY RECAP *****
debian-0 : ok=1 changed=0 unreachable=0 failed=0 skipped=0 rescued=0 ignored=0

/home/ansible> ansible -m setup debian-0 27/04/2024 10:20:11
debian-0 SUCCESS => (
  "ansible_facts": {
    "ansible_all_ipv4_addresses": [
      "172.28.0.2"
    ],
    "ansible_all_ipv6_addresses": [
      "fe80::42:aaff:fe1c:2"
    ],
    "ansible_apparmor": {
      "status": "disabled"
    },
    "ansible_architecture": "x86_64",
    "ansible_bios_date": "12/01/2006",
    "ansible_bios_vendor": "innotek GmbH",
    "ansible_bios_version": "VirtualBox",
    "ansible_board_asset_tag": "NA",
    "ansible_board_name": "VirtualBox",
    "ansible_board_serial": "0",
    "ansible_board_vendor": "Oracle Corporation",
    "ansible_board_version": "1.2",
    "ansible_chassis_asset_tag": "NA",
    "ansible_chassis_serial": "NA",
    "ansible_chassis_vendor": "Oracle Corporation",
    "ansible_chassis_version": "NA",
    "ansible_end_line": {
      "BOOT_IMAGE": "/vmlinuz-6.1.0-20-amd64",
      "net.ifnames": "0",
      "quiet": true,
      "root": true,
      "root": "UUID=140999f6-826d-4091-8d31-620de84374d0"
    },
    "ansible_date_time": {
      "date": "2024-04-27",
      "day": "27",
      "epoch": "1714235276",
      "epoch_int": "1714235276",
      "hour": "18",
      "iso8601": "2024-04-27T16:27:56Z",
      "iso8601_basic": "20240427T162756Z21193",
      "iso8601_basic_short": "20240427T162756",
      "iso8601_micro": "2024-04-27T16:27:56.721193Z",
      "minute": "27",
      "month": "04",
      "second": "56",
      "time": "18:27:56",
      "tz": "CEST",
      "tz_dst": "CEST",
      "tz_offset": "+0200",
    },
  },
)
```

C'est facts permettent de connaître les informations sur la machine cible.

- ## 7. Récupérez les facts contenant les adresses IP de tous les containers via un filtre.

```
ansible -m setup debian -a "filter=ansible_default_ipv4"
```

```

1/1 ▾ + □ □ □
Tillie: bastien_fedora@desktop-31amj9f-1:~

specific_tasks ▾
/home/ansible> ansible -m setup debian -a "filter=ansible_default_ipv4" 4 27/04/2024 18:33:05
debian-1 | SUCCESS => {
  "ansible_facts": {
    "ansible_default_ipv4": {
      "address": "192.168.16.2",
      "alias": "eth0",
      "broadcast": "192.168.31.255",
      "gateway": "192.168.16.1",
      "interface": "eth0",
      "macaddress": "02:42:c0:a8:10:02",
      "mtu": 1500,
      "netmask": "255.255.240.0",
      "network": "192.168.16.0",
      "prefix": "20",
      "type": "ether"
    },
    "discovered_interpreter_python": "/usr/bin/python3"
  },
  "changed": false
}
debian-2 | SUCCESS => {
  "ansible_facts": {
    "ansible_default_ipv4": {
      "address": "172.30.0.2",
      "alias": "eth0",
      "broadcast": "172.30.255.255",
      "gateway": "172.30.0.1",
      "interface": "eth0",
      "macaddress": "02:42:ac:1e:00:02",
      "mtu": 1500,
      "netmask": "255.255.0.0",
      "network": "172.30.0.0",
      "prefix": "16",
      "type": "ether"
    },
    "discovered_interpreter_python": "/usr/bin/python3"
  },
  "changed": false
}
debian-0 | SUCCESS => {
  "ansible_facts": {
    "ansible_default_ipv4": {
      "address": "172.28.0.2",
      "alias": "eth0",
      "broadcast": "172.28.255.255",
      "gateway": "172.28.0.1",
      "interface": "eth0",
      "macaddress": "02:42:ac:1c:00:02",
      "mtu": 1500,
      "netmask": "255.255.0.0",
      "network": "172.28.0.0",
      "prefix": "16",
      "type": "ether"
    },
    "discovered_interpreter_python": "/usr/bin/python3"
  },
  "changed": false
}

```

8. Utilisez les facts et les templates jinja2 afin de modifier la directive fichier ports.conf sous Debian pour que lors de l'installation du module apache2 de Debian n'écoute que sur l'IP interne du container. Vous utiliserez les mots clefs notify et handler pour relancer le service apache dans le playbook.

```
---
- hosts: debian
  tasks:
    - name: Modifier le fichier ports.conf
      ansible.builtin.template:
        src: ports.conf.j2
        dest: /etc/apache2/ports.conf
        owner: root
        group: root
        mode: 0644
      notify: Reload Apache

  handlers:
    - name: Reload Apache
      ansible.builtin.service:
        name: apache2
        state: reloaded
```

```
Listen {{ ansible_default_ipv4.address }}
```

```
ansible-playbook ports.yml
```