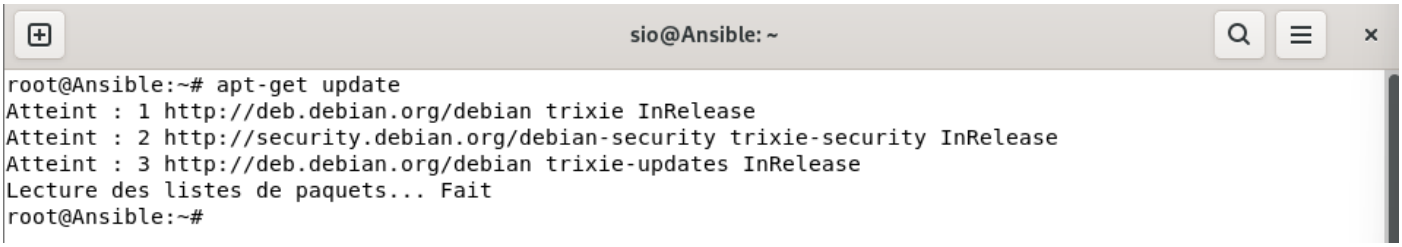
Chapitre 3 – Configuration de serveurs et d'applications avec Ansible

Sommaire

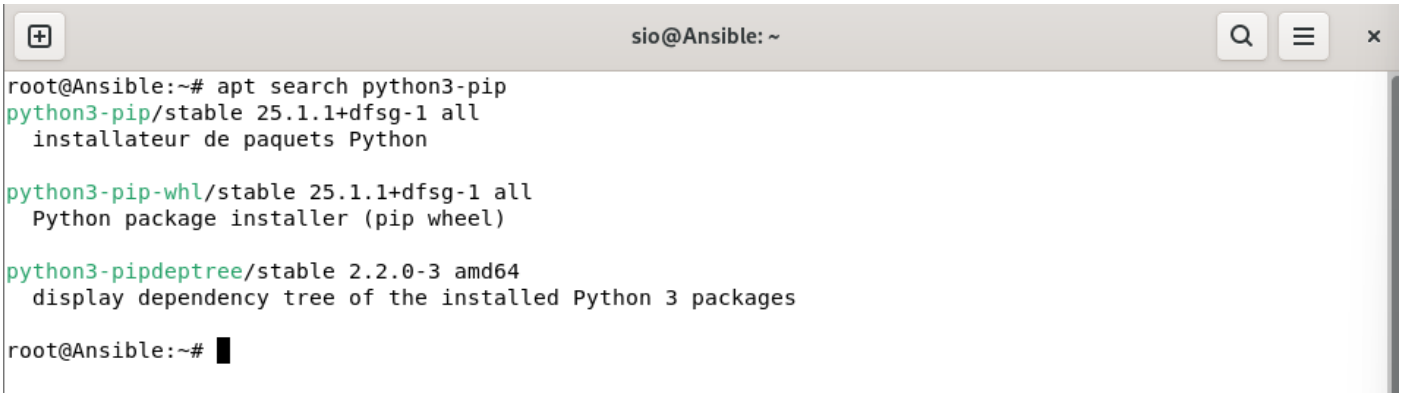
1. Installation d'Ansible.

- Je modifie le fichier hosts et hostname :

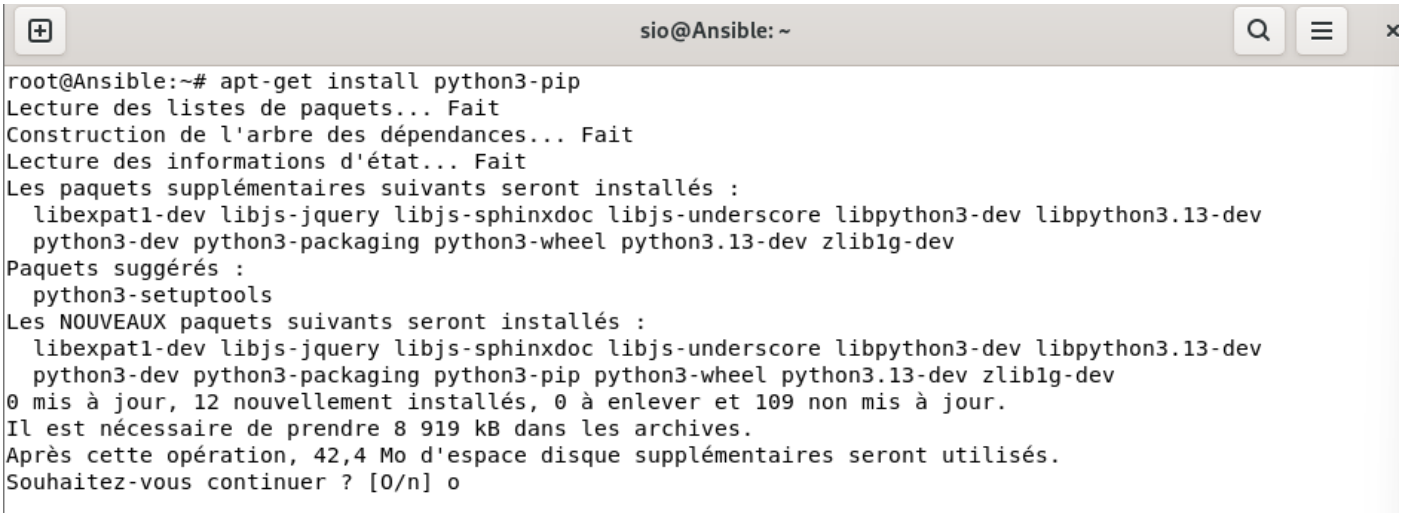
- Je mets à jour les paquets disponibles :



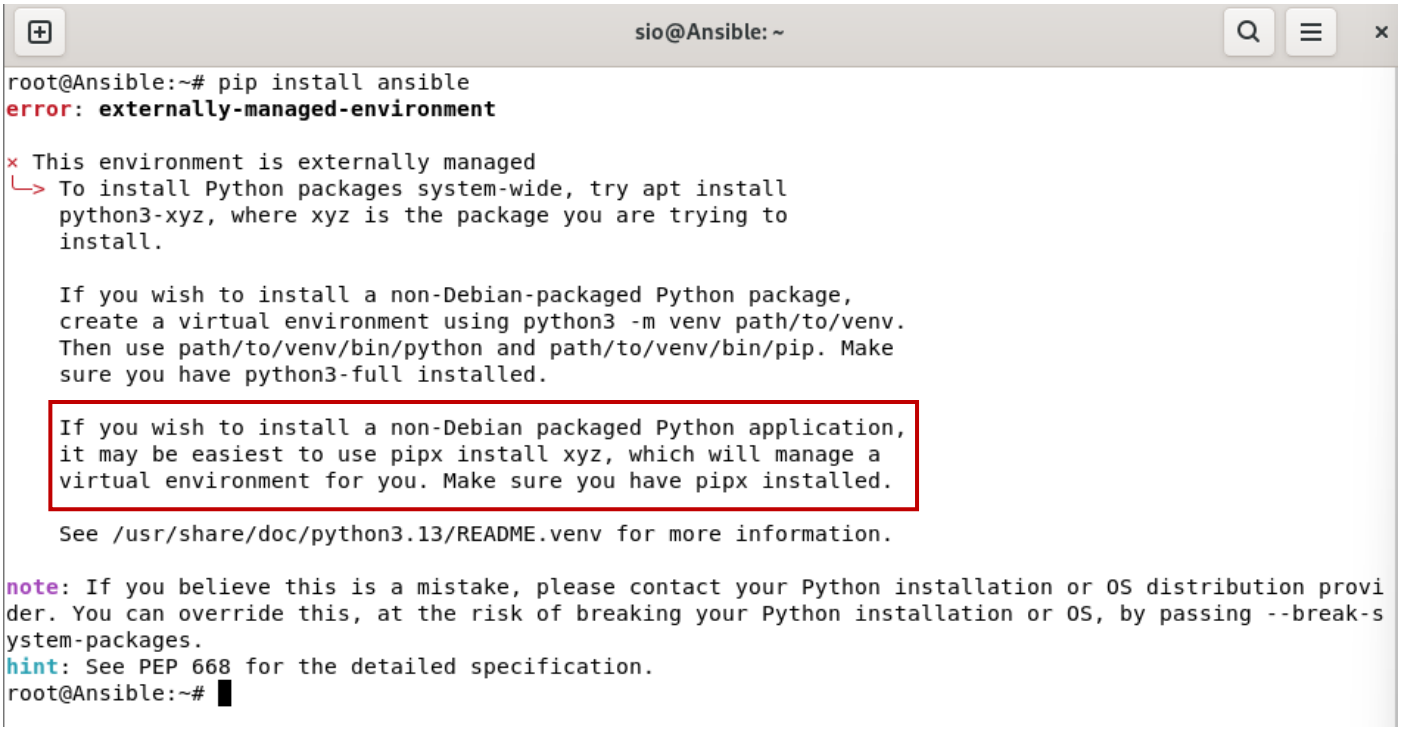
- J'installe l'outil pip :



- J'installe le paquet python3 :

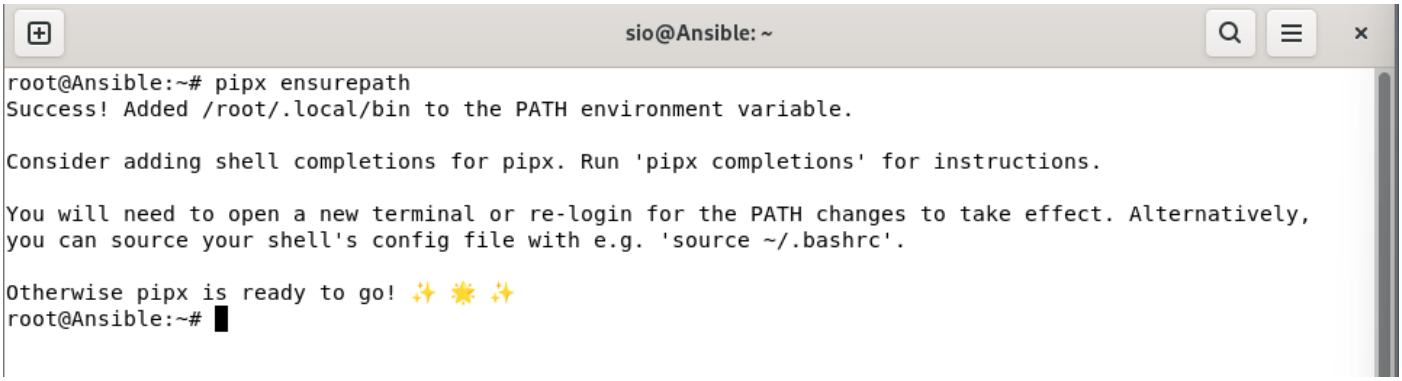


- Grâce à pip j'essaye d'installer ansible, je me rends compte que ce n'est pas possible et que je vais devoir installer un autre paquet :



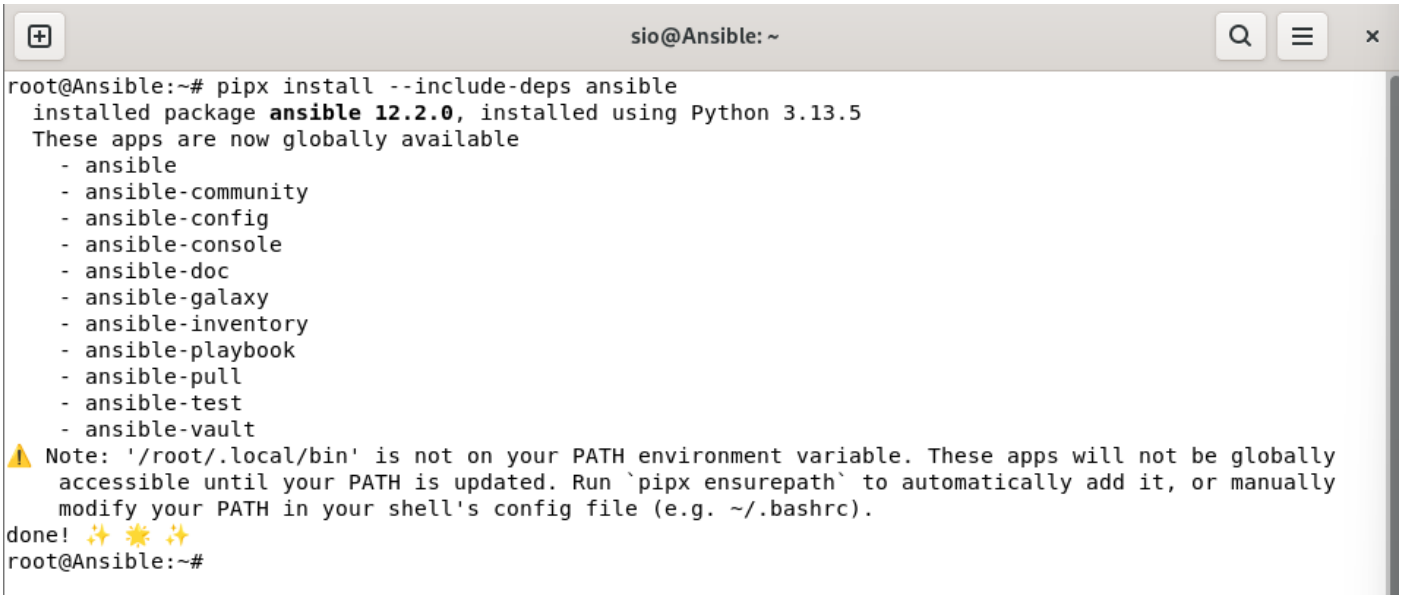
- J’installe pipx (pour installer des applications Python dans des environnements isolés) :

- J’ajoute le chemin d'exécution de pipx à la variable PATH :

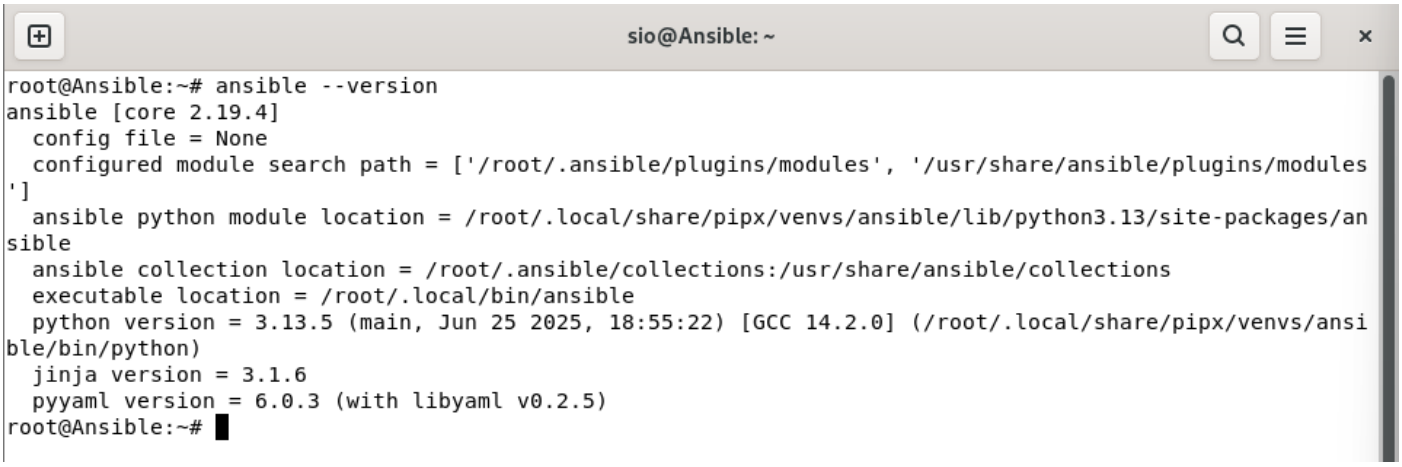


- Je vérifie les chemins d'exécution globaux pour pipx :

- Je finalise l’installation d'ansible via pipx :



- Je vérifie la version d'ansible installé :



2. Premier module avec Ansible (setup).

- J'exécute le module setup pour collecter les informations et les sauvegarder dans un fichier :

- J’affiche les informations détaillées sur l’hote :

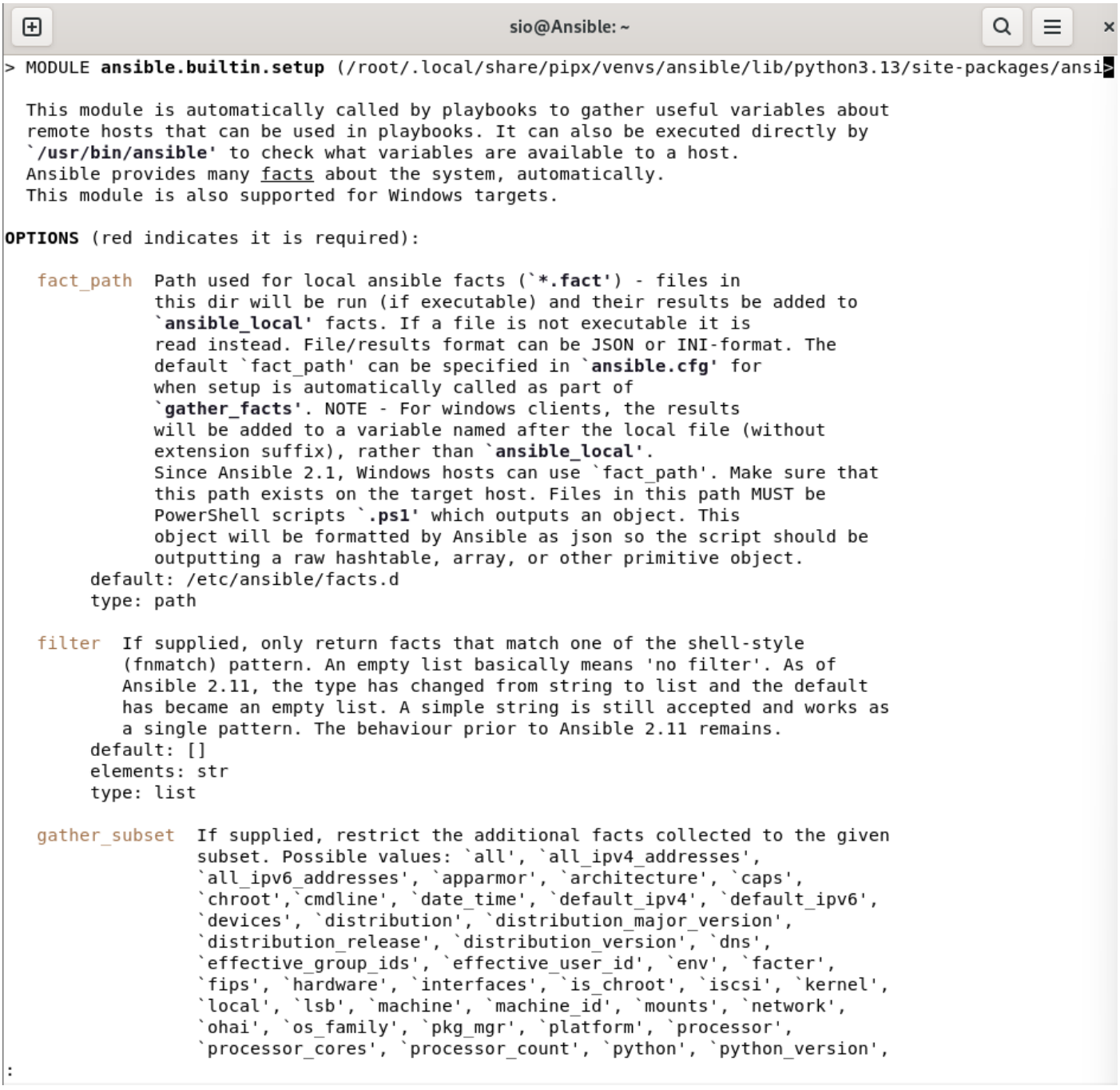
sio@Ansible: ~

```
root@Ansible:~# cat setup.txt
localhost | SUCCESS => {
    "ansible_facts": {
        "ansible_all_ipv4_addresses": [
            "10.0.2.15"
        ],
        "ansible_all_ipv6_addresses": [
            "fd17:625c:f037:2:a00:27ff:fee2:8661",
            "fe80::a00:27ff:fee2:8661",
            "fd17:625c:f037:2:db71:8829:d5f4:32"
        ],
        "ansible_apparmor": {
            "status": "enabled"
        },
        "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_cmdline": {
            "BOOT_IMAGE": "/boot/vmlinuz-6.12.48+deb13-amd64",
            "quiet": true,
            "ro": true,
            "root": "UUID=9ccbd479-6936-430a-8f70-1ed16e8b90e6"
        },
        "ansible_date_time": {
            "date": "2025-11-19",
            "day": "19",
            "epoch": "1763563231",
            "epoch_int": "1763563231",
            "hour": "15",
            "iso8601": "2025-11-19T14:40:31Z",
            "iso8601_basic": "20251119T154031333196",
            "iso8601_basic_short": "20251119T154031",
            "iso8601_micro": "2025-11-19T14:40:31.333196Z",
            "minute": "40",
            "month": "11",
            "second": "31",
            "time": "15:40:31",
            "tz": "CET",
```

```
        "iso8601_basic_short": "20251119T154031",
        "iso8601_micro": "2025-11-19T14:40:31.333196Z",
        "minute": "40",
        "month": "11",
        "second": "31",
        "time": "15:40:31",
        "tz": "CET",
        "tz_dst": "CEST",
        "tz_offset": "+0100",
        "weekday": "mercredi",
        "weekday_number": "3",
        "weeknumber": "46",
        "year": "2025"
    },
    "ansible_default_ipv4": {
        "address": "10.0.2.15",
        "alias": "enp0s3",
        "broadcast": "10.0.2.255",
        "gateway": "10.0.2.2",
        "interface": "enp0s3",
        "macaddress": "08:00:27:e2:86:61",
        "mtu": 1500,
        "netmask": "255.255.255.0",
        "network": "10.0.2.0",
        "prefix": "24",
        "type": "ether"
    },
    "ansible_default_ipv6": {
        "address": "fd17:625c:f037:2:db71:8829:d5f4:32",
        "gateway": "fe80::2",
        "interface": "enp0s3",
        "macaddress": "08:00:27:e2:86:61",
        "mtu": 1500,
        "prefix": "64",
        "scope": "global",
        "type": "ether"
    },
    "ansible_device_links": {
        "ids": {
            "sda": [
                "ata-VBOX_HARDDISK_VBdf726026-66acad41"
            ],
            "sda1": [
                "ata-VBOX_HARDDISK_VBdf726026-66acad41-part1"
            ],
            "sda2": [
                "ata-VBOX_HARDDISK_VBdf726026-66acad41-part2"
            ],
            "sda5": [
```

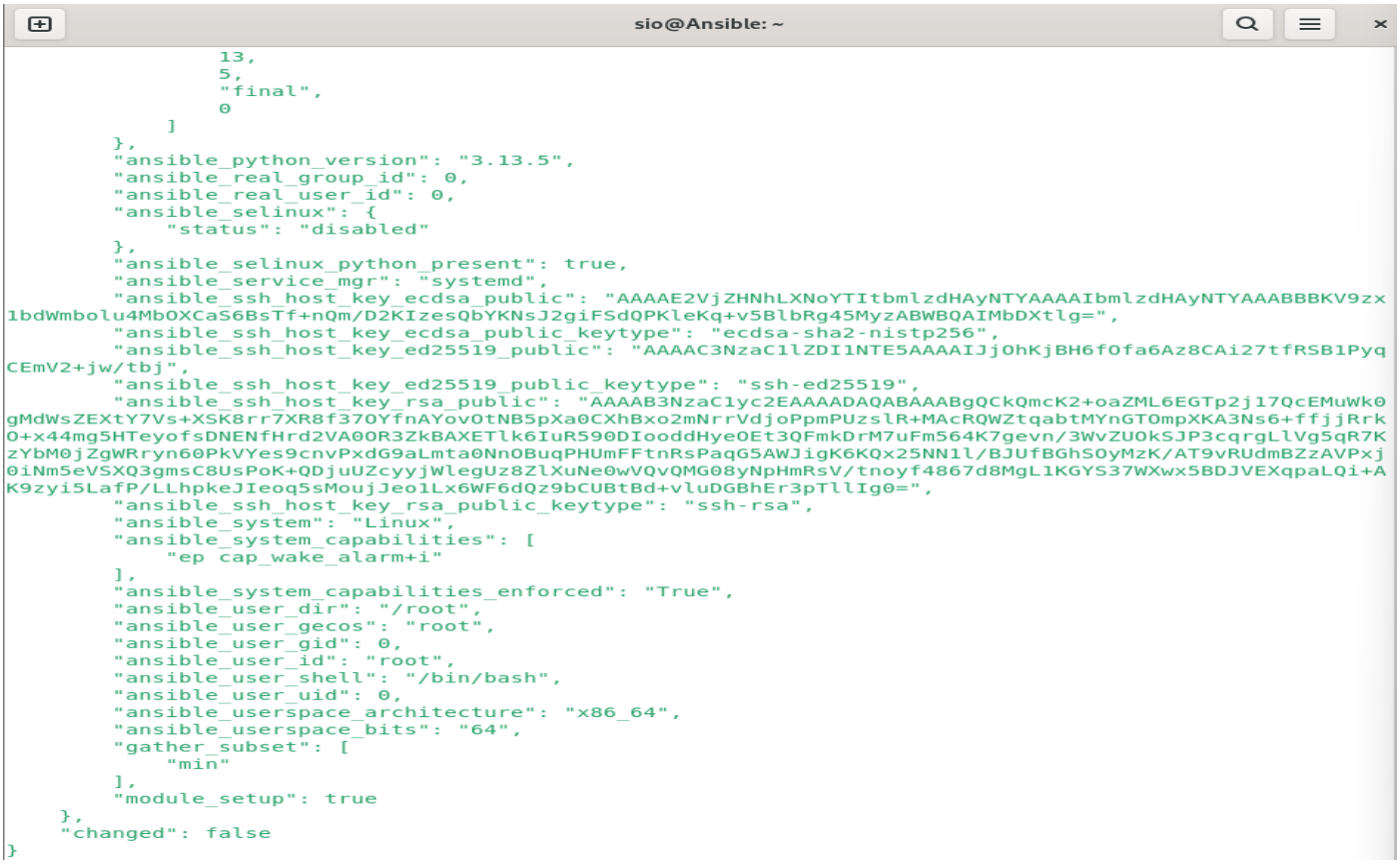
3. Aide et documentation officielle

- Je tape la commande ansible-doc setup, pour afficher la documentation du module setup :



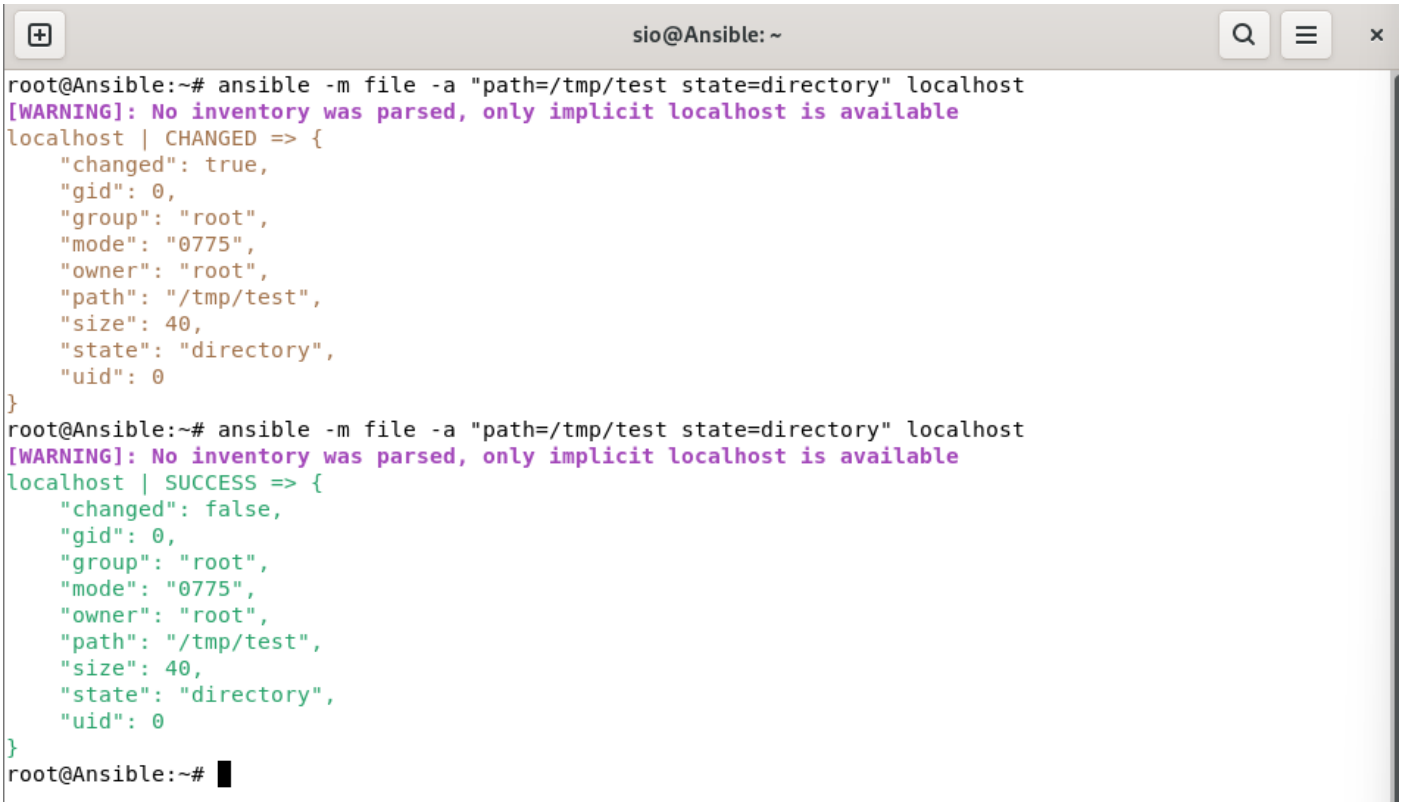
```
gather_subset  If supplied, restrict the additional facts collected to the given
               subset. Possible values: `all', `all_ipv4_addresses',
               `all_ipv6_addresses', `apparmor', `architecture', `caps',
               `chroot',`cmdline', `date_time', `default_ipv4', `default_ipv6',
               `devices', `distribution', `distribution_major_version',
               `distribution_release', `distribution_version', `dns',
               `effective_group_ids', `effective_user_id', `env', `facter',
               `fips', `hardware', `interfaces', `is_chroot', `iscsi', `kernel',
               `local', `lsb', `machine', `machine_id', `mounts', `network',
               `ohai', `os_family', `pkg_mgr', `platform', `processor',
               `processor_cores', `processor_count', `python', `python_version',
               `real_user_id', `selinux', `service_mgr',
               `ssh_host_key_dsa_public', `ssh_host_key_ecdsa_public',
               `ssh_host_key_ed25519_public', `ssh_host_key_rsa_public',
               `ssh_host_pub_keys', `ssh_pub_keys', `system',
               `system_capabilities', `system_capabilities_enforced', `systemd',
               `user', `user_dir', `user_gecos', `user_gid', `user_id',
               `user_shell', `user_uid', `virtual', `virtualization_role',
               `virtualization_type'. Can specify a list of values to specify a
               larger subset. Values can also be used with an initial
               `!' to specify that that specific subset should not be
               collected.  For instance:
               `!hardware,!network,!virtual,!ohai,!facter'. If `!all' is
               specified then only the min subset is collected. To avoid
               collecting even the min subset, specify `!all,!min'. To collect
               only specific facts, use `!all,!min', and specify the particular
               fact subsets. Use the filter parameter if you do not want to
               display some collected facts.
     default: all
     elements: str
     type: list

gather_timeout  Set the default timeout in seconds for individual fact
                gathering.
     default: 10
     type: int
```

- Je collecte le minimum des facts système :

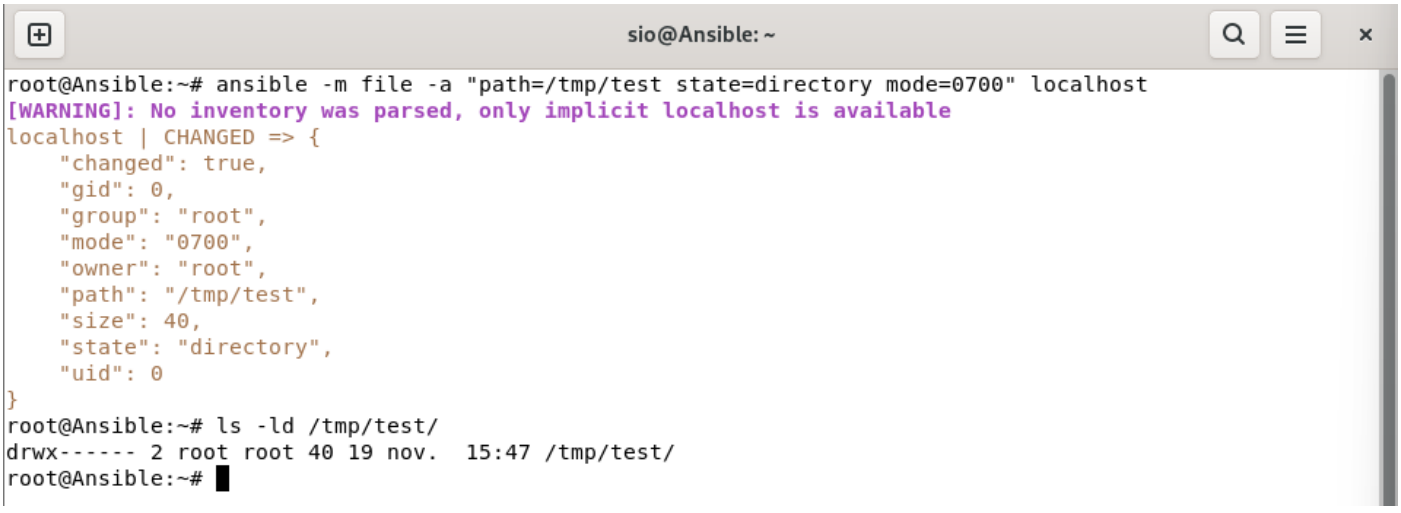


4. Idempotence : exemple avec gestion des répertoires

- J'utilise le module file d'Ansible pour créer un répertoire /tmp/test sur la machine locale (localhost) :

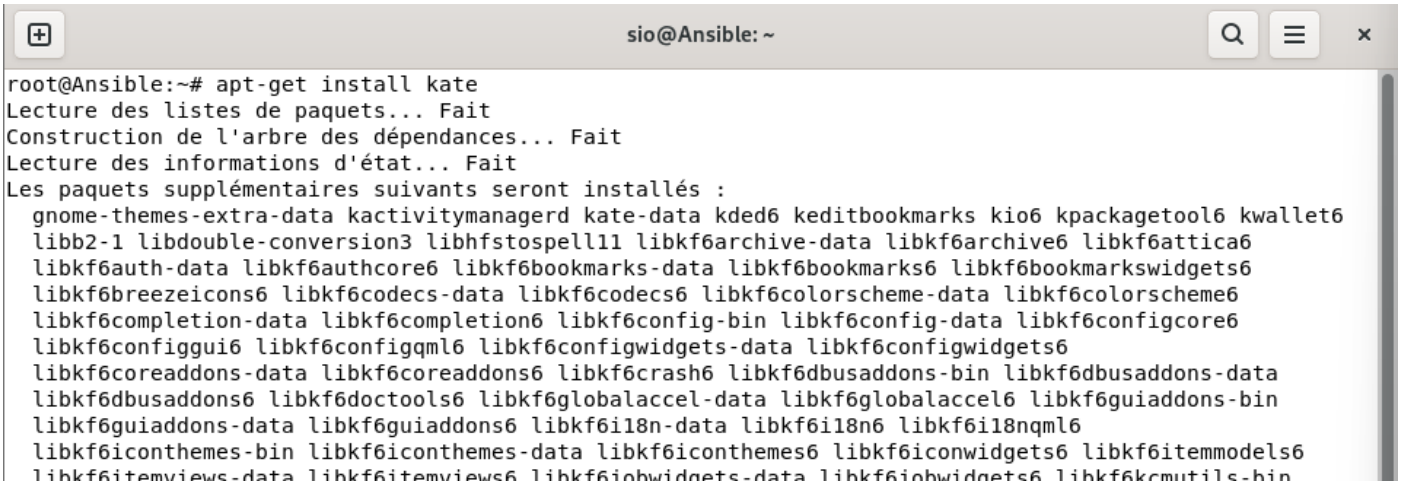


- J'utilise le module file d'Ansible pour modifier les permissions d'un répertoire déjà existant :

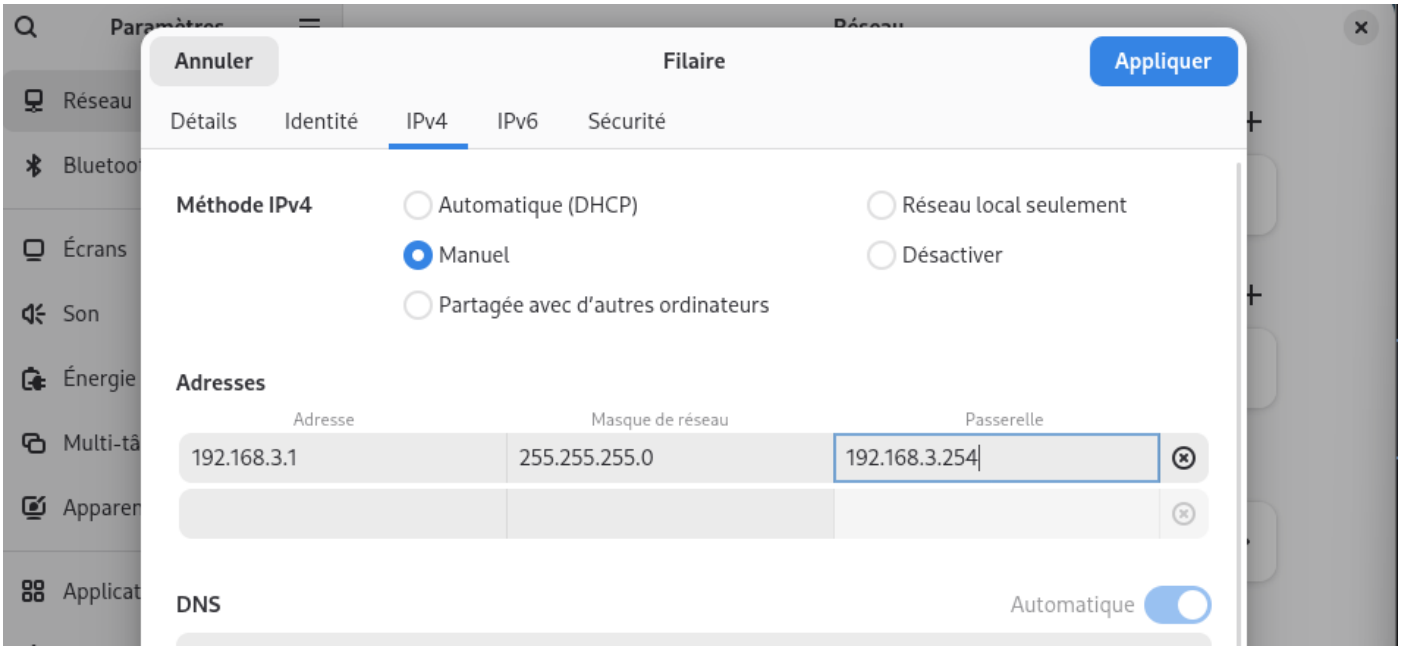


5. Création d'un fichier d'inventaire

- J'installe le paquet Kate :

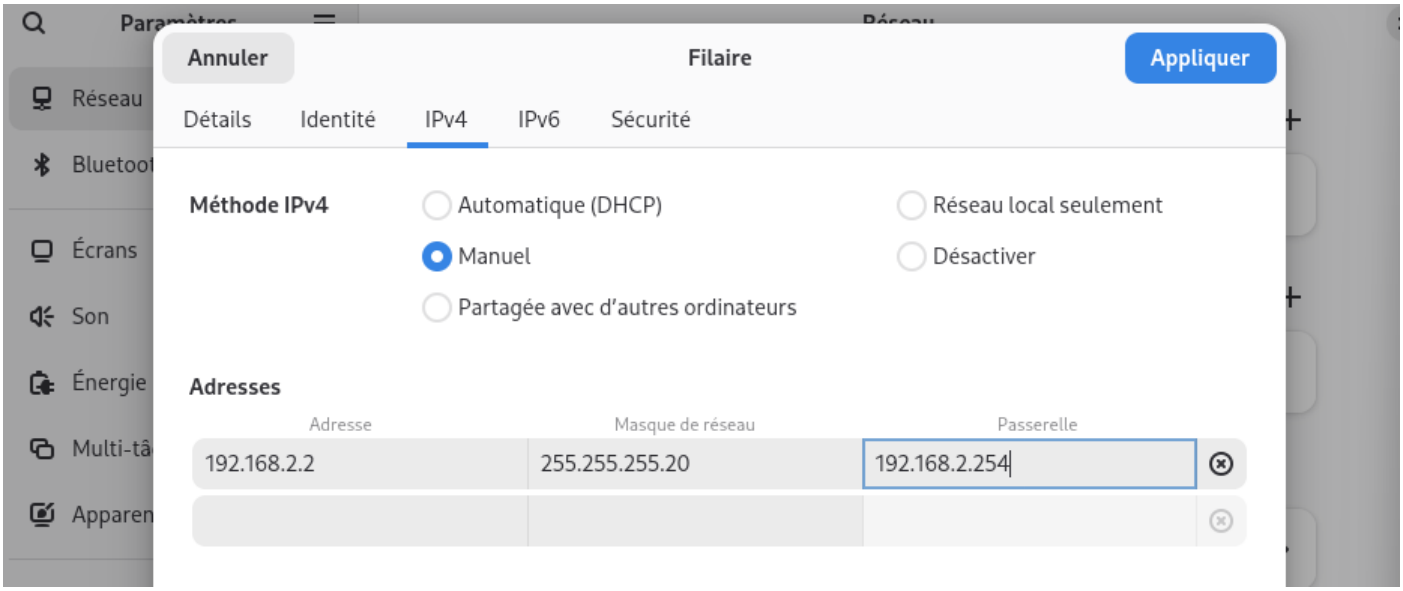


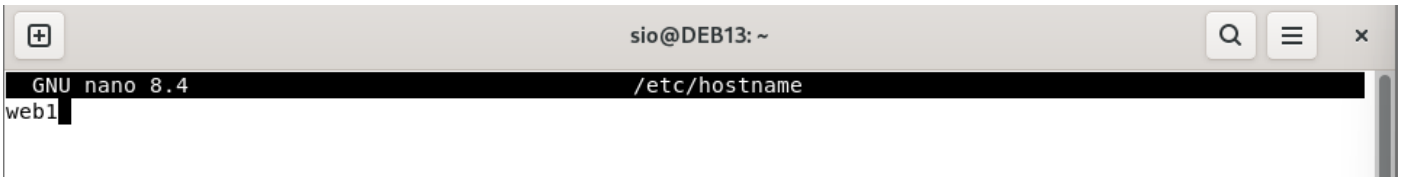
- Je change les paramètres de la carte réseau :

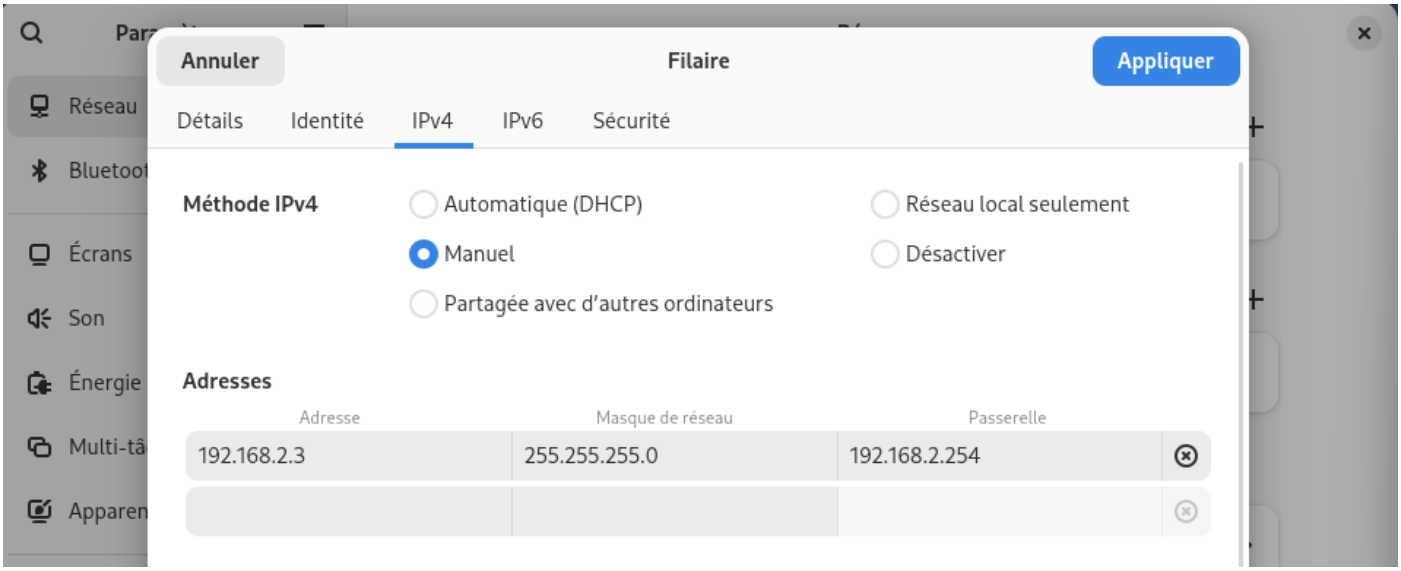


- Et le fichier /etc/hosts :

- Idem pour la machine web-1 et bdd-1 :







- J'active SSH sur les machines :

```
sio@Ansible: ~
root@Ansible:~# systemctl restart sshd
root@Ansible:~#
```

- Avec Kate je créer un fichier en .ini :

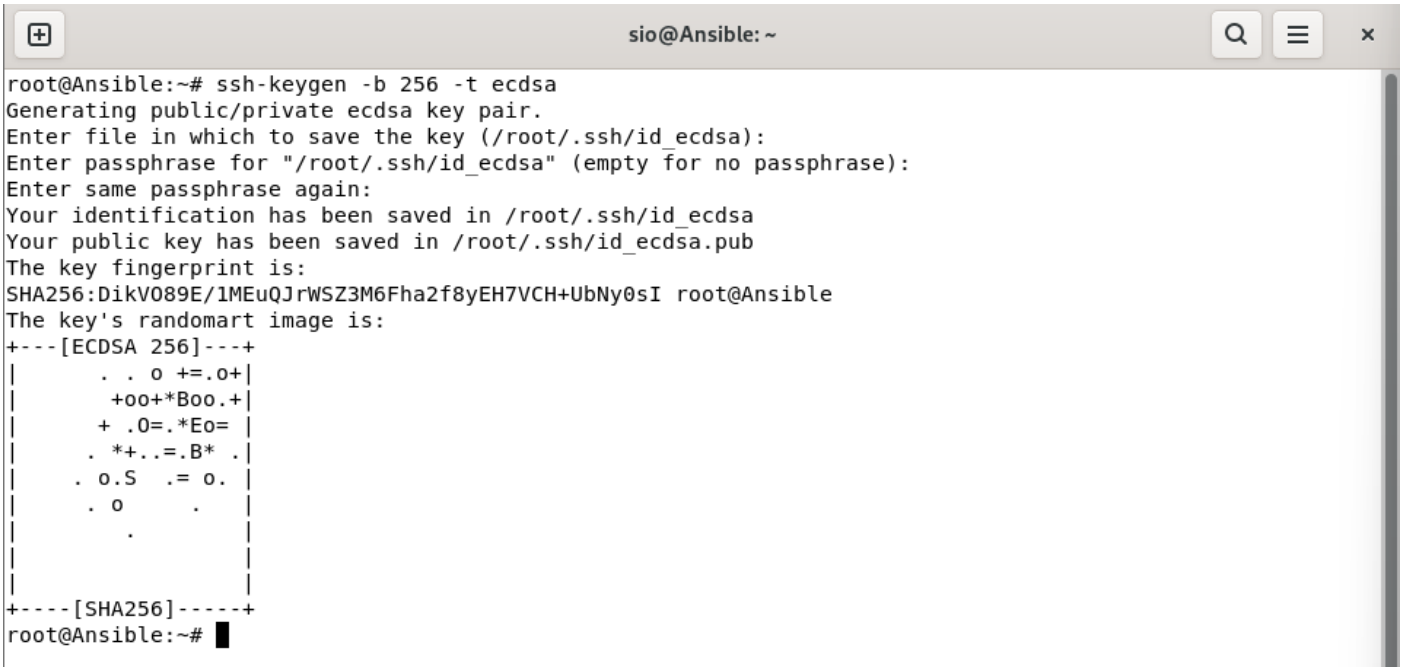
```
Nouveau  Ouvrir  Enregistrer  Enregistrer sous  Annuler  Refaire
test.inv
home ▸ sio ▸ Documents ▸ Inventory ▸ test.inv
1  localhost ansible_connection=local
2
3  [front]
4  web-1 ansible_host=192.168.2.2
5
6  [database]
7  bdd-1 ansible_host=192.168.2.3
8
9  [front:vars]
10 ansible_user=root
11
```

- J'utilise le module debug d'Ansible pour afficher les groupes et je le définis dans un fichier d'inventaire :

```
sio@Ansible: ~
root@Ansible:/home/sio/Documents# ansible -i Inventory/test.inv -m debug -a var=groups localhost
localhost | SUCCESS => {
    "groups": {
        "all": [
            "localhost",
            "web-1",
            "bdd-1"
        ],
        "database": [
            "bdd-1"
        ],
        "front": [
            "web-1"
        ],
        "ungrouped": [
            "localhost"
        ]
    }
}
root@Ansible:/home/sio/Documents#
```

6. Connexion aux serveurs avec le protocole SSH

- Je génère une paire de clés publique/privée :



- Sur les deux serveurs SSH je décommente les lignes PubkeyAuthentication yes et AuthorizedKeysFile dans le fichier de configuration du démon SSH :

- Sur le client SSH Ansible, J'enlève le # de commentaire dans le fichier de configuration du client ssh :

```
 GNU nano 8.4                                /etc/ssh/ssh_config
#  1. command line options
#  2. user-specific file
#  3. system-wide file
# Any configuration value is only changed the first time it is set.
# Thus, host-specific definitions should be at the beginning of the
# configuration file, and defaults at the end.

# Site-wide defaults for some commonly used options.  For a comprehensive
# list of available options, their meanings and defaults, please see the
# ssh_config(5) man page.

Include /etc/ssh/ssh_config.d/*.conf

Host *
#   ForwardAgent no
#   ForwardX11 no
#   ForwardX11Trusted yes
#   PasswordAuthentication yes
#   HostbasedAuthentication no
#   GSSAPIAuthentication no
#   GSSAPIDelegateCredentials no
#   GSSAPIKeyExchange no
#   GSSAPITrustDNS no
#   BatchMode no
#   CheckHostIP no
#   AddressFamily any
#   ConnectTimeout 0
#   StrictHostKeyChecking ask
#   IdentityFile ~/.ssh/id_rsa
#   IdentityFile ~/.ssh/id_dsa
   IdentityFile ~/.ssh/id_ecdsa
#   IdentityFile ~/.ssh/id_ed25519
#   Port 22
```

```
sio@Ansible: ~

root@Ansible:~# systemctl restart ssh
root@Ansible:~#
```

- J'envois depuis le client SSH Anisble, la clé publique aux deux serveurs SSH web-1 et bdd-1 :

```
sio@Ansible: ~

root@Ansible:~# ssh-copy-id -i .ssh/id_ecdsa.pub root@192.168.2.2
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: ".ssh/id_ecdsa.pub"
The authenticity of host '192.168.2.2 (192.168.2.2)' can't be established.
ED25519 key fingerprint is SHA256:VGQShOWT3H8BYmK+RUPxe516LgXCR/mBXvVOETmonwM.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already
 installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install
the new keys
root@192.168.2.2's password:

Number of key(s) added: 1

Now try logging into the machine, with: "ssh -i .ssh/id_ecdsa 'root@192.168.2.2'"
and check to make sure that only the key(s) you wanted were added.

root@Ansible:~#
```

```
root@Ansible:~# ssh-copy-id -i .ssh/id_ecdsa.pub root@192.168.2.3
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: ".ssh/id_ecdsa.pub"
The authenticity of host '192.168.2.3 (192.168.2.3)' can't be established.
ED25519 key fingerprint is SHA256:VGQShOWT3H8BYmK+RUPxe516LgXCR/mBXvVOETmonwM.
This host key is known by the following other names/addresses:
    ~/.ssh/known_hosts:1: [hashed name]
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already
 installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install
the new keys
root@192.168.2.3's password:

Number of key(s) added: 1

Now try logging into the machine, with: "ssh -i .ssh/id_ecdsa 'root@192.168.2.3'"
and check to make sure that only the key(s) you wanted were added.

root@Ansible:~#
```

- Je vérifie la présence de la clé publique sur les serveurs SSH :

```
sio@web1: ~
root@web1:~# cd .ssh/
root@web1:~/.ssh# ls -l
total 4
-rw------- 1 root root 174 26 nov.  15:38 authorized_keys
root@web1:~/.ssh# cat authorized_keys
ecdsa-sha2-nistp256 AAAAE2VjZHNhLXNoYTItbmlzdHAyNTYAAAAIbmlzdHAyNTYAAABBBIoi0KRGa5vGXJW5jcV8yTNBMgFRTew1
X98KUkm6sO+eHbl/HjEJkfntlyDFp6B6O9lLhMrkn9Mqr1IzIW8FYQ8= root@Ansible
root@web1:~/.ssh#
```

```
sio@bdd-1: ~
root@bdd-1:~# cd .ssh/
root@bdd-1:~/.ssh# ls -l
total 4
-rw------- 1 root root 174 26 nov.  15:39 authorized_keys
root@bdd-1:~/.ssh# cat authorized_keys
ecdsa-sha2-nistp256 AAAAE2VjZHNhLXNoYTItbmlzdHAyNTYAAAAIbmlzdHAyNTYAAABBBIoi0KRGa5vGXJW5jcV8yTNBMgFRTew1
X98KUkm6sO+eHbl/HjEJkfntlyDFp6B6O9lLhMrkn9Mqr1IzIW8FYQ8= root@Ansible
root@bdd-1:~/.ssh#
```

- Je vérifie le bon fonctionnement de l'authentification par clés :

```
sio@Ansible: ~
root@Ansible:~# ssh root@192.168.2.2
Linux web1 6.12.48+deb13-amd64 #1 SMP PREEMPT_DYNAMIC Debian 6.12.48-1 (2025-09-20) 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.
root@web1:~#
```

- Sur les deux serveurs SSH web-1 et bdd-1, je désactive l'authentification par mot de passe pour juste conserver celle par clés dans le fichier de configuration /etc/ssh/sshd_config. Je décommente pour ce faire la directive PasswordAuthentication et je lui affecte le paramètre no :

```
  GNU nano 8.4                          /etc/ssh/sshd_config *

#AuthorizedPrincipalsFile none

#AuthorizedKeysCommand none
#AuthorizedKeysCommandUser nobody

# For this to work you will also need host keys in /etc/ssh/ssh_known_hosts
#HostbasedAuthentication no
# Change to yes if you don't trust ~/.ssh/known_hosts for
# HostbasedAuthentication
#IgnoreUserKnownHosts no
# Don't read the user's ~/.rhosts and ~/.shosts files
#IgnoreRhosts yes

# To disable tunneled clear text passwords, change to "no" here!
PasswordAuthentication no
#PermitEmptyPasswords no
```

```
  GNU nano 8.4                          /etc/ssh/sshd_config

# For this to work you will also need host keys in /etc/ssh/ssh_known_hosts
#HostbasedAuthentication no
# Change to yes if you don't trust ~/.ssh/known_hosts for
# HostbasedAuthentication
#IgnoreUserKnownHosts no
# Don't read the user's ~/.rhosts and ~/.shosts files
#IgnoreRhosts yes

# To disable tunneled clear text passwords, change to "no" here!
PasswordAuthentication no
#PermitEmptyPasswords no

# Change to "yes" to enable keyboard-interactive authentication.  Depending on
# the system's configuration, this may involve passwords, challenge-response,
# one-time passwords or some combination of these and other methods.
# Beware issues with some PAM modules and threads.
KbdInteractiveAuthentication no
```

- J'active l'agent SSH sur le client SSH Ansible :

```
sio@Ansible: ~
root@Ansible:~# ssh-agent /bin/bash
root@Ansible:~# ssh-add
Identity added: /root/.ssh/id_ecdsa (root@Ansible)
root@Ansible:~#
```

7. Test de communication avec le module ping

- Je réalise un test de communication avec les machines de l'inventaire :

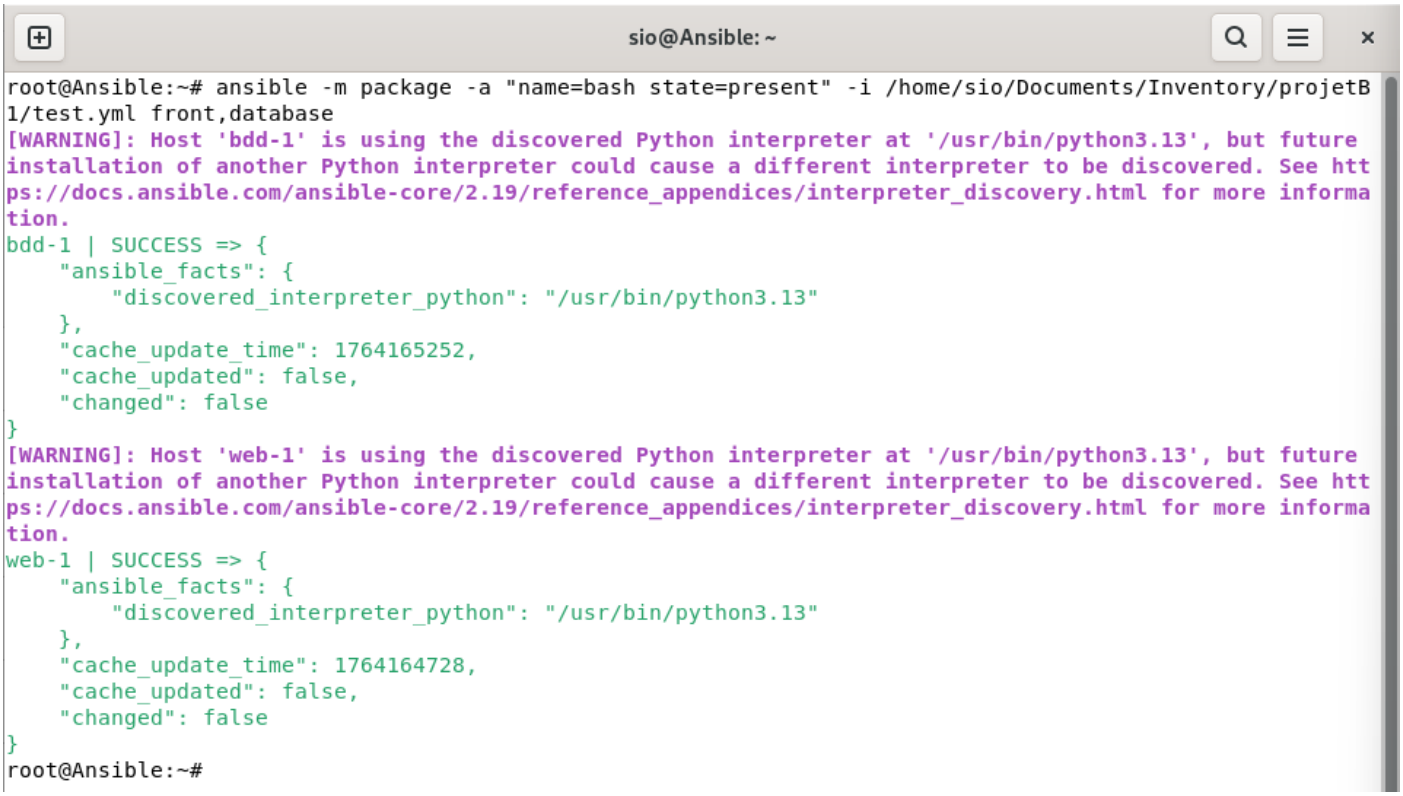
```
root@Ansible:~# ansible -i /home/sio/Documents/Inventory/test.inv -m ping all
[WARNING]: Host 'localhost' is using the discovered Python interpreter at '/usr/bin/python3.13', but fut
ure installation of another Python interpreter could cause a different interpreter to be discovered. See
 https://docs.ansible.com/ansible-core/2.19/reference_appendices/interpreter_discovery.html for more inf
ormation.
localhost | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.13"
    },
    "changed": false,
    "ping": "pong"
}
[WARNING]: Host 'web-1' is using the discovered Python interpreter at '/usr/bin/python3.13', but future
installation of another Python interpreter could cause a different interpreter to be discovered. See htt
ps://docs.ansible.com/ansible-core/2.19/reference_appendices/interpreter_discovery.html for more informa
tion.
web-1 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.13"
    },
    "changed": false,
    "ping": "pong"
}
[WARNING]: Host 'bdd-1' is using the discovered Python interpreter at '/usr/bin/python3.13', but future
installation of another Python interpreter could cause a different interpreter to be discovered. See htt
ps://docs.ansible.com/ansible-core/2.19/reference_appendices/interpreter_discovery.html for more informa
tion.
bdd-1 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.13"
    },
    "changed": false,
    "ping": "pong"
}
root@Ansible:~#
```

```
sio@Ansible: ~
root@Ansible:~# ansible -i /home/sio/Documents/Inventory/test.yml -m ping front
[WARNING]: Host 'web-1' is using the discovered Python interpreter at '/usr/bin/python3.13', but future
installation of another Python interpreter could cause a different interpreter to be discovered. See htt
ps://docs.ansible.com/ansible-core/2.19/reference_appendices/interpreter_discovery.html for more informa
tion.
web-1 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.13"
    },
    "changed": false,
    "ping": "pong"
}
root@Ansible:~#
```

8. Installation d'un serveur Apache (en mode ad-hoc)

- Je m'assure de la présence d'un paquet grâce au module apt :

- Ou module package si la distribution est différente :



- J'installe le serveur Apache sur les machines du groupe front :

```
root@Ansible:~# ansible -i /home/sio/Documents/Inventory/projetB1/test.yml -m apt -a "name=apache2 state
=present" front
[WARNING]: Host 'web-1' is using the discovered Python interpreter at '/usr/bin/python3.13', but future
installation of another Python interpreter could cause a different interpreter to be discovered. See htt
ps://docs.ansible.com/ansible-core/2.19/reference_appendices/interpreter_discovery.html for more informa
tion.
web-1 | CHANGED => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.13"
    },
    "cache_update_time": 1764164728,
    "cache_updated": false,
    "changed": true,
    "stderr": "",
    "stderr_lines": [],
    "stdout": "Reading package lists...\nBuilding dependency tree...\nReading state information...\nThe
following additional packages will be installed:\n  apache2-data apache2-utils\nSuggested packages:\n  a
pache2-doc apache2-suexec-pristine | apache2-suexec-custom ufw\nThe following NEW packages will be insta
lled:\n  apache2 apache2-data apache2-utils\n0 upgraded, 3 newly installed, 0 to remove and 109 not upgr
aded.\nNeed to get 599 kB of archives.\nAfter this operation, 1914 kB of additional disk space will be u
sed.\nGet:1 http://deb.debian.org/debian trixie/main amd64 apache2-data all 2.4.65-2 [160 kB]\nGet:2 htt
p://deb.debian.org/debian trixie/main amd64 apache2-utils amd64 2.4.65-2 [215 kB]\nGet:3 http://deb.debi
an.org/debian trixie/main amd64 apache2 amd64 2.4.65-2 [224 kB]\nFetched 599 kB in 0s (1699 kB/s)\nSelec
ting previously unselected package apache2-data.\r\n(Reading database ... \r(Reading database ... 5%\r(R
eading database ... 10%\r(Reading database ... 15%\r(Reading database ... 20%\r(Reading database ... 25%
\r(Reading database ... 30%\r(Reading database ... 35%\r(Reading database ... 40%\r(Reading database ...
 45%\r(Reading database ... 50%\r(Reading database ... 55%\r(Reading database ... 60%\r(Reading database
 ... 65%\r(Reading database ... 70%\r(Reading database ... 75%\r(Reading database ... 80%\r(Reading data
base ... 85%\r(Reading database ... 90%\r(Reading database ... 95%\r(Reading database ... 100%\r(Reading
 database ... 164926 files and directories currently installed.)\r\nPreparing to unpack .../apache2-data
_2.4.65-2_all.deb ...\r\nUnpacking apache2-data (2.4.65-2) ...\r\nSelecting previously unselected packag
e apache2-utils.\r\nPreparing to unpack .../apache2-utils_2.4.65-2_amd64.deb ...\r\nUnpacking apache2-ut
ils (2.4.65-2) ...\r\nSelecting previously unselected package apache2.\r\nPreparing to unpack .../apache
2_2.4.65-2_amd64.deb ...\r\nUnpacking apache2 (2.4.65-2) ...\r\nSetting up apache2-data (2.4.65-2) ...\r
\nSetting up apache2-utils (2.4.65-2) ...\r\nSetting up apache2 (2.4.65-2) ...\r\nEnabling module mpm_ev
ent.\r\nEnabling module authz_core.\r\nEnabling module authz_host.\r\nEnabling module authn_core.\r\nEna
bling module auth_basic.\r\nEnabling module access_compat.\r\nEnabling module authn_file.\r\nEnabling mo
dule authz_user.\r\nEnabling module alias.\r\nEnabling module dir.\r\nEnabling module autoindex.\r\nEnab
ling module env.\r\nEnabling module mime.\r\nEnabling module negotiation.\r\nEnabling module setenvif.\r
\nEnabling module filter.\r\nEnabling module deflate.\r\nEnabling module status.\r\nEnabling module reqt
imeout.\r\nEnabling conf charset.\r\nEnabling conf localized-error-pages.\r\nEnabling conf other-vhosts-
access-log.\r\nEnabling conf security.\r\nEnabling conf serve-cgi-bin.\r\nEnabling site 000-default.\r\n
Created symlink '/etc/systemd/system/multi-user.target.wants/apache2.service' → '/usr/lib/systemd/system
/apache2.service'.\r\r\nCreated symlink '/etc/systemd/system/multi-user.target.wants/apache-htcacheclean
```

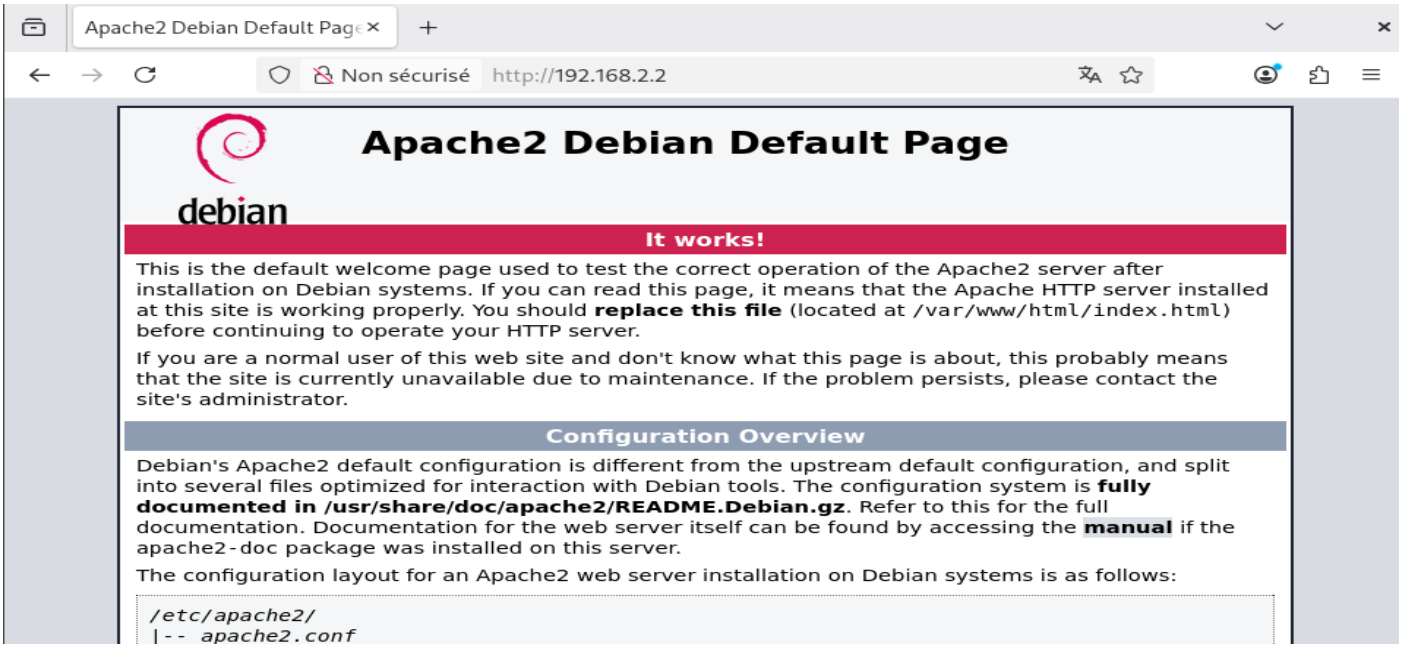
```
        "(Reading database ... 100%",
        "(Reading database ... 164926 files and directories currently installed.)",
        "Preparing to unpack .../apache2-data_2.4.65-2_all.deb ...",
        "Unpacking apache2-data (2.4.65-2) ...",
        "Selecting previously unselected package apache2-utils.",
        "Preparing to unpack .../apache2-utils_2.4.65-2_amd64.deb ...",
        "Unpacking apache2-utils (2.4.65-2) ...",
        "Selecting previously unselected package apache2.",
        "Preparing to unpack .../apache2_2.4.65-2_amd64.deb ...",
        "Unpacking apache2 (2.4.65-2) ...",
        "Setting up apache2-data (2.4.65-2) ...",
        "Setting up apache2-utils (2.4.65-2) ...",
        "Setting up apache2 (2.4.65-2) ...",
        "Enabling module mpm_event.",
        "Enabling module authz_core.",
        "Enabling module authz_host.",
        "Enabling module authn_core.",
        "Enabling module auth_basic.",
        "Enabling module access_compat.",
        "Enabling module authn_file.",
        "Enabling module authz_user.",
        "Enabling module alias.",
        "Enabling module dir.",
        "Enabling module autoindex.",
        "Enabling module env.",
        "Enabling module mime.",
        "Enabling module negotiation.",
        "Enabling module setenvif.",
        "Enabling module filter.",
        "Enabling module deflate.",
        "Enabling module status.",
        "Enabling module reqtimeout.",
        "Enabling conf charset.",
        "Enabling conf localized-error-pages.",
        "Enabling conf other-vhosts-access-log.",
        "Enabling conf security.",
        "Enabling conf serve-cgi-bin.",
        "Enabling site 000-default.",
        "Created symlink '/etc/systemd/system/multi-user.target.wants/apache2.service' → '/usr/lib/systemd/system/apache2.service'.",
        "",
        "Created symlink '/etc/systemd/system/multi-user.target.wants/apache-htcacheclean.service' → '/usr/lib/systemd/system/apache-htcacheclean.service'.",
        "",
        "Processing triggers for man-db (2.13.1-1) ..."
    ]
}
```


- Je créer le fichier de configuration .ansible.cfg dans le répertoire personnel pour supprimer le Warning :

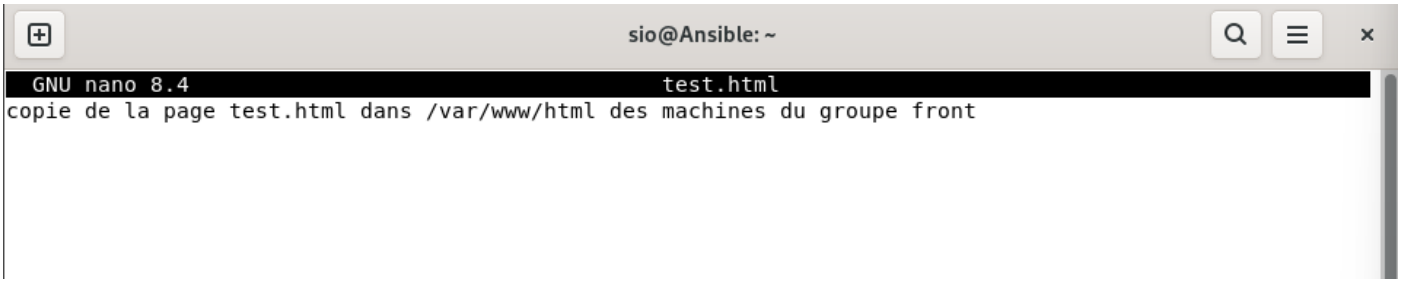
```
root@Ansible:~# ansible -i /home/sio/Documents/Inventory/projetB1/test.yml -m apt -a "name=apache2 state
=present" front
[WARNING]: Host 'web-1' is using the discovered Python interpreter at '/usr/bin/python3.13', but future
installation of another Python interpreter could cause a different interpreter to be discovered. See htt
ps://docs.ansible.com/ansible-core/2.19/reference_appendices/interpreter_discovery.html for more informa
tion.
web-1 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.13"
    },
    "cache_update_time": 1764164728,
    "cache_updated": false,
    "changed": false
}
root@Ansible:~#
```

- Je vérifie le statut d'apache :

```
sio@web1: ~
● apache2.service - The Apache HTTP Server
     Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)
     Active: active (running) since Wed 2025-12-03 16:02:20 CET; 4min 40s ago
 Invocation: 9ea54bd3d9d84e04b530074c77b2ced5
       Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 3771 (apache2)
      Tasks: 55 (limit: 4619)
     Memory: 9M (peak: 9.5M)
        CPU: 142ms
     CGroup: /system.slice/apache2.service
             ├─3771 /usr/sbin/apache2 -k start
             ├─3772 /usr/sbin/apache2 -k start
             └─3773 /usr/sbin/apache2 -k start

déc. 03 16:02:19 web1 systemd[1]: Starting apache2.service - The Apache HTTP Server...
déc. 03 16:02:20 web1 apachectl[3770]: AH00558: apache2: Could not reliably determine the server's full>
déc. 03 16:02:20 web1 systemd[1]: Started apache2.service - The Apache HTTP Server.
~
~
~
```



- Je créer une page de test :

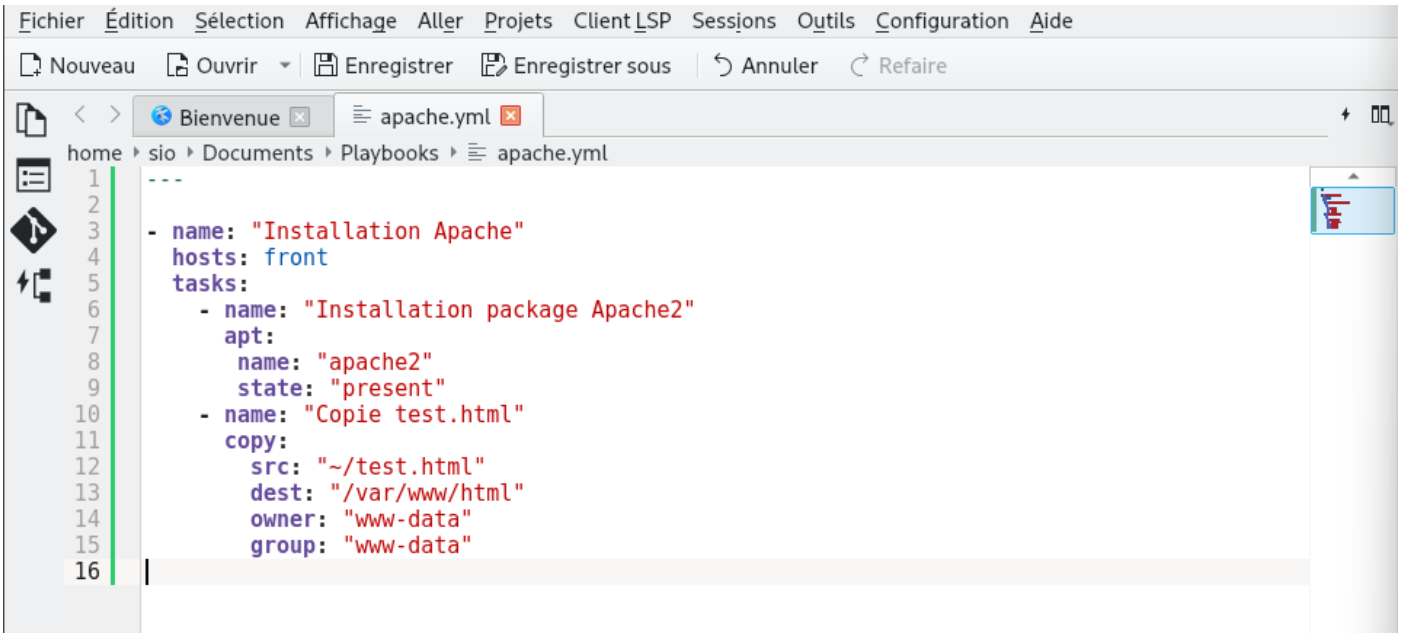


- Je copie le fichier local test.html vers un emplacement distant sur les machines du groupe front :

```
root@Ansible:~# ansible -i /home/sio/Documents/Inventory/projetB1/test.yml -m copy -a "src=test.html own
er=www-data group=www-data mode=644 dest=/var/www/html" front
[WARNING]: Host 'web-1' is using the discovered Python interpreter at '/usr/bin/python3.13', but future
installation of another Python interpreter could cause a different interpreter to be discovered. See htt
ps://docs.ansible.com/ansible-core/2.19/reference_appendices/interpreter_discovery.html for more informa
tion.
web-1 | CHANGED => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.13"
    },
    "changed": true,
    "checksum": "17d9995016f61d5a9938586c21f05036cb99e314",
    "dest": "/var/www/html/test.html",
    "gid": 33,
    "group": "www-data",
    "md5sum": "d567e81f8c8a10afade741c8be372fce",
    "mode": "0644",
    "owner": "www-data",
    "size": 75,
    "src": "/root/.ansible/tmp/ansible-tmp-1764774650.1689014-3667-189740020429475/.source.html",
    "state": "file",
    "uid": 33
}
root@Ansible:~#
```

9. Premier playbook

- Je créer dans le dossier Playbook, un fichier apache.yml :

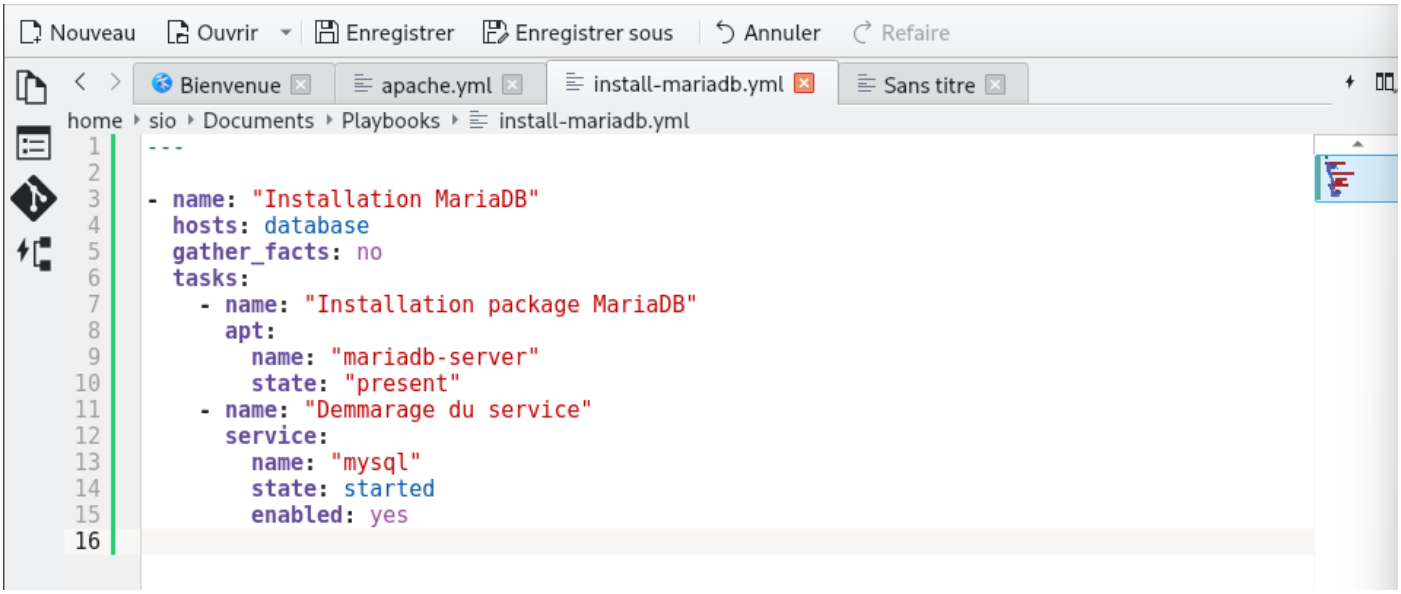


- Puis grâce a ce fichier je lance l'installation d'apache :

```
root@Ansible:~# ansible-playbook -i /home/sio/Documents/Inventory/projetB1/test.yml /home/sio/Documents/
Playbooks/apache.yml

PLAY [Installation Apache] *****************************************************

TASK [Gathering Facts] *********************************************************
[WARNING]: Host 'web-1' is using the discovered Python interpreter at '/usr/bin/python3.13', but future
installation of another Python interpreter could cause a different interpreter to be discovered. See htt
ps://docs.ansible.com/ansible-core/2.19/reference_appendices/interpreter_discovery.html for more informa
tion.
ok: [web-1]

TASK [Installation package Apache2] ********************************************
ok: [web-1]

TASK [Copie test.html] *********************************************************
ok: [web-1]

PLAY RECAP *********************************************************************
web-1                      : ok=3    changed=0    unreachable=0    failed=0    skipped=0    rescued=0
 ignored=0

root@Ansible:~#
```

10. Installation d'un serveur MariaDB

- Je créer un fichier install-mariadb.yml :



- Puis je l'installe :

```
root@Ansible:~# ansible-playbook -i /home/sio/Documents/Inventory/test.yml /home/sio/Documents/Playbooks
/install-mariadb.yml

PLAY [Installation MariaDB] ****************************************************************************

TASK [Installation package MariaDB] ********************************************************************
[WARNING]: Host 'bdd-1' is using the discovered Python interpreter at '/usr/bin/python3.13', but future
installation of another Python interpreter could cause a different interpreter to be discovered. See htt
ps://docs.ansible.com/ansible-core/2.19/reference_appendices/interpreter_discovery.html for more informa
tion.
changed: [bdd-1]

TASK [Demarrage du service] ****************************************************************************
ok: [bdd-1]

PLAY RECAP *********************************************************************************************
bdd-1                      : ok=2    changed=1    unreachable=0    failed=0    skipped=0    rescued=0
 ignored=0

root@Ansible:~#
```

- Puis je vérifie sur bdd-1le statutde mariadb :

```
root@bdd-1:~# ss -antp4
State    Recv-Q   Send-Q     Local Address:Port      Peer Address:Port   Process
LISTEN   0        4096           127.0.0.1:631            0.0.0.0:*       users:(("cupsd",pid=1619,fd=7))
LISTEN   0        128              0.0.0.0:22             0.0.0.0:*       users:(("sshd",pid=1017,fd=6))
LISTEN   0        80             127.0.0.1:3306           0.0.0.0:*       users:(("mariadbd",pid=4920,fd=28))
root@bdd-1:~# systemctl status mariadb
● mariadb.service - MariaDB 11.8.3 database server
     Loaded: loaded (/usr/lib/systemd/system/mariadb.service; enabled; preset: enabled)
     Active: active (running) since Wed 2025-12-10 15:45:22 CET; 2min 43s ago
 Invocation: 42f28598534c43fda13ec575705f9116
       Docs: man:mariadbd(8)
             https://mariadb.com/kb/en/library/systemd/
   Main PID: 4920 (mariadbd)
     Status: "Taking your SQL requests now..."
      Tasks: 10 (limit: 30491)
     Memory: 124.7M (peak: 129.5M)
        CPU: 1.479s
     CGroup: /system.slice/mariadb.service
             └─4920 /usr/sbin/mariadbd

déc. 10 15:45:21 bdd-1 mariadbd[4920]: 2025-12-10 15:45:21 0 [Note] Plugin 'wsrep-provider' is disabled.
déc. 10 15:45:21 bdd-1 mariadbd[4920]: 2025-12-10 15:45:21 0 [Note] InnoDB: Loading buffer pool(s) from
déc. 10 15:45:21 bdd-1 mariadbd[4920]: 2025-12-10 15:45:21 0 [Note] InnoDB: Buffer pool(s) load complet
déc. 10 15:45:22 bdd-1 mariadbd[4920]: 2025-12-10 15:45:22 0 [Note] Server socket created on IP: '127.0
déc. 10 15:45:22 bdd-1 mariadbd[4920]: 2025-12-10 15:45:22 0 [Note] mariadbd: Event Scheduler: Loaded 0
déc. 10 15:45:22 bdd-1 mariadbd[4920]: 2025-12-10 15:45:22 0 [Note] /usr/sbin/mariadbd: ready for conne
déc. 10 15:45:22 bdd-1 mariadbd[4920]: Version: '11.8.3-MariaDB-0+deb13u1 from Debian'  socket: '/run/m
déc. 10 15:45:22 bdd-1 systemd[1]: Started mariadb.service - MariaDB 11.8.3 database server.
déc. 10 15:45:22 bdd-1 /etc/mysql/debian-start[4943]: Upgrading MariaDB tables if necessary.
déc. 10 15:45:22 bdd-1 /etc/mysql/debian-start[4954]: Checking for insecure root accounts.
lines 1-24/24 (END)
```

11. Configuration de la base de données

- Je créer la base de données wordpress :

```
sio@Ansible: ~                                    sio@Ansible: ~
root@Ansible:~# ansible-playbook -i /home/sio/Documents/Inventory/test.yml /home/sio/Documents/Playbooks
/config-mariadb.yml

PLAY [Configuration de MariaDB] ************************************************************************

TASK [Création base de données Wordpress] **************************************************************
[WARNING]: Host 'bdd-1' is using the discovered Python interpreter at '/usr/bin/python3.13', but future
installation of another Python interpreter could cause a different interpreter to be discovered. See htt
ps://docs.ansible.com/ansible-core/2.19/reference_appendices/interpreter_discovery.html for more informa
tion.
[ERROR]: Task failed: Module failed: A MySQL module is required: for Python 2.7 either PyMySQL, or MySQL
-python, or for Python 3.X mysqlclient or PyMySQL. Consider setting ansible_python_interpreter to use th
e intended Python version.
Origin: /home/sio/Documents/Playbooks/config-mariadb.yml:7:7

5   gather_facts: no
6   tasks:
7     - name: "Création base de données Wordpress"
        ^ column 7

fatal: [bdd-1]: FAILED! => {"ansible_facts": {"discovered_interpreter_python": "/usr/bin/python3.13"}, "
changed": false, "msg": "A MySQL module is required: for Python 2.7 either PyMySQL, or MySQL-python, or
for Python 3.X mysqlclient or PyMySQL. Consider setting ansible_python_interpreter to use the intended P
ython version."}

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

root@Ansible:~#
```

- J'installe le module avant la création de la base de données :

Nouveau | Ouvrir | Enregistrer | Enregistrer sous | Annuler | Refaire

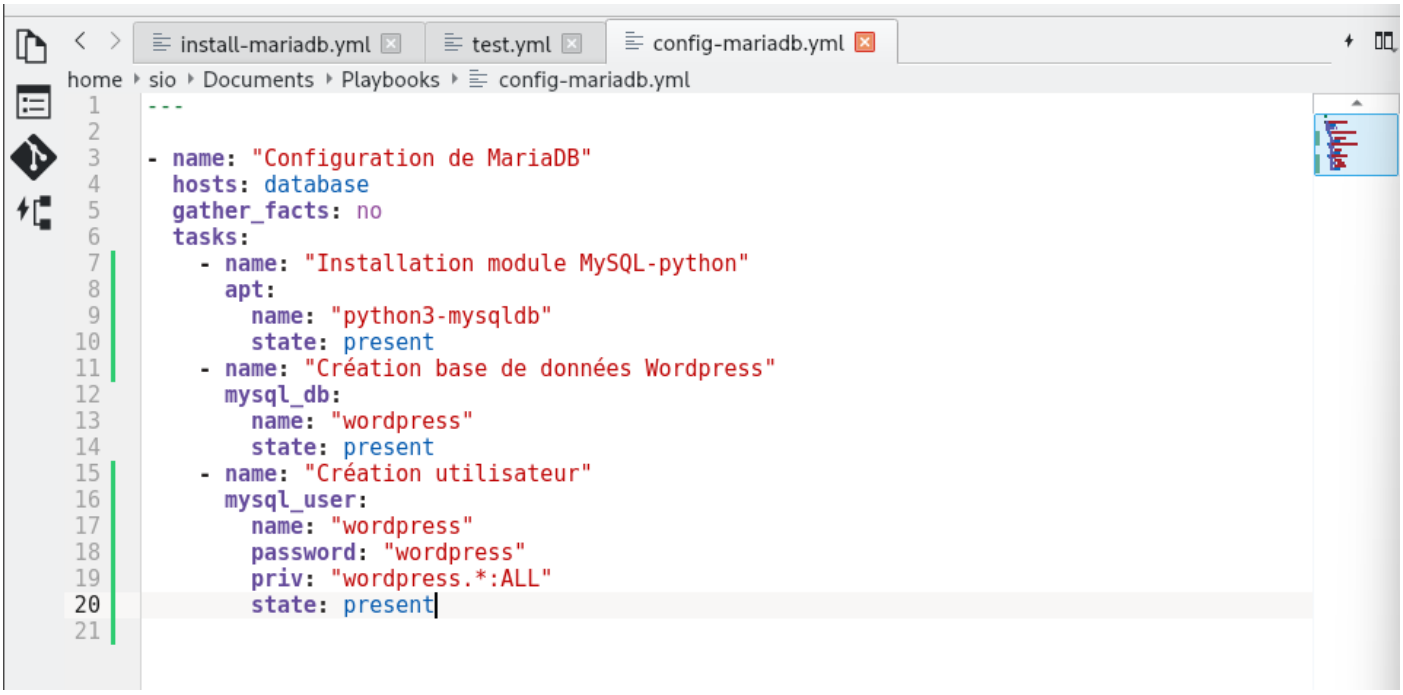
install-mariadb.yml | test.yml | config-mariadb.yml

home ▸ sio ▸ Documents ▸ Playbooks ▸ config-mariadb.yml

```yaml
---

- name: "Configuration de MariaDB"
  hosts: database
  gather_facts: no
  tasks:
    - name: "Installation module MySQL-python"
      apt:
        name: "python3-mysqldb"
        state: present
    - name: "Création base de données Wordpress"
      mysql_db:
        name: "wordpress"
        state: present
```

```
root@Ansible:~# ansible-playbook -i /home/sio/Documents/Inventory/test.yml /home/sio/Documents/Playbooks
/config-mariadb.yml

PLAY [Configuration de MariaDB] ************************************************************************

TASK [Installation module MySQL-python] ****************************************************************
[WARNING]: Host 'bdd-1' is using the discovered Python interpreter at '/usr/bin/python3.13', but future
installation of another Python interpreter could cause a different interpreter to be discovered. See htt
ps://docs.ansible.com/ansible-core/2.19/reference_appendices/interpreter_discovery.html for more informa
tion.
changed: [bdd-1]

TASK [Création base de données Wordpress] **************************************************************
[WARNING]: Support of mysqlcline/MySQLdb connector is deprecated. We'll stop testing against it in colle
ction version 4.0.0 and remove the related code in 5.0.0. Use PyMySQL connector instead.
changed: [bdd-1]

PLAY RECAP *********************************************************************************************
bdd-1                      : ok=2    changed=2    unreachable=0    failed=0    skipped=0    rescued=0
 ignored=0

root@Ansible:~#
```

- Je créer l'utilisateur SQL « wordpress » et octroi des droits sur l's tables de la base de données wordpress à l'utilisateur wordpress grâce au module mysql_user :



- Je consulte la documentation sur le module mysql_user :

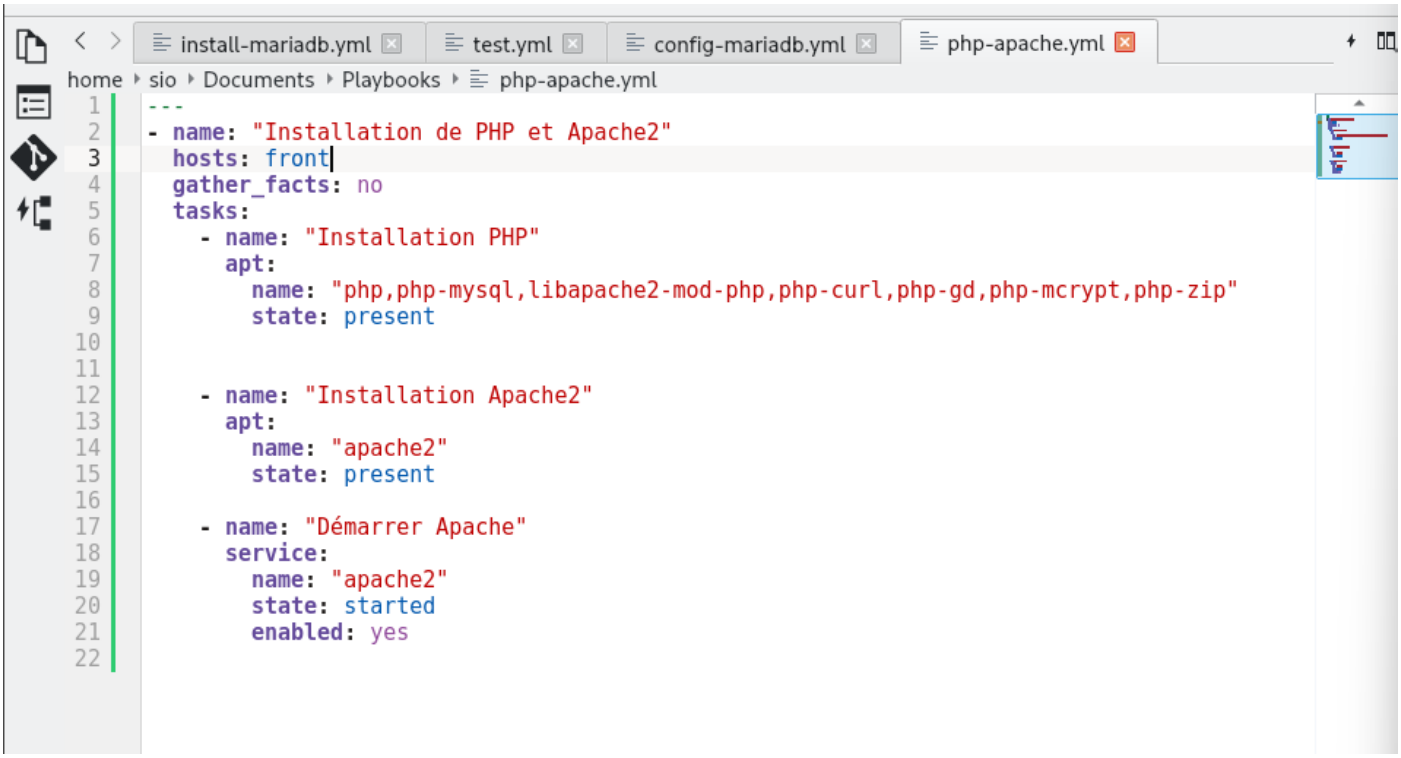
```
root@Ansible:~# ansible-doc mysql_user
> MODULE community.mysql.mysql_user (/root/.local/share/pipx/venvs/ansible/lib/python3.13/site-packages

  Adds or removes a user from a MySQL or MariaDB database.

OPTIONS (red indicates it is required):

   append_privs  Append the privileges defined by priv to the existing ones for
                 this user instead of overwriting existing ones. Mutually exclusive
                 with subtract_privs.
         default: false
         type: bool

   attributes  Create, update, or delete user attributes (arbitrary 'key: value'
               comments) for the user.
               MySQL server must support the INFORMATION_SCHEMA.USER_ATTRIBUTES
               table. Provided since MySQL 8.0.
               To delete an existing attribute, set its value to null.
         default: null
         type: dict

   ca_cert  The path to a Certificate Authority (CA) certificate. This option, if
            used, must specify the same certificate as used by the server.
         aliases: [ssl_ca]
         default: null
         type: path

   check_hostname  Whether to validate the server host name when an SSL connection
                   is required. Corresponds to MySQL CLIs `--ssl'
                   switch.
                   Setting this to `false' disables hostname
                   verification. Use with caution.
                   Requires pymysql >= 0.7.11.
         default: null
         type: bool

   check_implicit_admin  Check if mysql allows login as root/nopassword before
                         trying supplied credentials.
                         If success, passed
                         login_user/login_password will be ignored.
         default: false
         type: bool

   client_cert  The path to a client public key certificate.
         aliases: [ssl_cert]
.
```

- J'exécute le playbook pour configurer la base de données MariaDB sur la machine bdd-1 :

```
root@Ansible:~# ansible-playbook -i /home/sio/Documents/Inventory/test.yml /home/sio/Documents/Playbooks
/config-mariadb.yml

PLAY [Configuration de MariaDB] ************************************************************************

TASK [Installation module MySQL-python] ****************************************************************
[WARNING]: Host 'bdd-1' is using the discovered Python interpreter at '/usr/bin/python3.13', but future
installation of another Python interpreter could cause a different interpreter to be discovered. See htt
ps://docs.ansible.com/ansible-core/2.19/reference_appendices/interpreter_discovery.html for more informa
tion.
ok: [bdd-1]

TASK [Création base de données Wordpress] **************************************************************
[WARNING]: Support of mysqlcline/MySQLdb connector is deprecated. We'll stop testing against it in colle
ction version 4.0.0 and remove the related code in 5.0.0. Use PyMySQL connector instead.
ok: [bdd-1]

TASK [Création utilisateur] ****************************************************************************
[WARNING]: Option column_case_sensitive is not provided. The default is now false, so the column's name
will be uppercased. The default will be changed to true in community.mysql 4.0.0.
changed: [bdd-1]

PLAY RECAP *********************************************************************************************
bdd-1                      : ok=3    changed=1    unreachable=0    failed=0    skipped=0    rescued=0
 ignored=0

root@Ansible:~#
```

12. Installation d'un serveur PHP

- Je créer un fichier php-apache.yml :



- Ensuite je l'installe :

```
root@Ansible:~# ansible-playbook -i /home/sio/Documents/Inventory/test.yml /home/sio/Documents/Playbooks
/php-apache.yml

PLAY [Installation de PHP et Apache2] ******************************************************************

TASK [Installation PHP] ********************************************************************************
[WARNING]: Host 'web-1' is using the discovered Python interpreter at '/usr/bin/python3.13', but future
installation of another Python interpreter could cause a different interpreter to be discovered. See htt
ps://docs.ansible.com/ansible-core/2.19/reference_appendices/interpreter_discovery.html for more informa
tion.
changed: [web-1]

TASK [Installation Apache2] ****************************************************************************
ok: [web-1]

TASK [Démarrer Apache] *********************************************************************************
ok: [web-1]

PLAY RECAP *********************************************************************************************
web-1                      : ok=3    changed=1    unreachable=0    failed=0    skipped=0    rescued=0
 ignored=0

root@Ansible:~#
```

13. Installation de Wordpress

- Je créer un fichier install-wordpress :

home ▸ sio ▸ Documents ▸ Playbooks ▸ install-wordpress1.yml

```yaml
---

- name: "Install Wordpress"
  hosts: front
  gather_facts: no
  tasks:
    - name: "Téléchargement Wordpress"
      get_url:
        url: "https://fr.wordpress.org/latest-fr_FR.tar.gz"
        dest: "{{ playbook_dir }}/latest-fr_FR.tar.gz"
      delegate_to: localhost

    - name: "Unarchive Wordpress"
      unarchive:
        src: "{{ playbook_dir }}/latest-fr_FR.tar.gz"
        dest: "/var/www/html"
        owner: "www-data"
        group: "www-data"
```