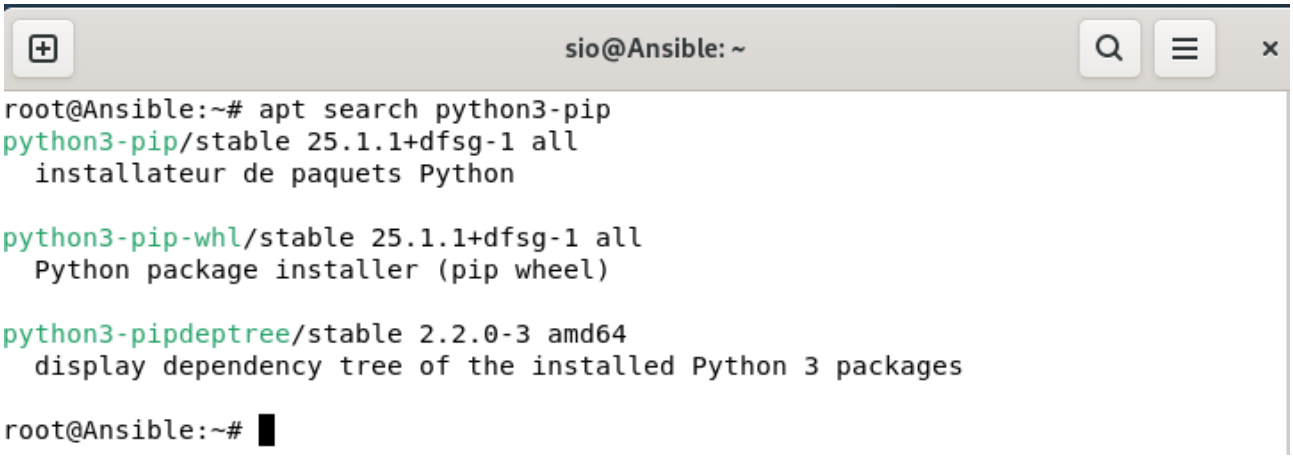
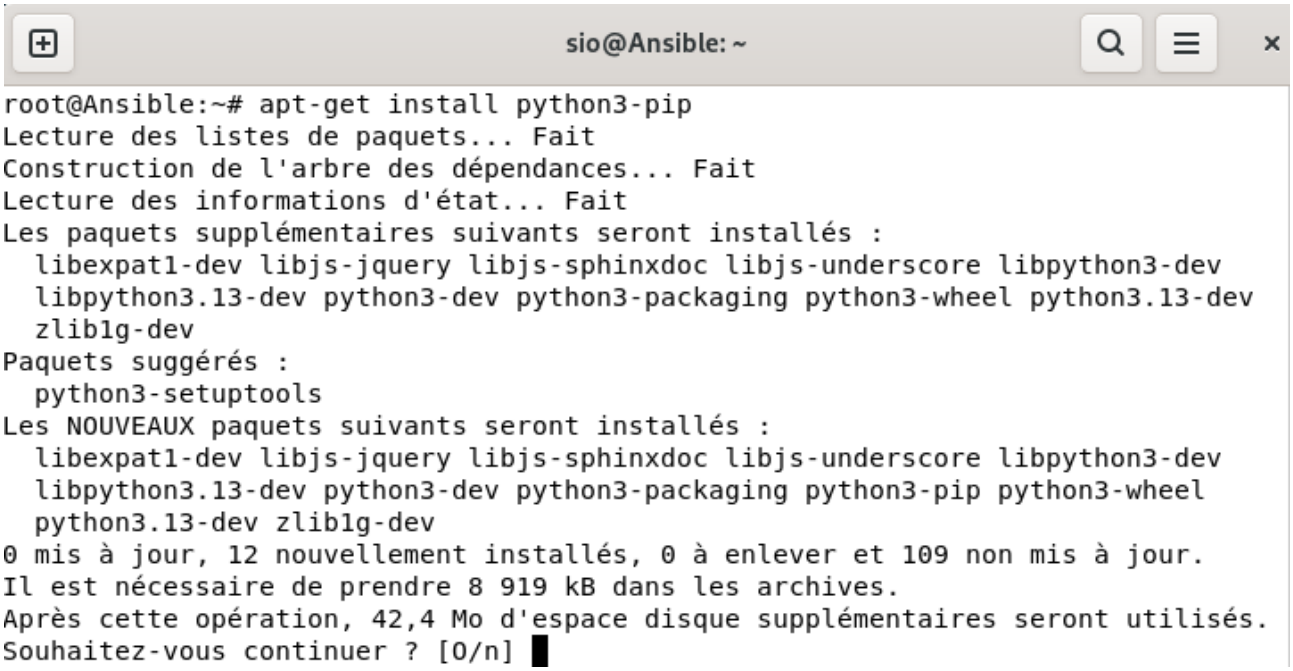
Chapitre 3 – Configuration de serveurs et d'applications avec Ansible

1. Installation d'Ansible.

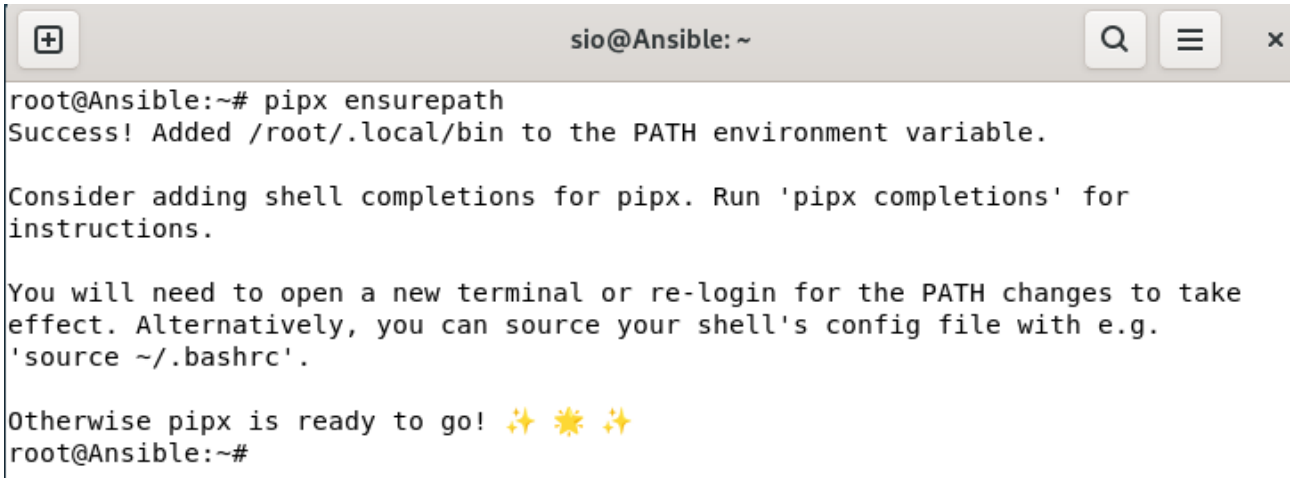
Installation d'Ansible via le gestionnaire de paquets Apt ou à l'aide de l'outil pip de Python

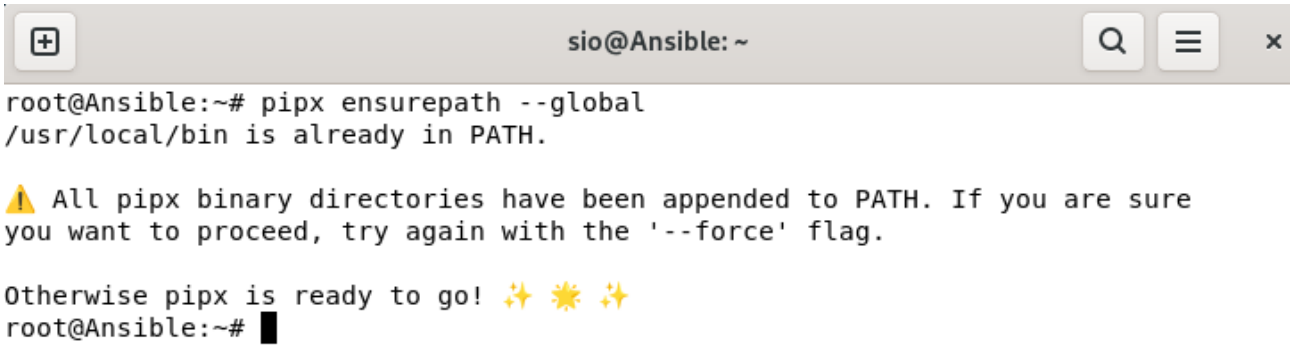

sio@Ansible: ~
root@Ansible:~# apt search python3-pip
python3-pip/stable 25.1.1+dfsg-1 all
installateur de paquets Python
python3-pip-whl/stable 25.1.1+dfsg-1 all
Python package installer (pip wheel)
python3-pipdeptree/stable 2.2.0-3 amd64
display dependency tree of the installed Python 3 packages
root@Ansible:~#


sio@Ansible: ~
root@Ansible:~# apt-get install python3-pip
Lecture des listes de paquets... Fait
Construction de l'arbre des dépendances... Fait
Lecture des informations d'état... Fait
Les paquets supplémentaires suivants seront installés :
libexpat1-dev libjs-jquery libjs-sphinxdoc libjs-underscore libpython3-dev
libpython3.13-dev python3-dev python3-packaging python3-wheel python3.13-dev
zlib1g-dev
Paquets suggérés :
python3-setuptools
Les NOUVEAUX paquets suivants seront installés :
libexpat1-dev libjs-jquery libjs-sphinxdoc libjs-underscore libpython3-dev
libpython3.13-dev python3-dev python3-packaging python3-pip python3-wheel
python3.13-dev zlib1g-dev
0 mis à jour, 12 nouvellement installés, 0 à enlever et 109 non mis à jour.
Il est nécessaire de prendre 8 919 kB dans les archives.
Après cette opération, 42,4 Mo d'espace disque supplémentaires seront utilisés.
Souhaitez-vous continuer ? [O/n]

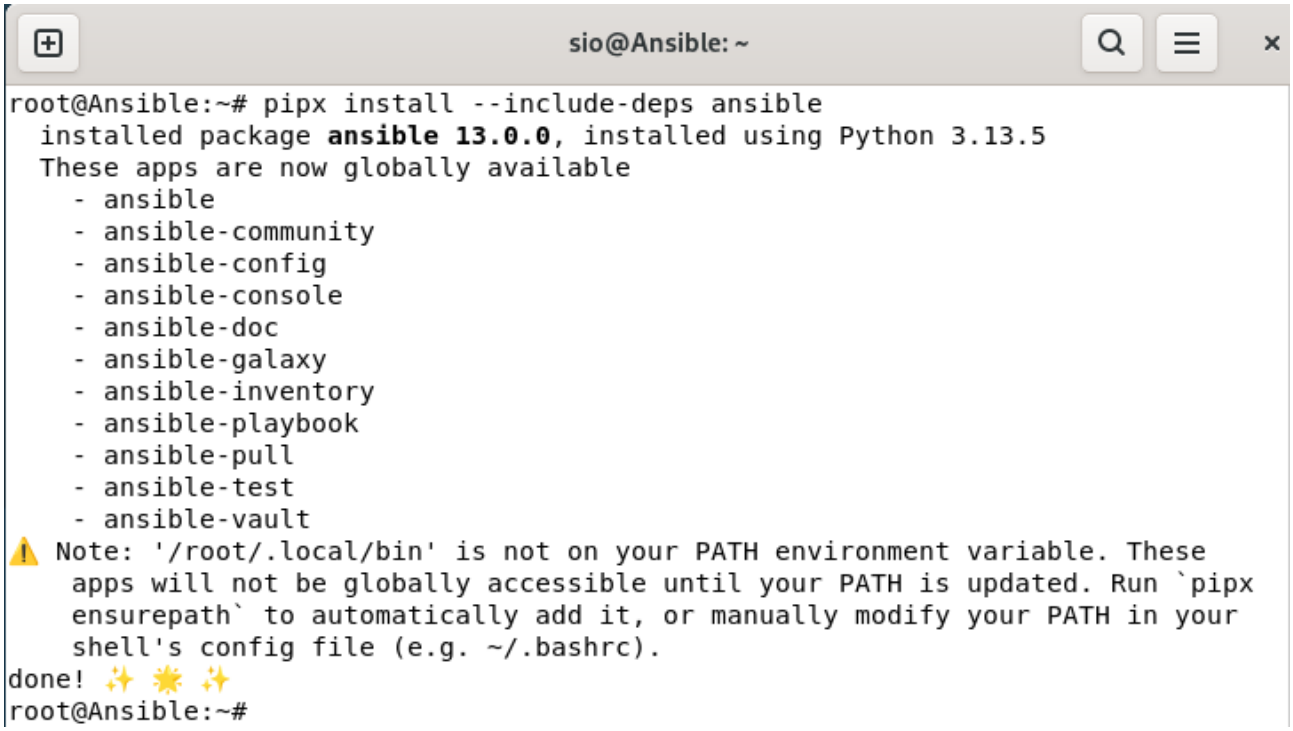

```
root@Ansible:~# pip install ansible
error: externally-managed-environment

× This environment is externally managed
╰─> To install Python packages system-wide, try apt install
    python3-xyz, where xyz is the package you are trying to
    install.

    If you wish to install a non-Debian-packaged Python package,
    create a virtual environment using python3 -m venv path/to/venv.
    Then use path/to/venv/bin/python and path/to/venv/bin/pip. Make
    sure you have python3-full installed.

    If you wish to install a non-Debian packaged Python application,
    it may be easiest to use pipx install xyz, which will manage a
    virtual environment for you. Make sure you have pipx installed.

    See /usr/share/doc/python3.13/README.venv for more information.

note: If you believe this is a mistake, please contact your Python installation
or OS distribution provider. You can override this, at the risk of breaking your
 Python installation or OS, by passing --break-system-packages.
hint: See PEP 668 for the detailed specification.
root@Ansible:~#
```

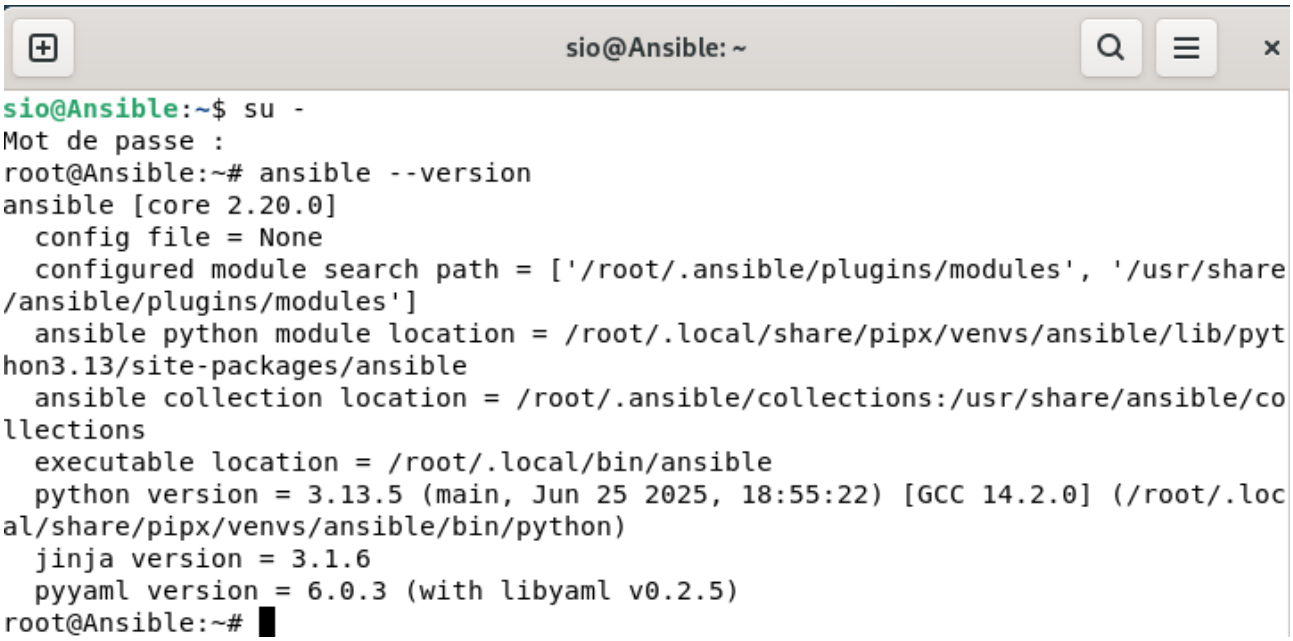

```
root@Ansible:~# apt-get install pipx
Lecture des listes de paquets... Fait
Construction de l'arbre des dépendances... Fait
Lecture des informations d'état... Fait
Les paquets supplémentaires suivants seront installés :
  python3-argcomplete python3-click python3-pip-whl python3-platformdirs
  python3-setuptools-whl python3-userpath python3-venv python3.13-venv
Les NOUVEAUX paquets suivants seront installés :
  pipx python3-argcomplete python3-click python3-pip-whl python3-platformdirs
  python3-setuptools-whl python3-userpath python3-venv python3.13-venv
0 mis à jour, 9 nouvellement installés, 0 à enlever et 109 non mis à jour.
Il est nécessaire de prendre 3 774 kB dans les archives.
Après cette opération, 7 481 ko d'espace disque supplémentaires seront utilisés.
Souhaitez-vous continuer ? [O/n] o
```


sio@Ansible: ~
root@Ansible:~# pipx ensurepath
Success! Added /root/.local/bin to the PATH environment variable.
Consider adding shell completions for pipx. Run 'pipx completions' for instructions.
You will need to open a new terminal or re-login for the PATH changes to take effect. Alternatively, you can source your shell's config file with e.g. 'source ~/.bashrc'.
Otherwise pipx is ready to go! ✨ 🌟 ✨
root@Ansible:~#


sio@Ansible: ~
root@Ansible:~# pipx ensurepath --global
/usr/local/bin is already in PATH.
⚠️ All pipx binary directories have been appended to PATH. If you are sure you want to proceed, try again with the '--force' flag.
Otherwise pipx is ready to go! ✨ 🌟 ✨
root@Ansible:~#


sio@Ansible: ~
root@Ansible:~# pipx install --include-deps ansible
installing ansible





2. Premier module avec Ansible (setup).

sio@Ansible: ~

```
root@Ansible:~# ansible -m setup localhost > setup.txt
[WARNING]: No inventory was parsed, only implicit localhost is available
root@Ansible:~#
```

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:fe84:beb9",
            "fe80::a00:27ff:fe84:beb9",
            "fd17:625c:f037:2:5094:b2c1:d488:cc00"
        ],
        "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": "2025-11-26",
            "day": "26",
            "epoch": "1764165743",
            "epoch_int": "1764165743",
            "hour": "15",
            "iso8601": "2025-11-26T14:02:23Z",
            "iso8601_basic": "20251126T150223574540",
            "iso8601_basic_short": "20251126T150223",
            "iso8601_micro": "2025-11-26T14:02:23.574540Z",
            "minute": "02",
            "month": "11",
            "second": "23",
            "time": "15:02:23",
            "tz": "CET",
```

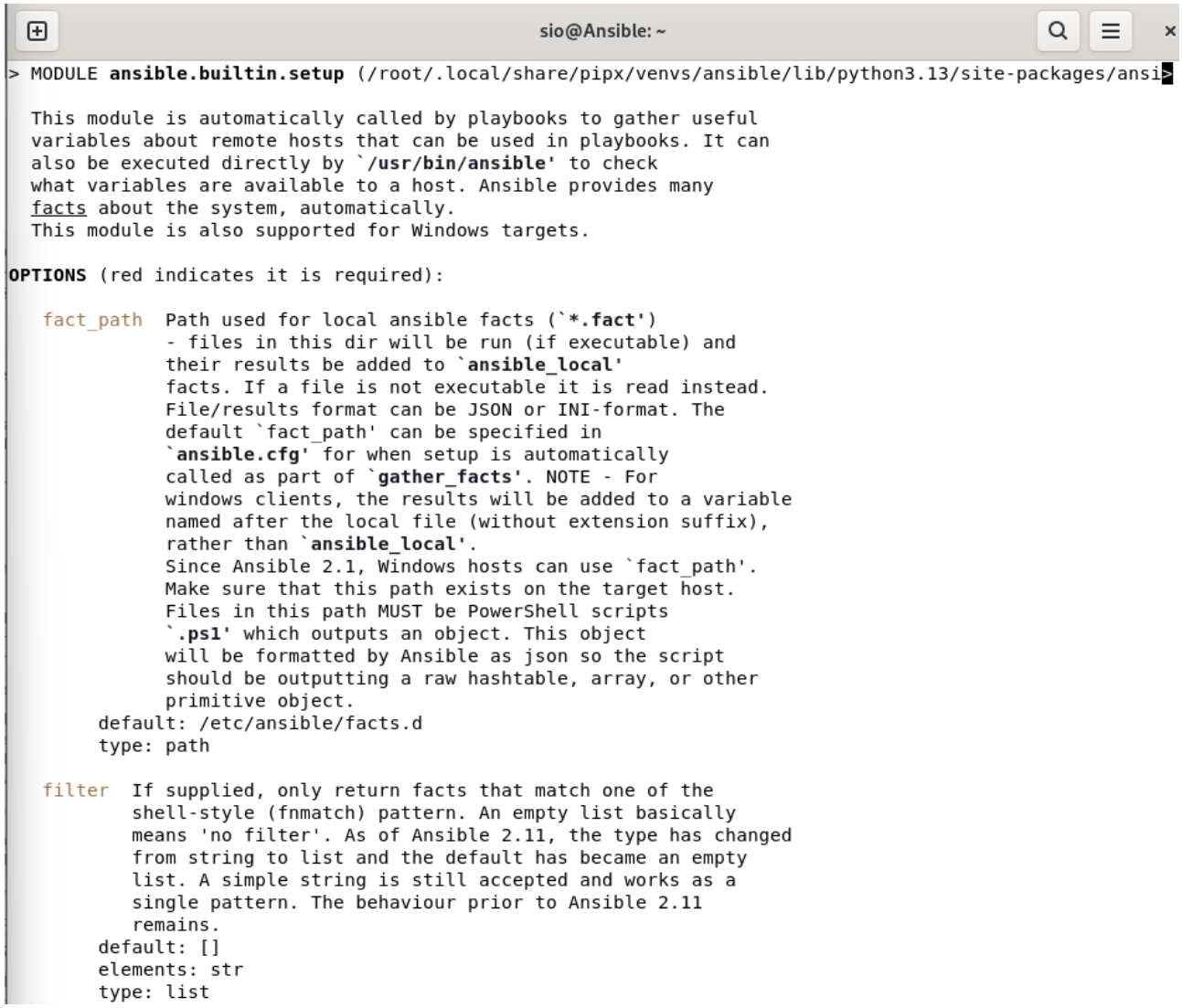
sio@Ansible: ~


```
        "tz": "CET",
        "tz_dst": "CEST",
        "tz_offset": "+0100",
        "weekday": "mercredi",
        "weekday_number": "3",
        "weeknumber": "47",
        "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": "08:00:27:84:be:b9",
        "mtu": 1500,
        "netmask": "255.255.255.0",
        "network": "10.0.2.0",
        "prefix": "24",
        "type": "ether"
    },
    "ansible_default_ipv6": {
        "address": "fd17:625c:f037:2:5094:b2c1:d488:cc00",
        "gateway": "fe80::2",
        "interface": "enp0s3",
        "macaddress": "08:00:27:84:be:b9",
        "mtu": 1500,
        "prefix": "64",
        "scope": "global",
        "type": "ether"
    },
    "ansible_device_links": {
        "ids": {
            "sda": [
                "ata-VBOX_HARDDISK_VB2cf1ad57-7b3a30d8"
            ],
            "sda1": [
                "ata-VBOX_HARDDISK_VB2cf1ad57-7b3a30d8-part1"
            ],
            "sda2": [
                "ata-VBOX_HARDDISK_VB2cf1ad57-7b3a30d8-part2"
            ],
            "sda5": [
                "ata-VBOX_HARDDISK_VB2cf1ad57-7b3a30d8-part5"
            ],
            "sr0": [
                "ata-VBOX_CD-ROM_VB0-01f003f6"
            ]
```

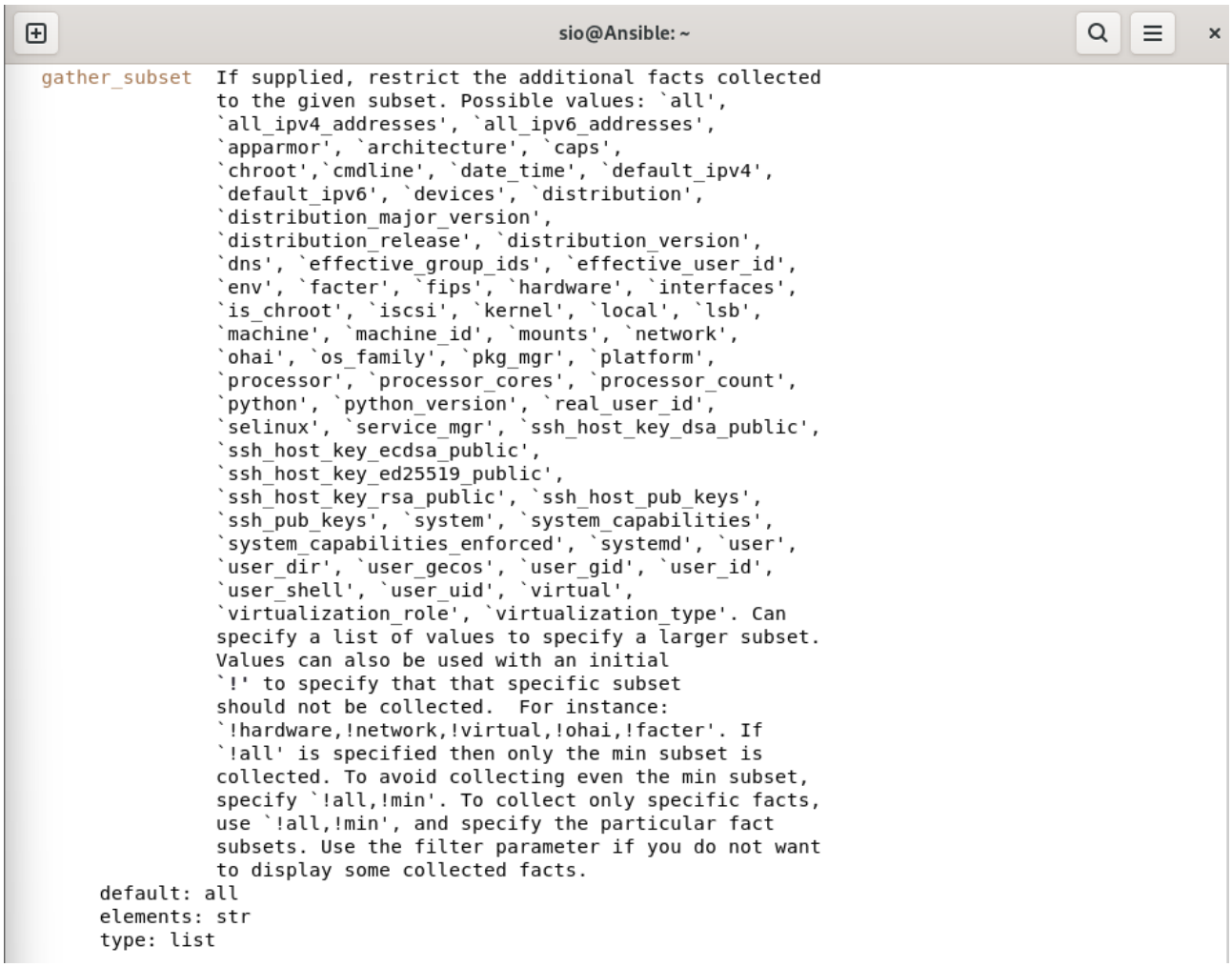
3. Aide et documentation officielle

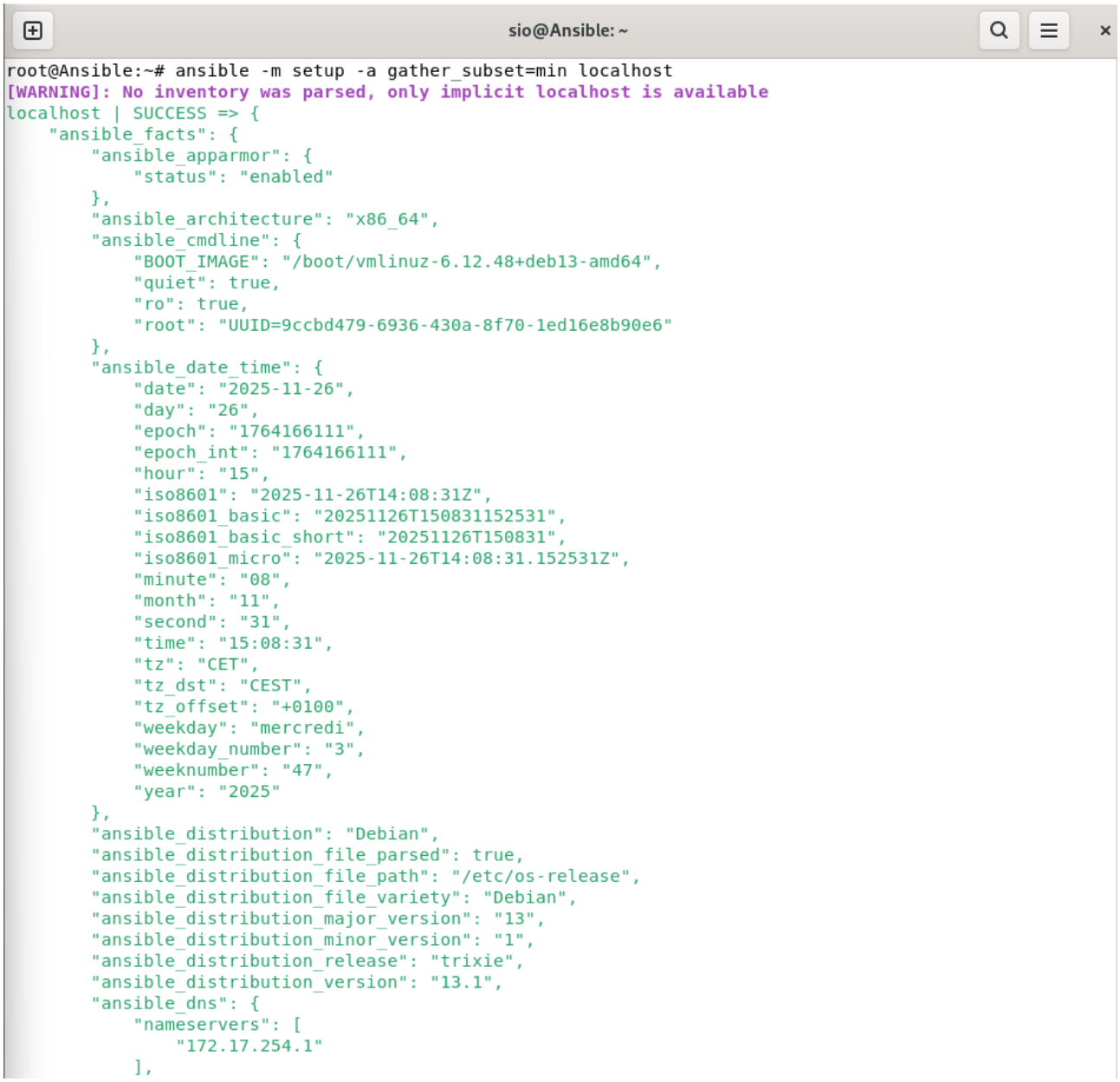
3.1. Ansible-doc setup


```
root@Ansible:~# ansible-doc setup
```




```
> MODULE ansible.builtin.setup (/root/.local/share/pipx/venvs/ansible/lib/python3.13/site-packages/ansi>

  This module is automatically called by playbooks to gather useful
  variables about remote hosts that can be used in playbooks. It can
  also be executed directly by `/usr/bin/ansible' to check
  what variables are available to a host. Ansible provides many
  facts about the system, automatically.
  This module is also supported for Windows targets.

OPTIONS (red indicates it is required):

   fact_path  Path used for local ansible facts (`*.fact')
              - files in this dir will be run (if executable) and
              their results be added to `ansible_local'
              facts. If a file is not executable it is read instead.
              File/results format can be JSON or INI-format. The
              default `fact_path' can be specified in
              `ansible.cfg' for when setup is automatically
              called as part of `gather_facts'. NOTE - For
              windows clients, the results will be added to a variable
              named after the local file (without extension suffix),
              rather than `ansible_local'.
              Since Ansible 2.1, Windows hosts can use `fact_path'.
              Make sure that this path exists on the target host.
              Files in this path MUST be PowerShell scripts
              `.ps1' which outputs an object. This object
              will be formatted by Ansible as json so the script
              should be outputting a raw hashtable, array, or other
              primitive object.
         default: /etc/ansible/facts.d
         type: path

   filter  If supplied, only return facts that match one of the
           shell-style (fnmatch) pattern. An empty list basically
           means 'no filter'. As of Ansible 2.11, the type has changed
           from string to list and the default has became an empty
           list. A simple string is still accepted and works as a
           single pattern. The behaviour prior to Ansible 2.11
           remains.
         default: []
         elements: str
         type: list
```

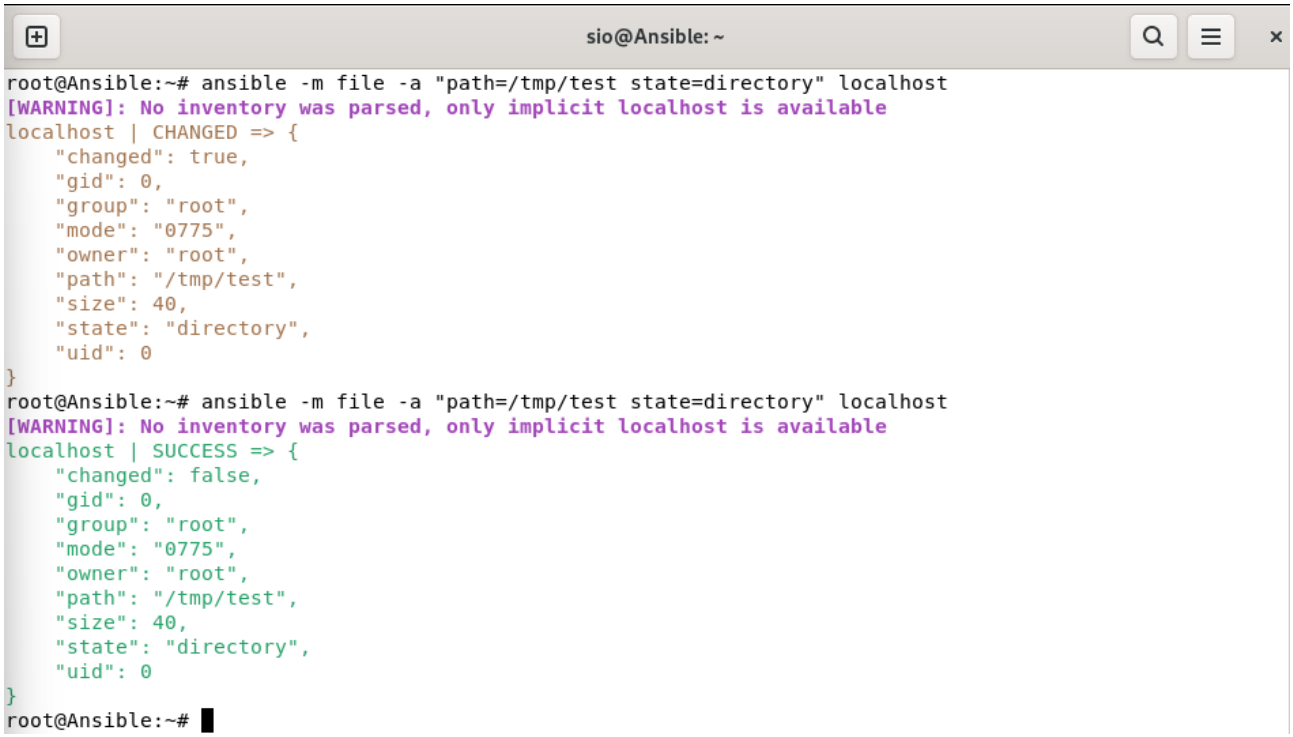

sio@Ansible: ~
gather_subset If supplied, restrict the additional facts collected
to the given subset. Possible values: `all',
`all_ipv4_addresses', `all_ipv6_addresses',
`apparmor', `architecture', `caps',
`chroot',`cmdline', `date_time', `default_ipv4',
`default_ipv6', `devices', `distribution',
`distribution_major_version',
`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

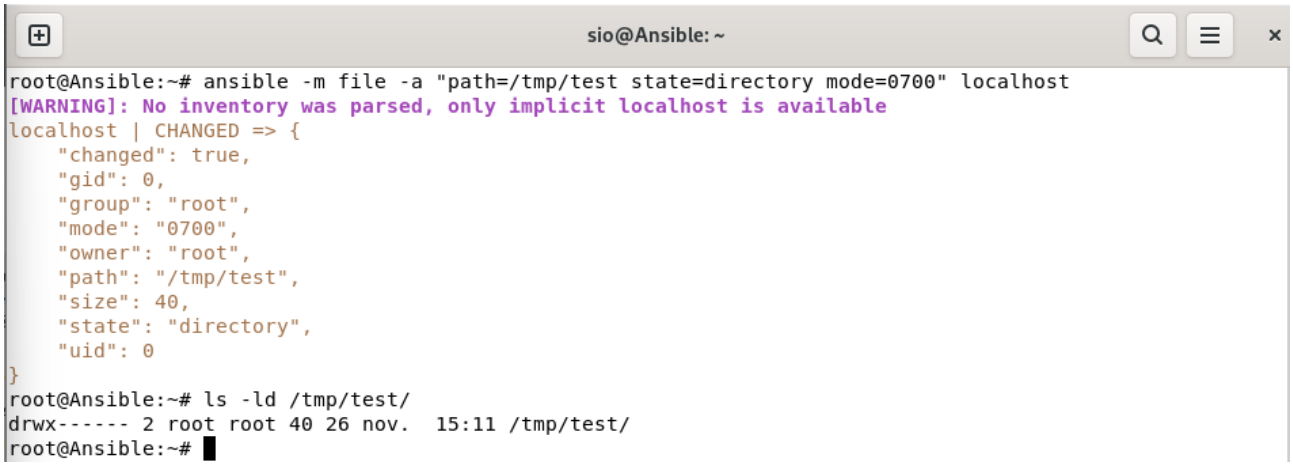


3.2. Documentation officielle

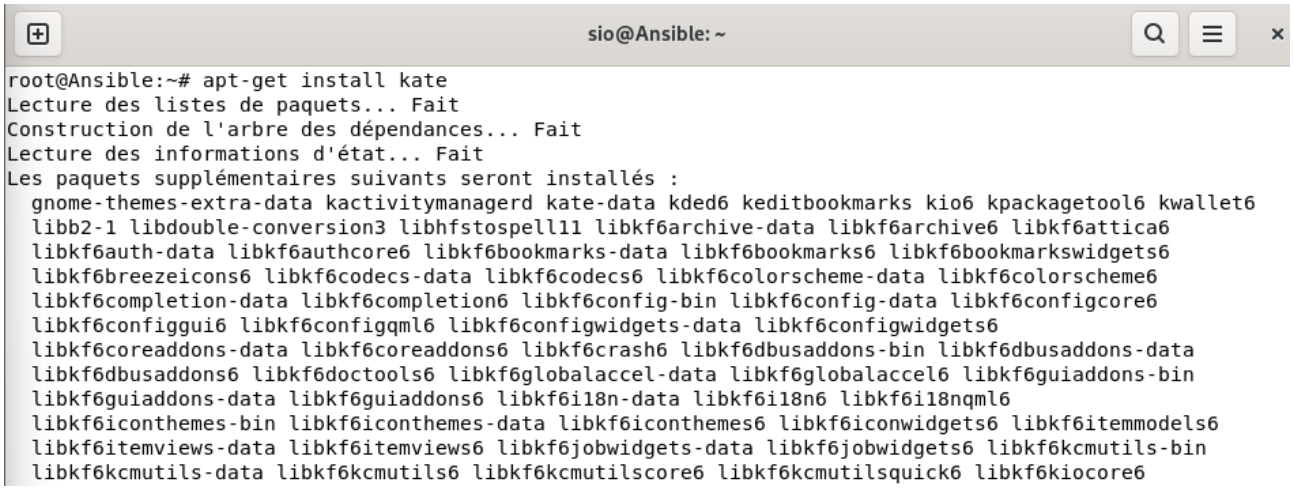
https://docs.ansible.com/

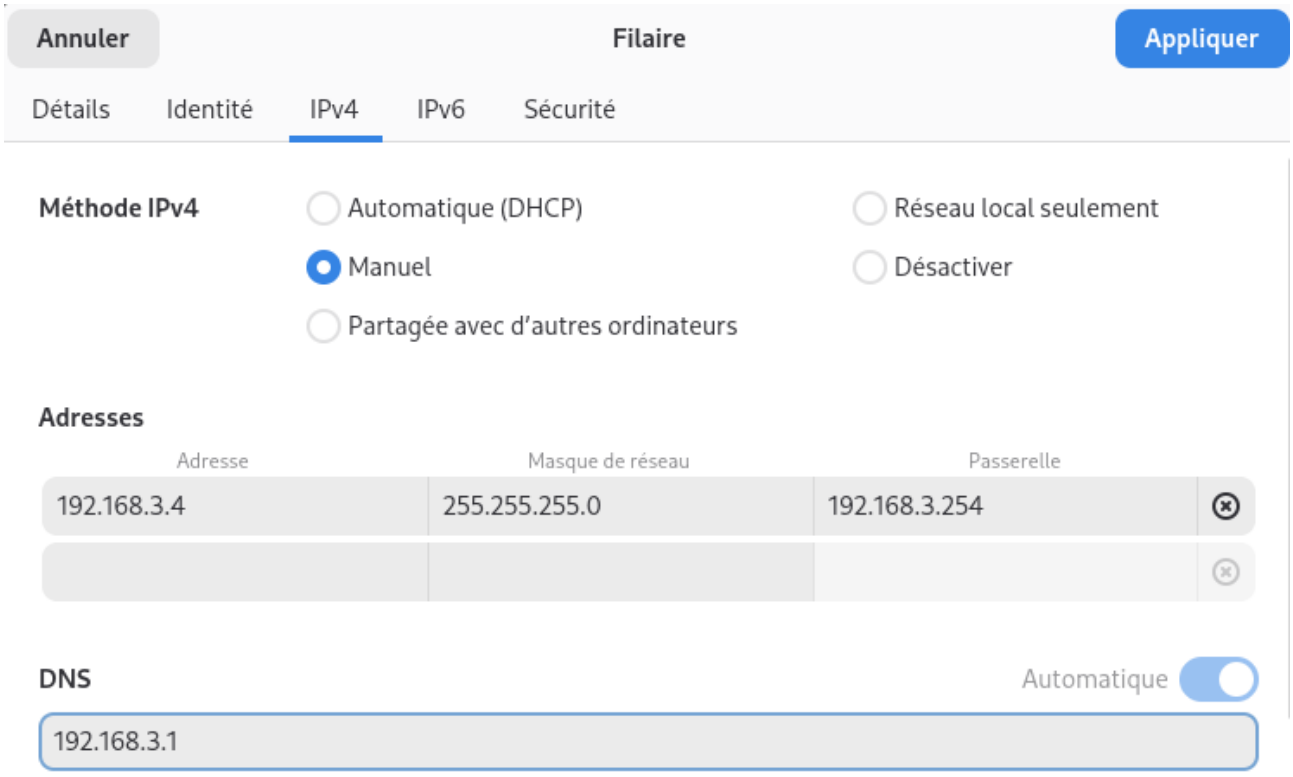
4. Idempotence : exemple avec gestion des répertoires

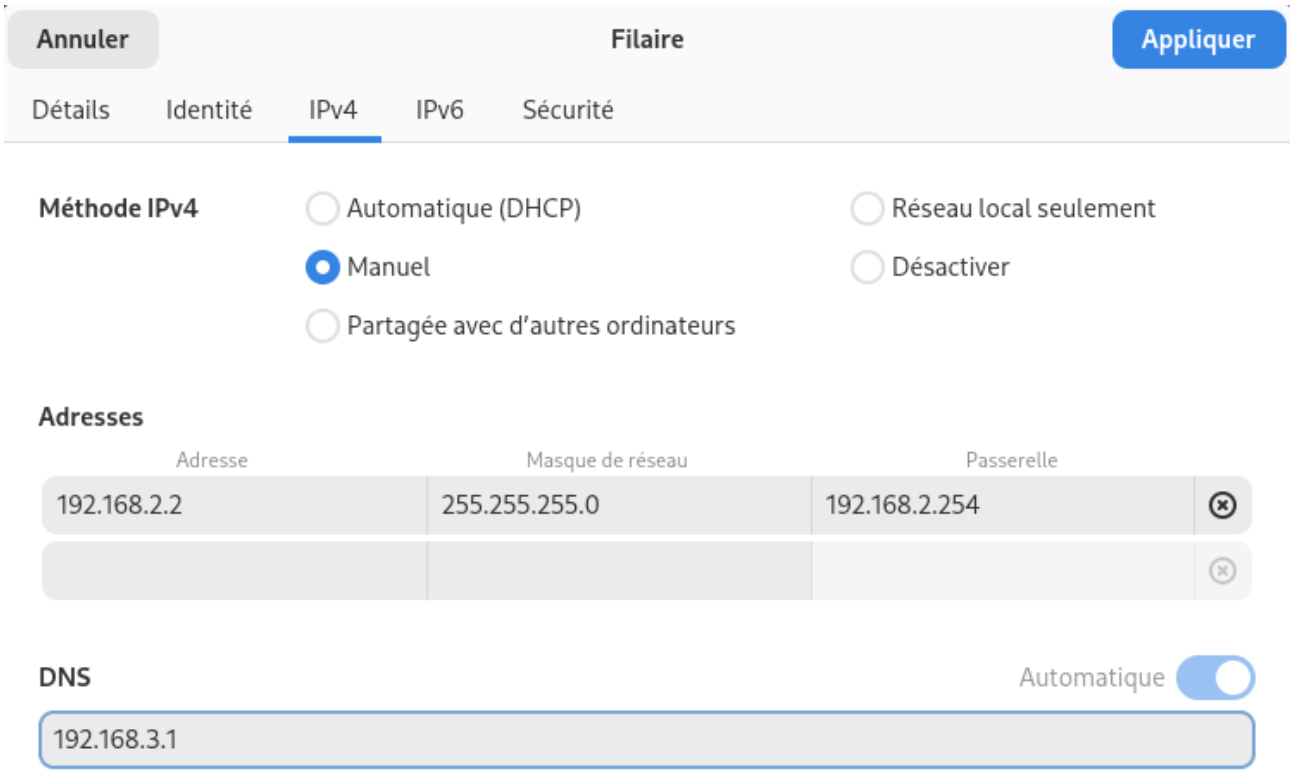




5. Création d’un fichier d’inventaire

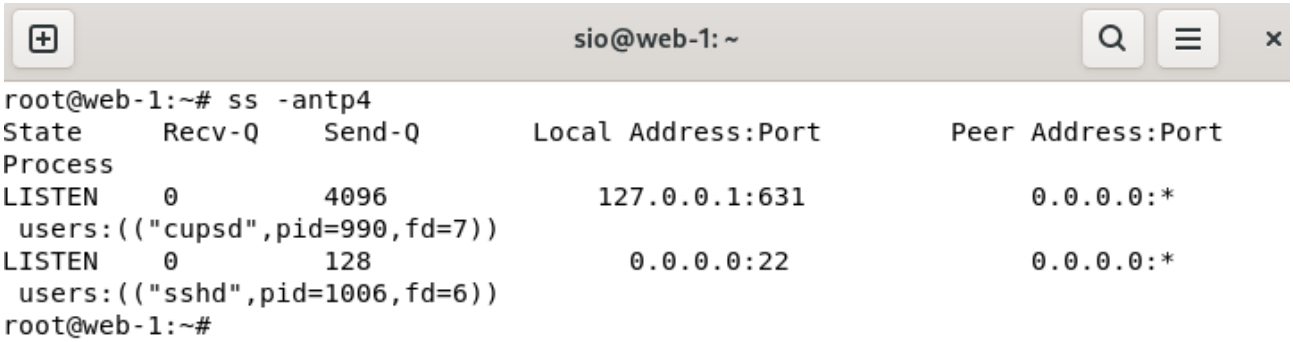




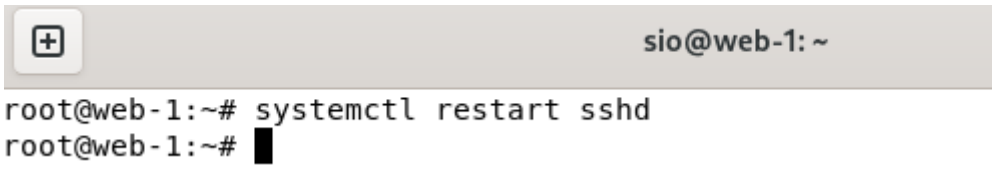

Annuler
Filaire
Appliquer
Détails
Identité
IPv4
IPv6
Sécurité
Méthode IPv4
Automatique (DHCP)
Réseau local seulement
Manuel
Désactiver
Partagée avec d'autres ordinateurs
Adresses
Adresse
Masque de réseau
Passerelle
192.168.2.2
255.255.255.0
192.168.2.254
DNS
Automatique
192.168.3.1

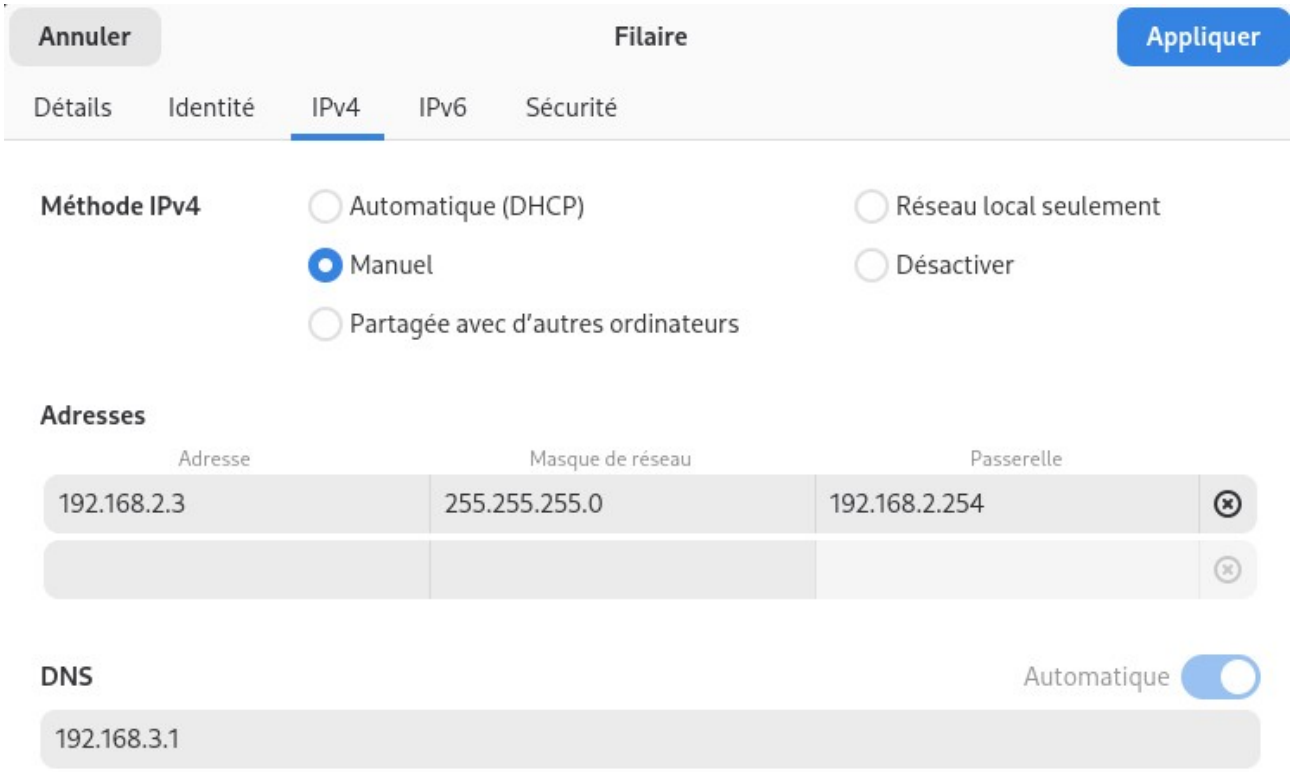

sio@Ansible: ~
GNU nano 8.4 /etc/hosts *
127.0.0.1 localhost
192.168.2.2 web-1
The following lines are desirable for IPv6 capable hosts
::1 localhost ip6-localhost ip6-loopback
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters


sio@Ansible: ~
GNU nano 8.4 /etc/hostname *
web-1


sio@web-1: ~
root@web-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=990,fd=7))
LISTEN 0 128 0.0.0.0:22 0.0.0.0:*
users:(("sshd",pid=1006,fd=6))
root@web-1:~#


sio@web-1: ~
GNU nano 8.4 /etc/ssh/sshd_config *
Authentication:
#LoginGraceTime 2m
PermitRootLogin yes
#StrictModes yes
#MaxAuthTries 6
#MaxSessions 10


sio@web-1: ~
root@web-1:~# systemctl restart sshd
root@web-1:~#


Annuler
Filaire
Appliquer
Détails
Identité
IPv4
IPv6
Sécurité
Méthode IPv4
Automatique (DHCP)
Réseau local seulement
Manuel
Désactiver
Partagée avec d'autres ordinateurs
Adresses
Adresse
Masque de réseau
Passerelle
192.168.2.3
255.255.255.0
192.168.2.254
DNS
Automatique
192.168.3.1


sio@Ansible: ~
GNU nano 8.4 /etc/hosts *
127.0.0.1 localhost
192.168.2.3 bdd-1
The following lines are desirable for IPv6 capable hosts
::1 localhost ip6-localhost ip6-loopback
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters

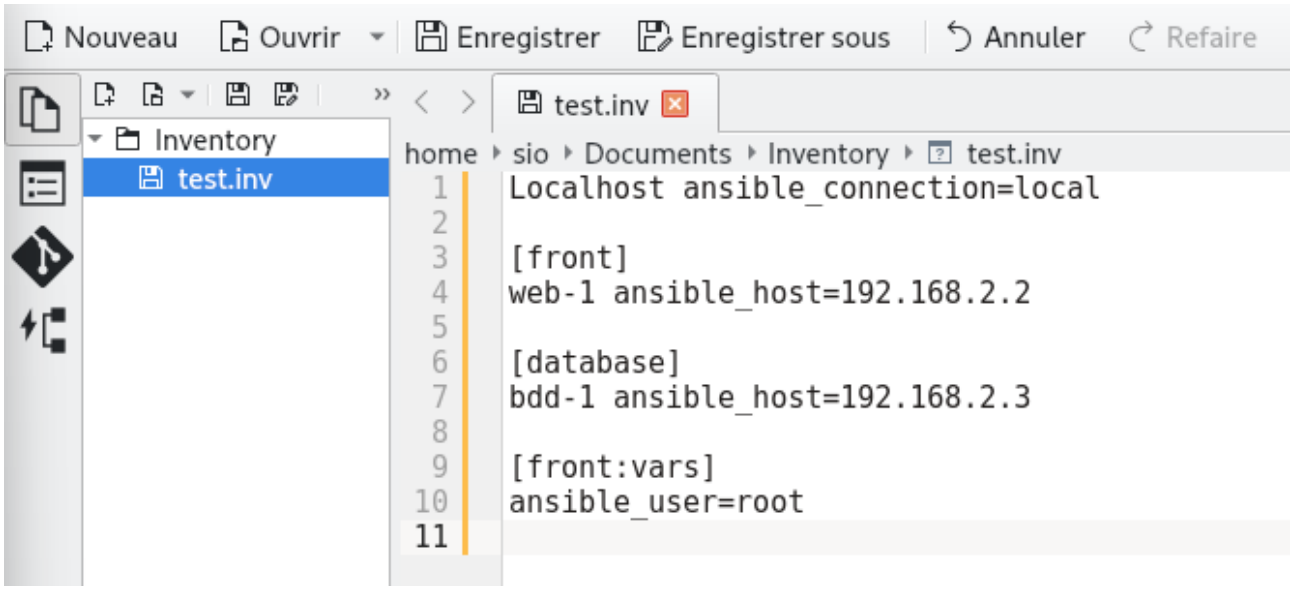

sio@Ansible: ~
GNU nano 8.4 /etc/hostname *
bdd-1

```
sio@bdd-1: ~
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=990,fd=7))
LISTEN    0         128                0.0.0.0:22               0.0.0.0:*
 users:(("sshd",pid=1007,fd=6))
root@bdd-1:~#
```

```
sio@bdd-1: ~
 GNU nano 8.4                  /etc/ssh/sshd_config *

# Authentication:

#LoginGraceTime 2m
PermitRootLogin yes
#StrictModes yes
#MaxAuthTries 6
#MaxSessions 10
```

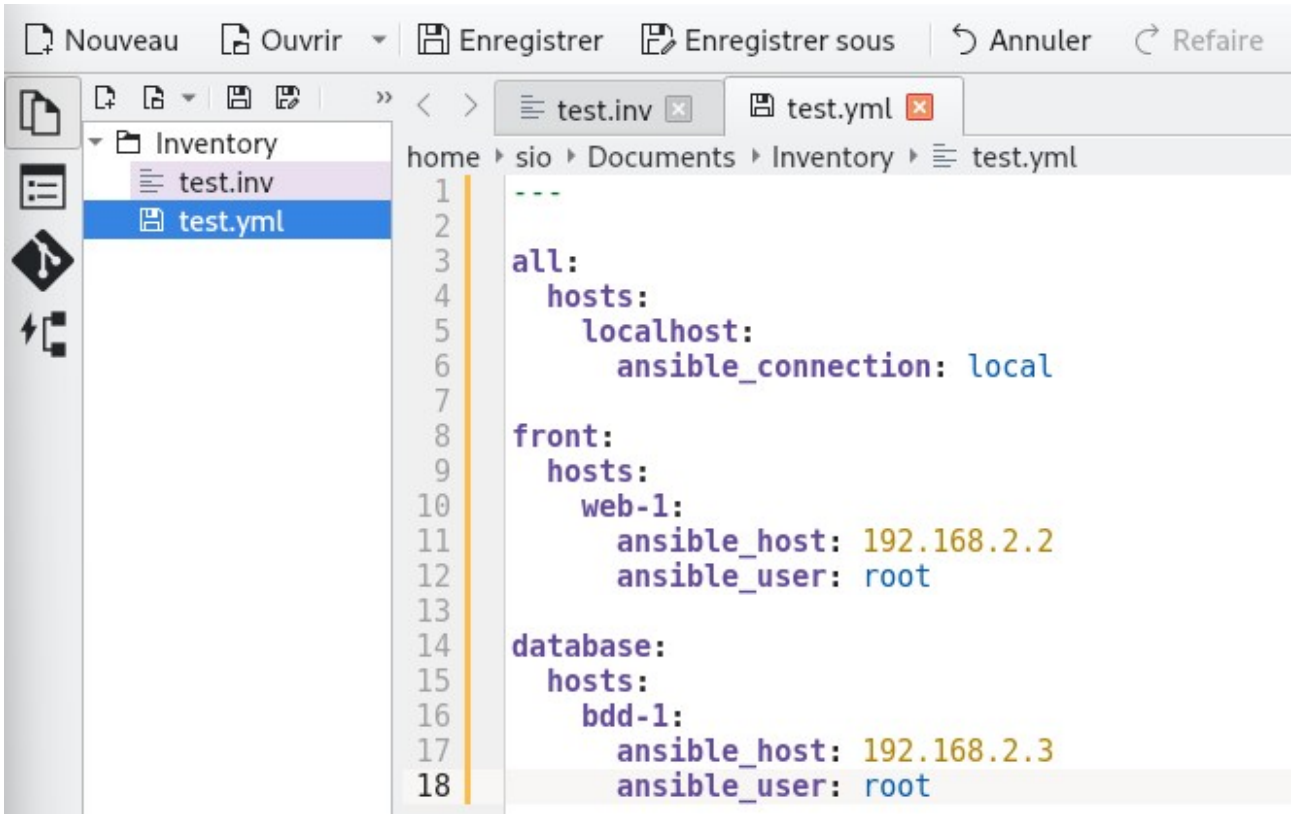
```
sio@bdd-1: ~
root@bdd-1:~# systemctl restart sshd
root@bdd-1:~#
```

Fichier d'inventaire au format INI :



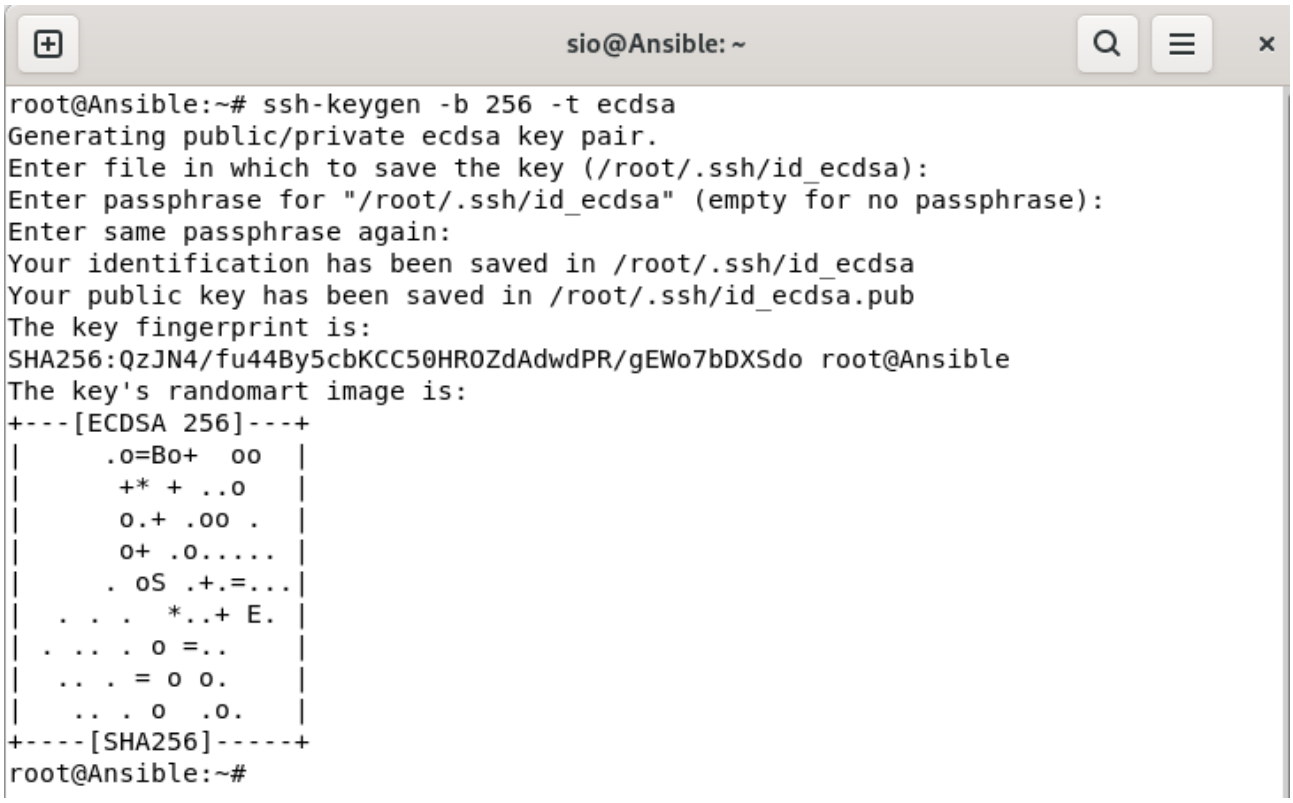
```
root@Ansible:~# cd /home/sio/Documents/
root@Ansible:/home/sio/Documents# ansible -i Inventory/test.inv -m debug -a var=
groups localhost
localhost | SUCCESS => {
    "groups": {
        "all": [
            "Localhost",
            "web-1",
            "bdd-1"
        ],
        "database": [
 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

Fichier d'inventaire au format YAML :



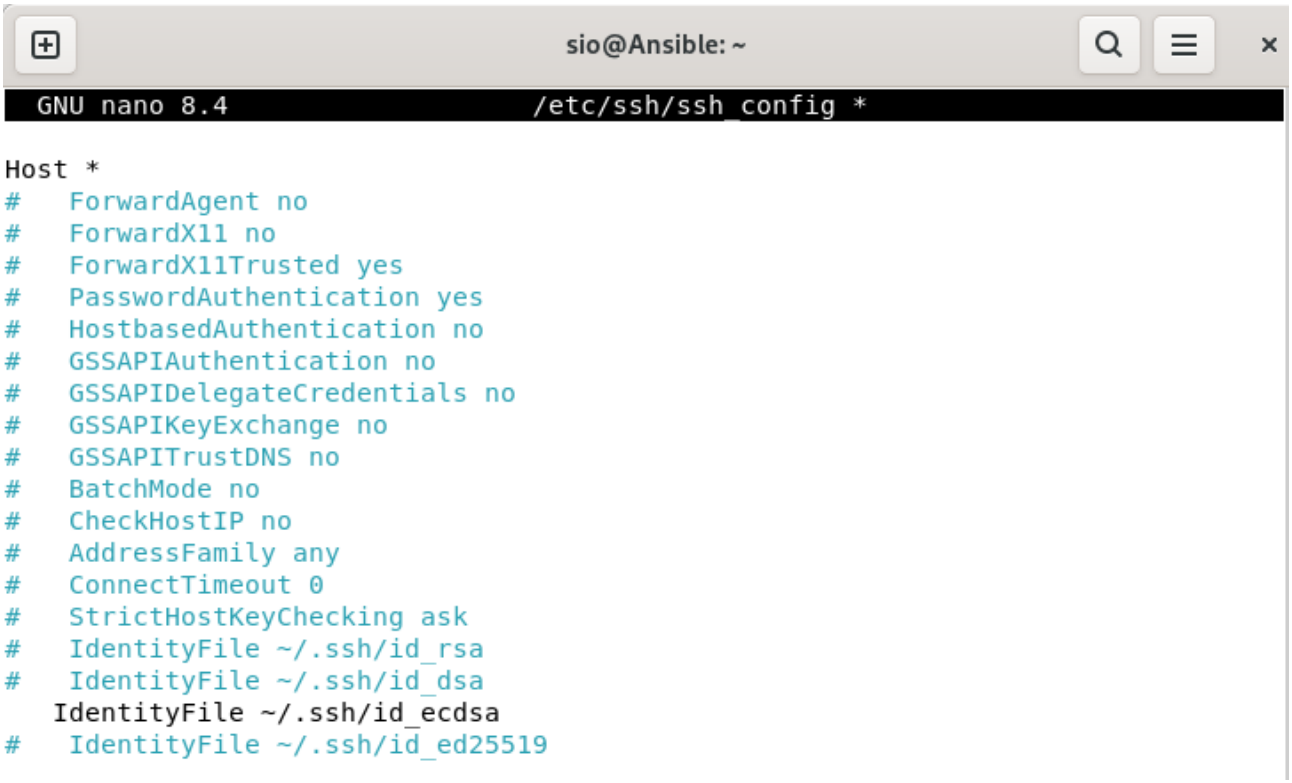
6. Connexion aux serveurs avec le protocole SSH

Sur le client SSH Ansible, générez, à l'aide de la commande ssh-keygen -b 256 -t ecdsa, la paire de clés publique/privée de l'utilisateur en cours (root en l'occurrence) pour l'algorithme EcDSA afin de pouvoir s'authentifier sur le serveur OpenSSH. Le générateur de clés va placer les deux clés dans $HOME/.ssh/ : une validation du fichier de sauvegarde par défaut de la clé vous est demandée (tapez Entrée), ainsi qu'une passphrase pour crypter la clé privée qui va être enregistrée sur la machine cliente (mettez « MaPassphrase »). Vous obtenez l'empreinte de la clé publique de l'utilisateur :

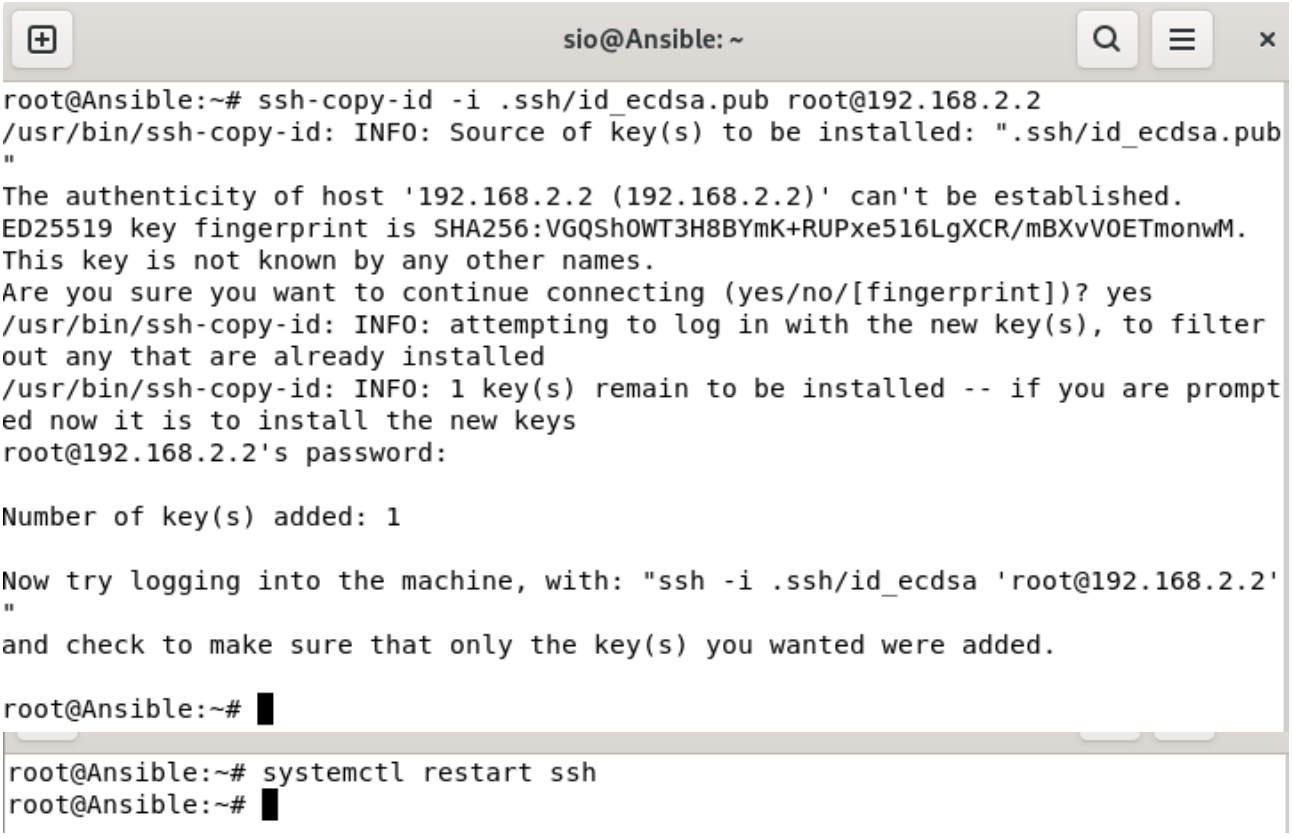


Sur les deux serveurs SSH web-1 et bdd-1, décommentez les lignes PubkeyAuthentication yes et AuthorizedKeysFile dans le fichier de configuration du démon SSH : /etc/ssh/sshd_config :

Sur le client SSH Ansible, enlevez le # de commentaire dans le fichier de configuration du client ssh (/etc/ssh/ssh_config) sur les lignes indiquées ci-dessous et relancez le service ssh :



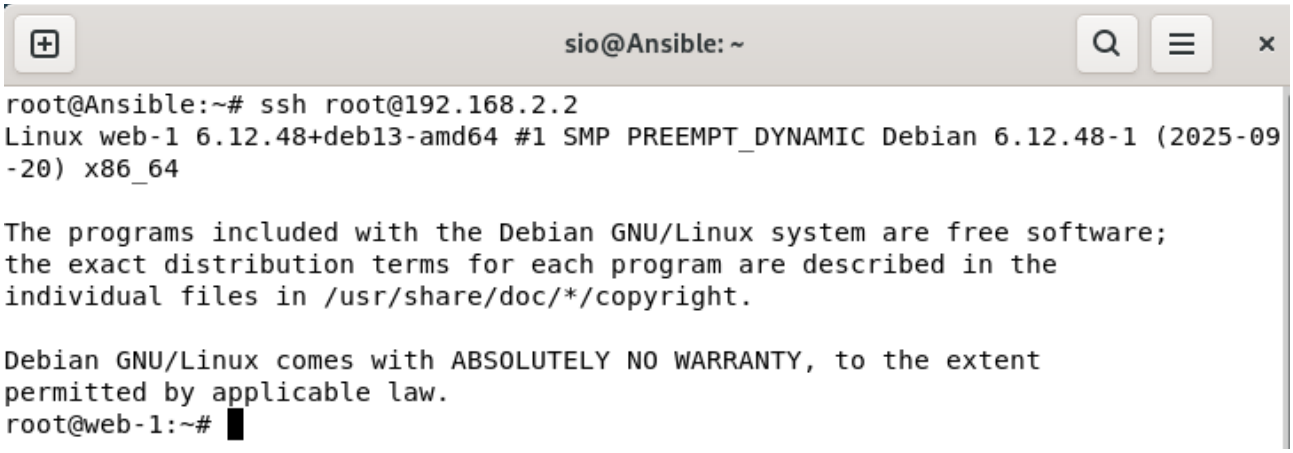
Il s'agit maintenant d'envoyer, depuis le client SSH Ansible, la clé publique id_ecdsa.pub aux deux serveurs SSH web-1 et bdd-1.

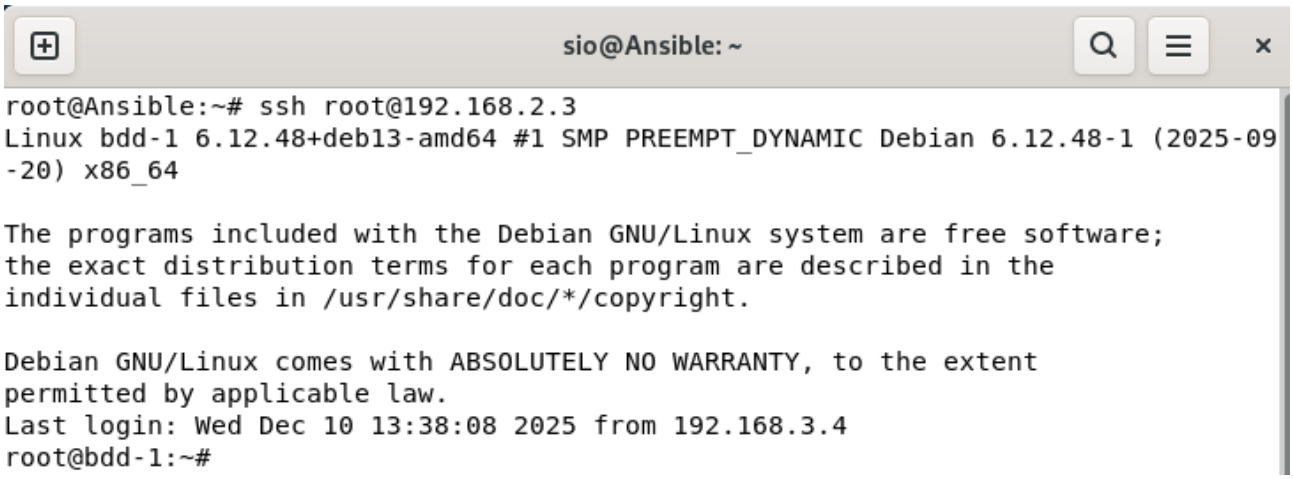


```
root@Ansible:~# ssh-copy-id -i .ssh/id_ecdsa.pub root@192.168.2.3
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: ".ssh/id_ecdsa.pub
"
The authenticity of host '192.168.2.3 (192.168.2.3)' can't be established.
ED25519 key fingerprint is SHA256:VGQShOWT3H8BYmK+RUPxe516LgXCR/mBXvVOETmonwM.
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 prompt
ed 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:~#
```

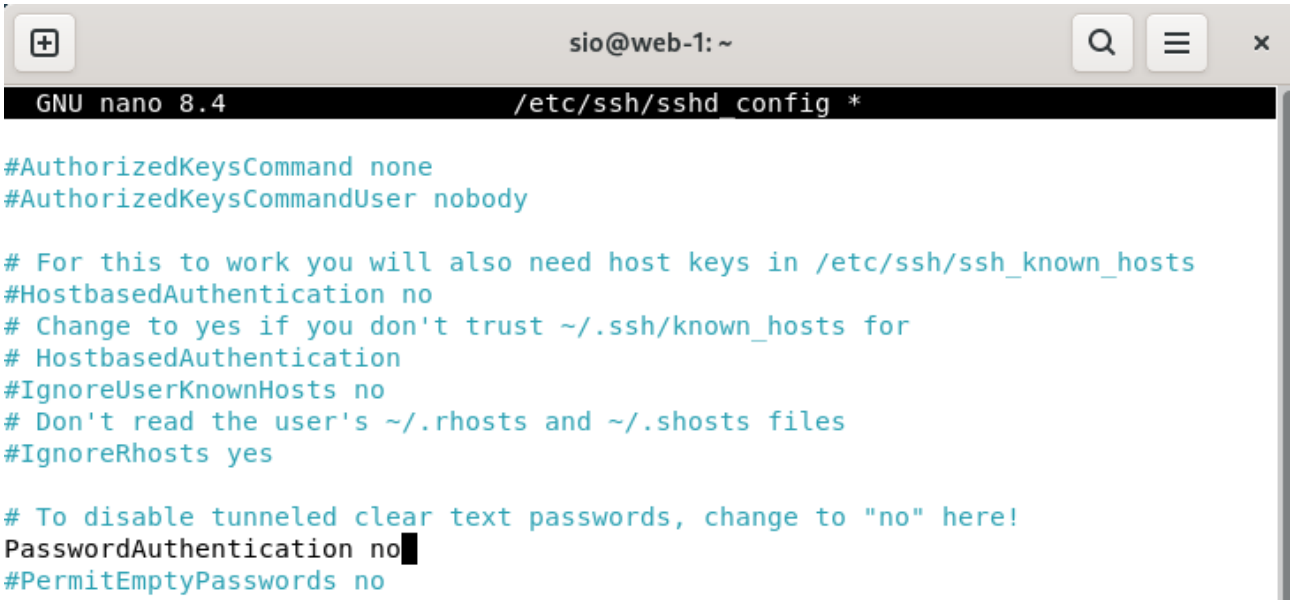
Sur les serveurs SSH web-1 et bdd-1, vérifiez la présence dans le fichier /root/.ssh/authorized_keys de la clé publique :

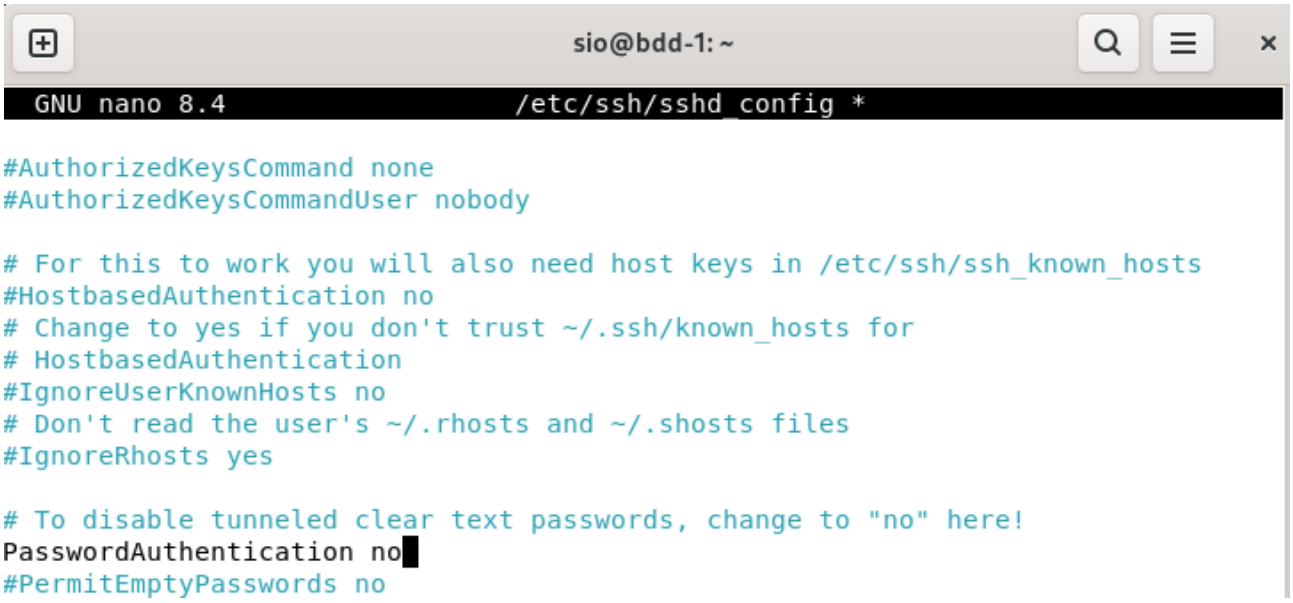
Pour vérifier le bon fonctionnement de l'authentification par clés, connectez-vous ensuite à partir du client SSH Ansible au serveur SSH web-1. La passphrase mise en place pour crypter la clé privée vous est demandée afin que le client puisse résoudre le challenge.



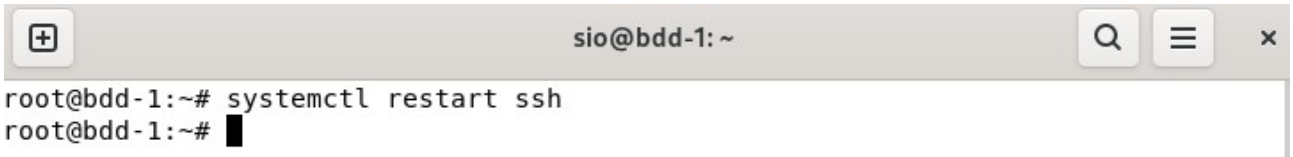


Sur les deux serveurs SSH web-1 et bdd-1, désactivez l'authentification par mot de passe pour juste conserver celle par clés dans le fichier de configuration /etc/ssh/sshd_config. Décommentez pour ce faire la directive PasswordAuthentication et affectez-lui le paramètre no.





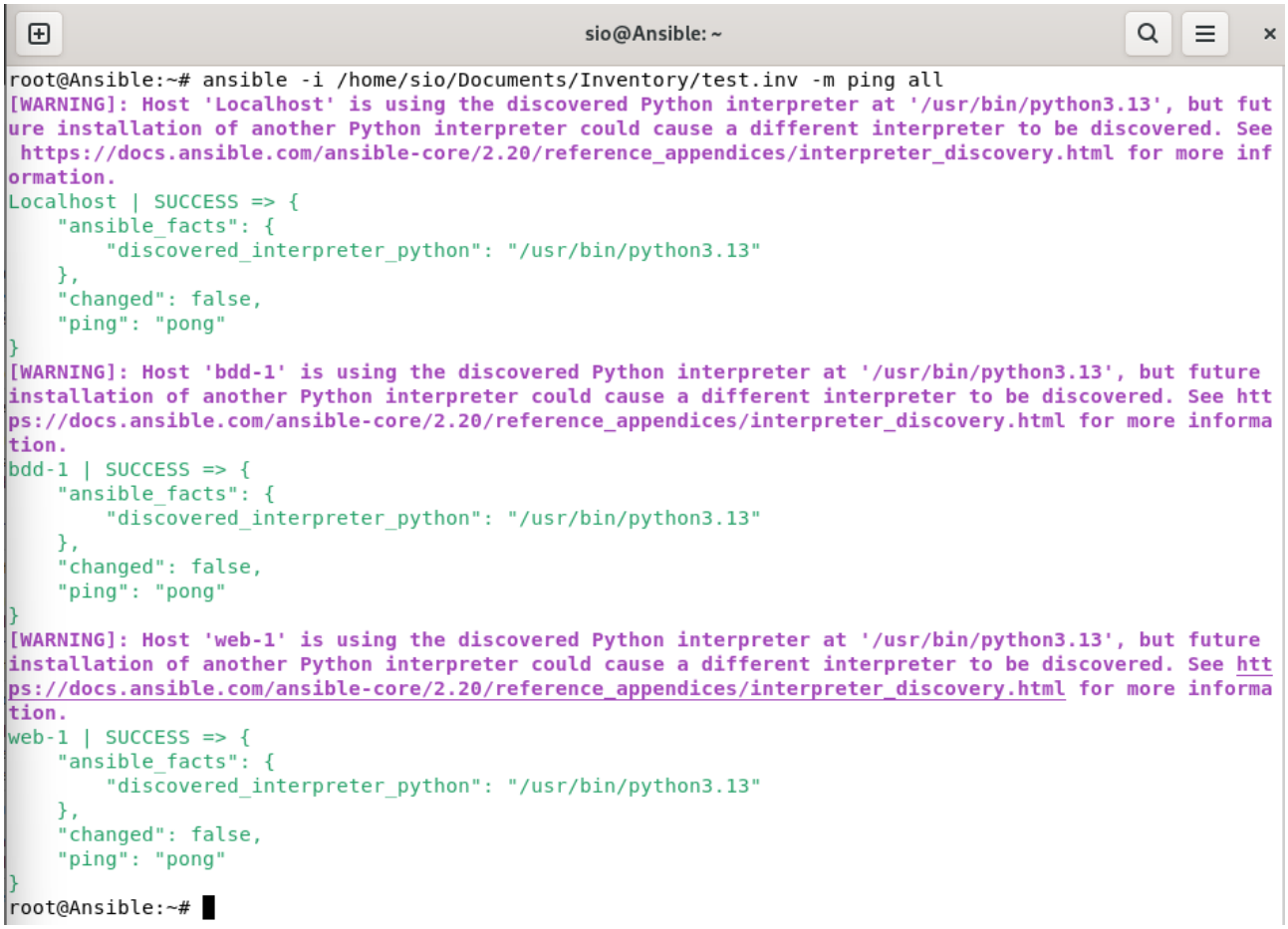
Redémarrez ensuite sur chaque machine le service SSH pour que la modification du fichier soit prise en compte.

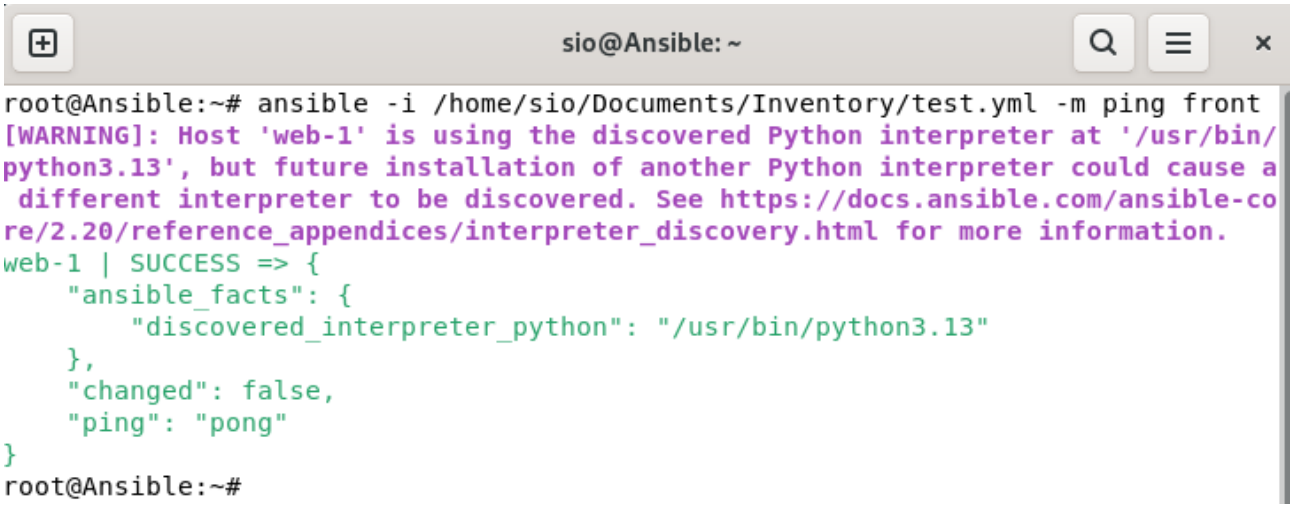


Activez l’agent SSH sur le client SSH Ansible (programme qui tourne en arrière-plan et qui garde en mémoire la clé privée) en saisissant les commandes ssh-agent /bin/bash et ssh-add (l’agent SSH vous demande la passphrase).

7. Test de communication avec le module ping

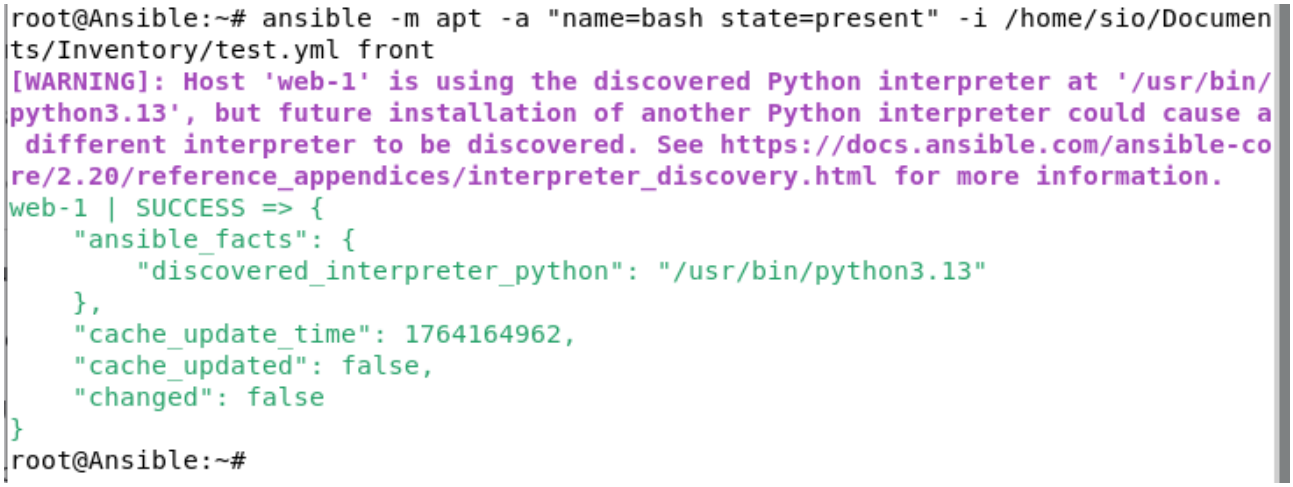
Réalisez le test de communication avec les machines de l’inventaire (groupe all puis front) :



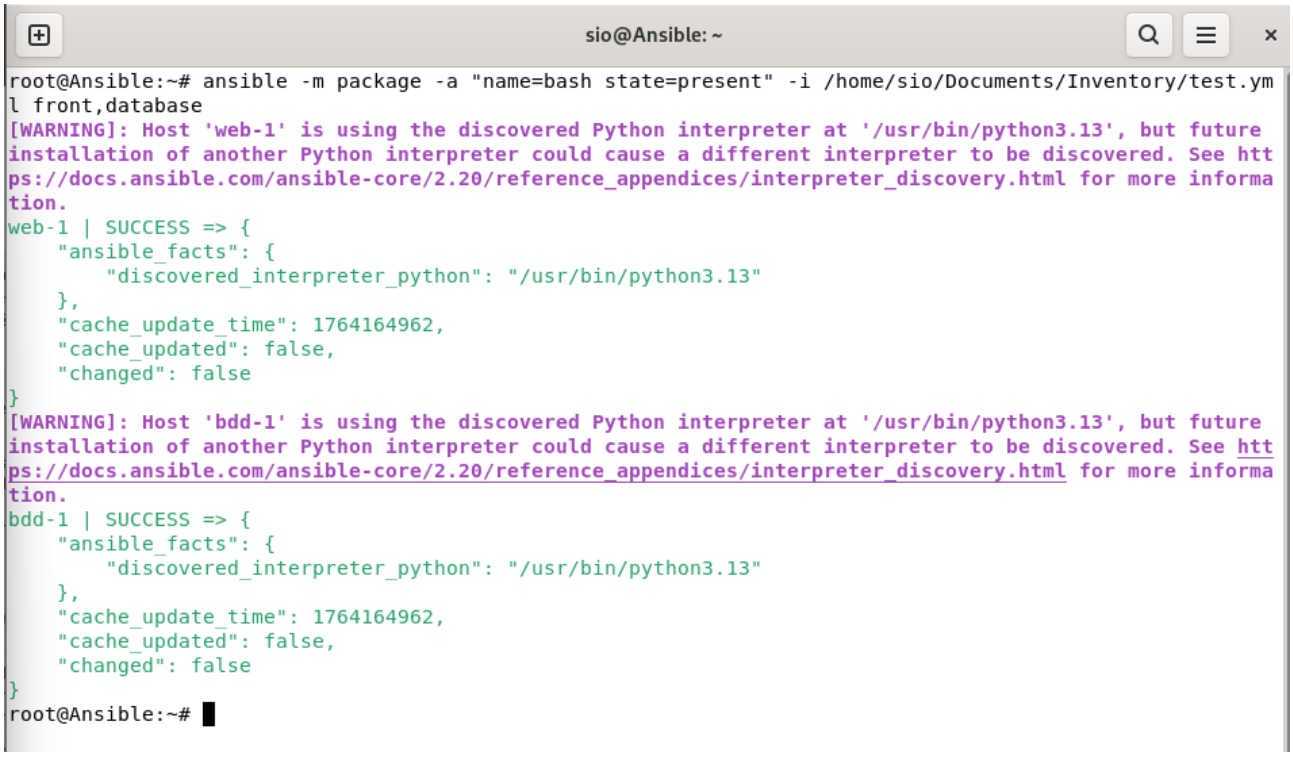


8. Installation d’un serveur Apache (en mode ad-hoc)

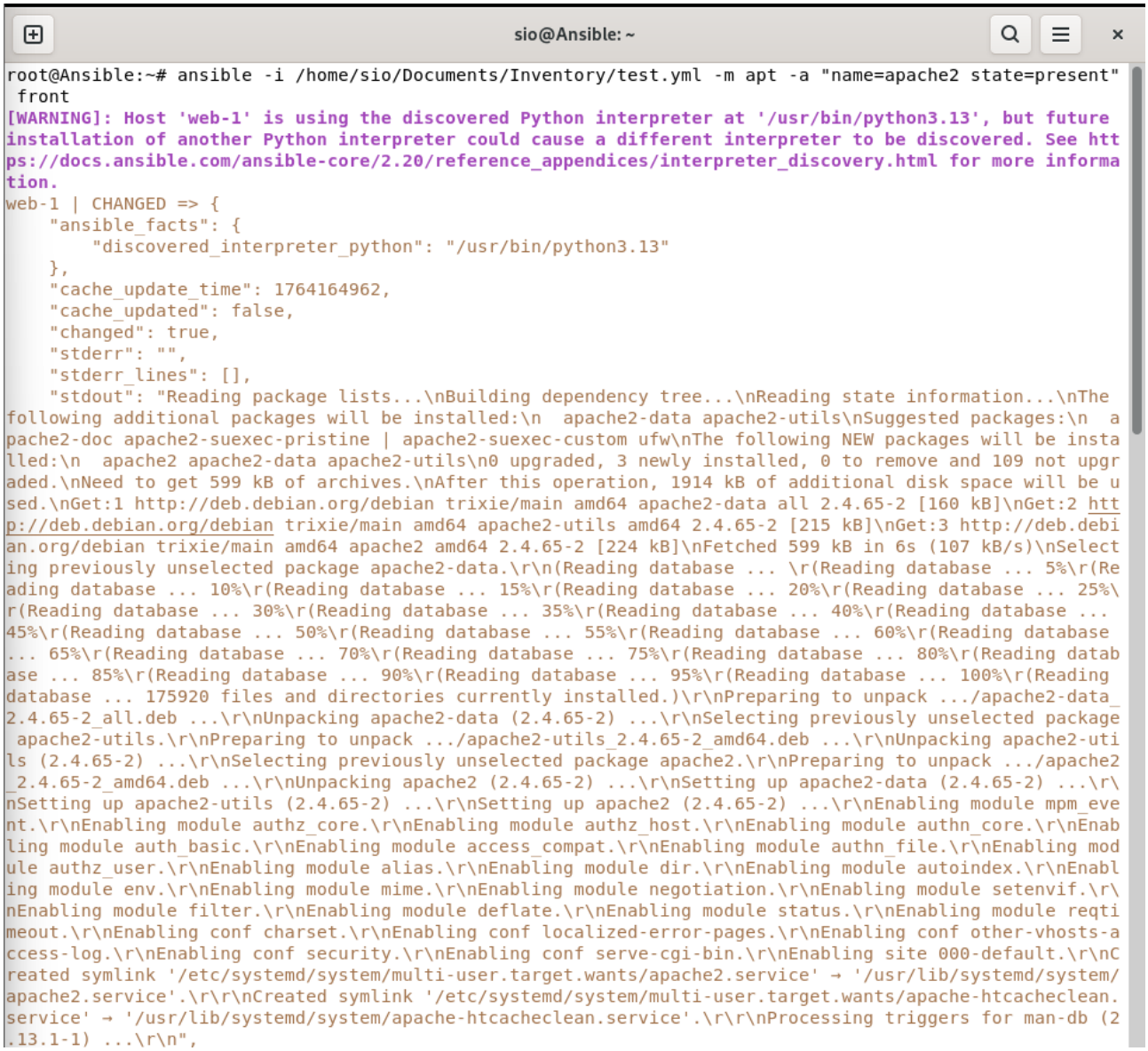
S’assurer de la présence d’un paquet (exemple bash) : module apt

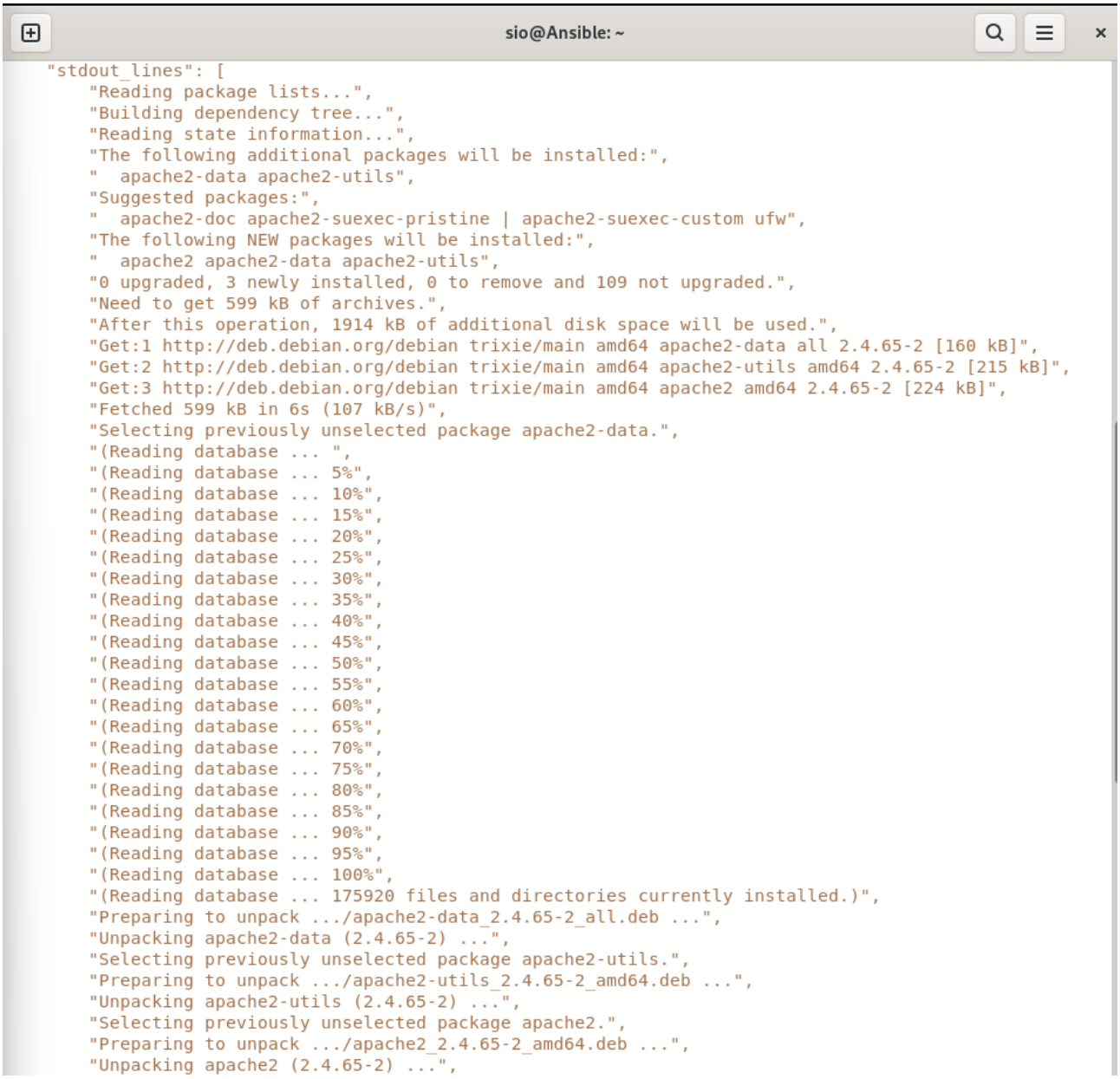


Si distribution différente (Debian et Red Hat par exemple) : module package



Installation du serveur Apache sur les machines du groupe front (module apt) :


sio@Ansible: ~
root@Ansible:~# ansible -i /home/sio/Documents/Inventory/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/2.20/reference_appendices/interpreter_discovery.html for more informa
tion.
web-1 | CHANGED => {
"ansible_facts": {
"discovered_interpreter_python": "/usr/bin/python3.13"
},
"cache_update_time": 1764164962,
"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 6s (107 kB/s)\nSelect
ing previously unselected package apache2-data.\r\n(Reading database ... \r(Reading database ... 5%\r(Re
ading 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 datab
ase ... 85%\r(Reading database ... 90%\r(Reading database ... 95%\r(Reading database ... 100%\r(Reading
database ... 175920 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 package
apache2-utils.\r\nPreparing to unpack .../apache2-utils_2.4.65-2_amd64.deb ...\r\nUnpacking apache2-uti
ls (2.4.65-2) ...\r\nSelecting previously unselected package apache2.\r\nPreparing to unpack .../apache2
_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_eve
nt.\r\nEnabling module authz_core.\r\nEnabling module authz_host.\r\nEnabling module authn_core.\r\nEnab
ling module auth_basic.\r\nEnabling module access_compat.\r\nEnabling module authn_file.\r\nEnabling mod
ule authz_user.\r\nEnabling module alias.\r\nEnabling module dir.\r\nEnabling module autoindex.\r\nEnabl
ing 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 reqti
meout.\r\nEnabling conf charset.\r\nEnabling conf localized-error-pages.\r\nEnabling conf other-vhosts-a
ccess-log.\r\nEnabling conf security.\r\nEnabling conf serve-cgi-bin.\r\nEnabling site 000-default.\r\nC
reated 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.
service' → '/usr/lib/systemd/system/apache-htcacheclean.service'.\r\r\nProcessing triggers for man-db (2
.13.1-1) ...\r\n",


sio@Ansible: ~
"stdout_lines": [
"Reading package lists...",
"Building dependency tree...",
"Reading state information...",
"The following additional packages will be installed:",
" apache2-data apache2-utils",
"Suggested packages:",
" apache2-doc apache2-suexec-pristine | apache2-suexec-custom ufw",
"The following NEW packages will be installed:",
" apache2 apache2-data apache2-utils",
"0 upgraded, 3 newly installed, 0 to remove and 109 not upgraded.",
"Need to get 599 kB of archives.",
"After this operation, 1914 kB of additional disk space will be used.",
"Get:1 http://deb.debian.org/debian trixie/main amd64 apache2-data all 2.4.65-2 [160 kB]",
"Get:2 http://deb.debian.org/debian trixie/main amd64 apache2-utils amd64 2.4.65-2 [215 kB]",
"Get:3 http://deb.debian.org/debian trixie/main amd64 apache2 amd64 2.4.65-2 [224 kB]",
"Fetched 599 kB in 6s (107 kB/s)",
"Selecting previously unselected package apache2-data.",
"(Reading database ... ",
"(Reading database ... 5%",
"(Reading database ... 10%",
"(Reading database ... 15%",
"(Reading database ... 20%",
"(Reading database ... 25%",
"(Reading database ... 30%",
"(Reading database ... 35%",
"(Reading database ... 40%",
"(Reading database ... 45%",
"(Reading database ... 50%",
"(Reading database ... 55%",
"(Reading database ... 60%",
"(Reading database ... 65%",
"(Reading database ... 70%",
"(Reading database ... 75%",
"(Reading database ... 80%",
"(Reading database ... 85%",
"(Reading database ... 90%",
"(Reading database ... 95%",
"(Reading database ... 100%",
"(Reading database ... 175920 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) ...",

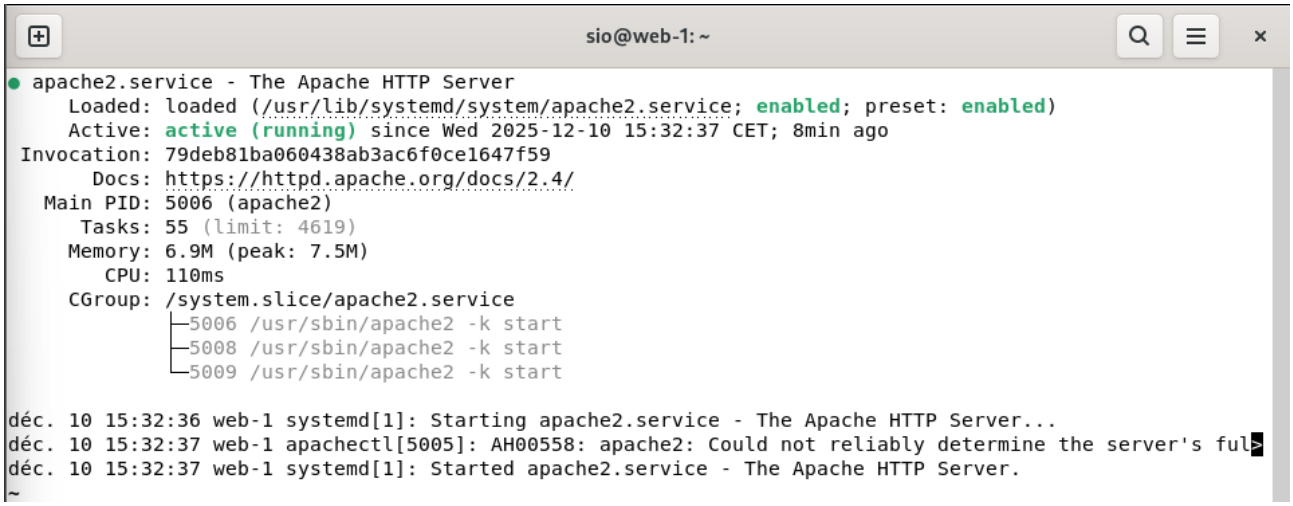
```
        "Setting up apache2-data (2.4.65-2) ...",
        "Setting up apache2-utils (2.4.65-2) ...",
        "Setting up apache2 (2.4.65-2) ...",
        "Enabling module mpm_event.",
        "Enabling module authz_core.",
        "Enabling module authz_host.",
        "Enabling module authn_core.",
        "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) ..."
    ]
}
root@Ansible:~#
```

Fichier de configuration .ansible.cfg à créer dans le répertoire personnel pour évincer le Warning :

```
sio@Ansible: ~
 GNU nano 8.4                        .ansible.cfg *
[defaults]
interpreter_python=auto_silent
```

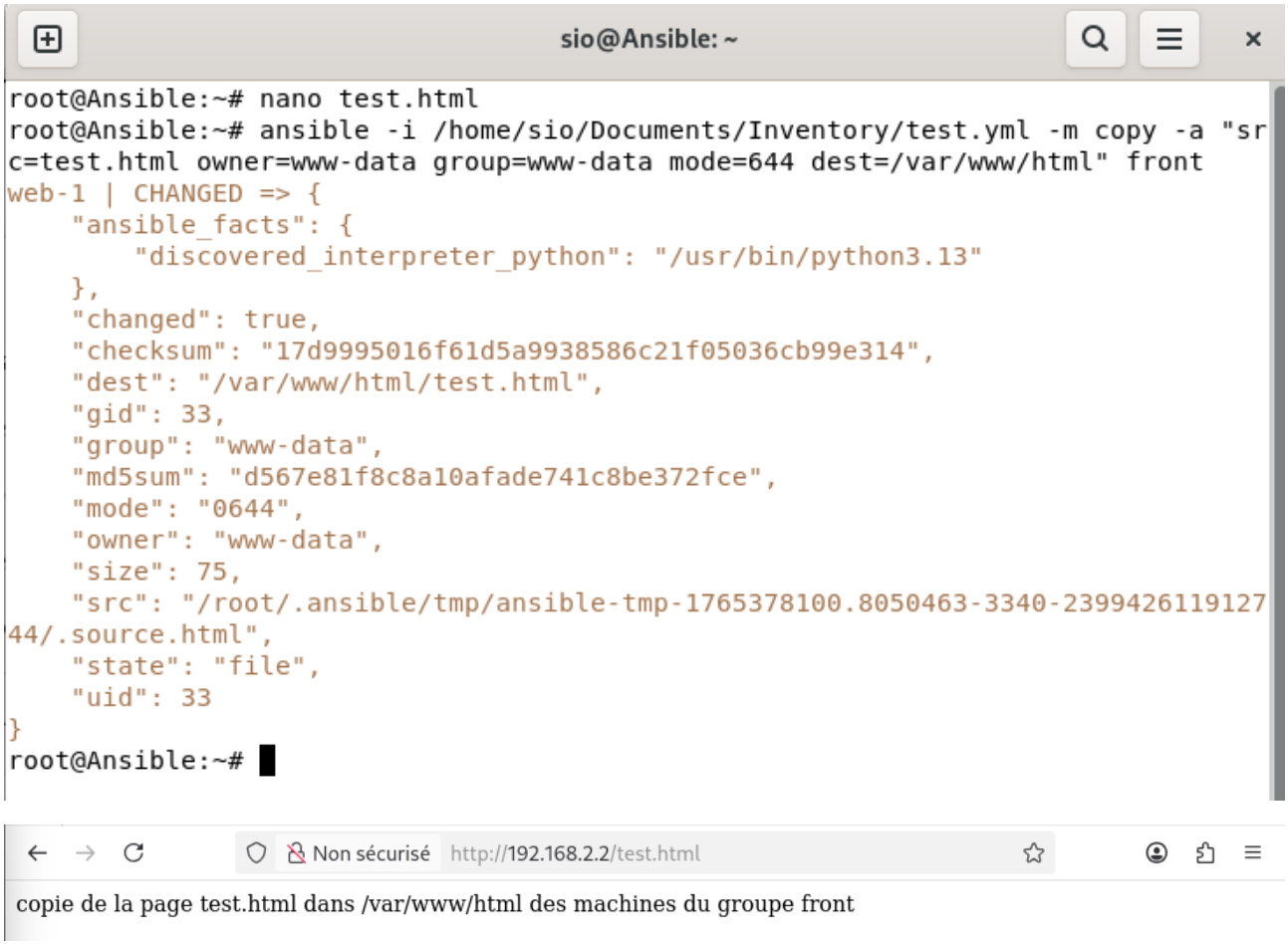
```
sio@Ansible: ~
root@Ansible:~# ansible -i /home/sio/Documents/Inventory/test.yml -m apt -a "name=apache2 state=present" front
web-1 | SUCCESS => {
    "ansible_facts": {
        "discovered_interpreter_python": "/usr/bin/python3.13"
    },
    "cache_update_time": 1764164962,
    "cache_updated": false,
    "changed": false
}
root@Ansible:~#
```

Systemctl status apache2 sur la VM web-1 :



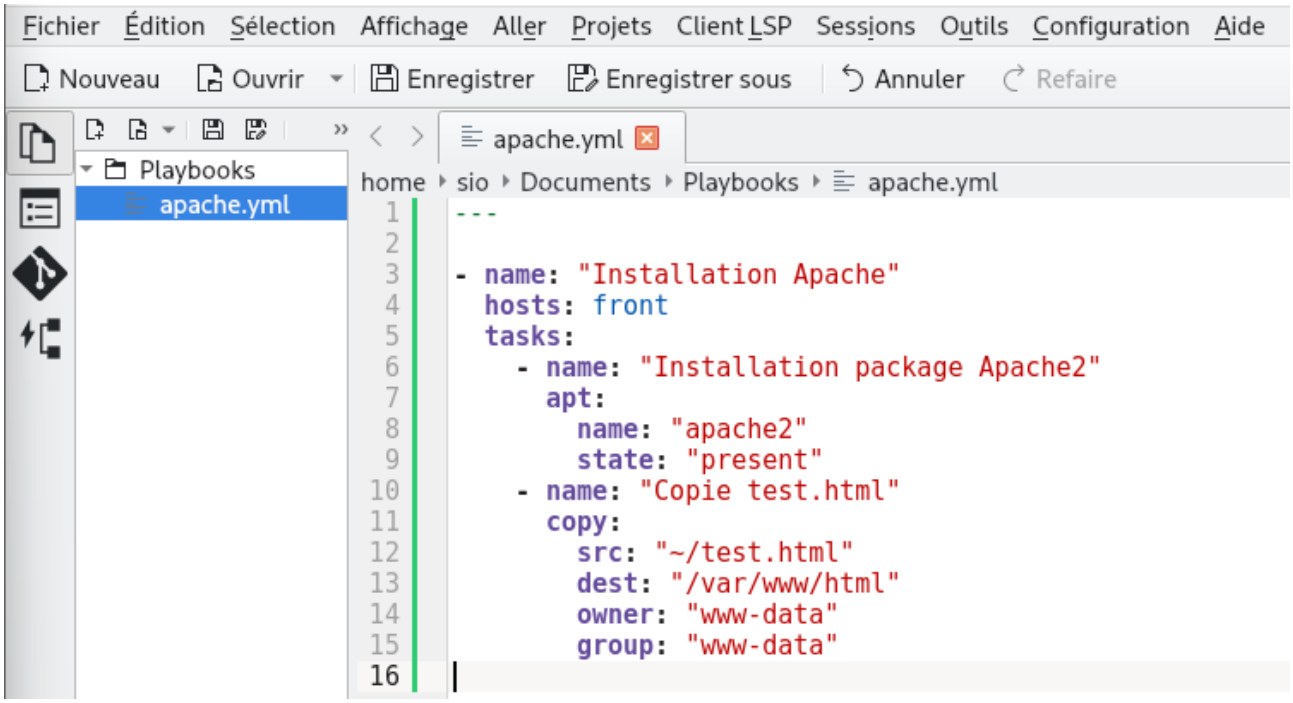
Test depuis la VM Ansible :

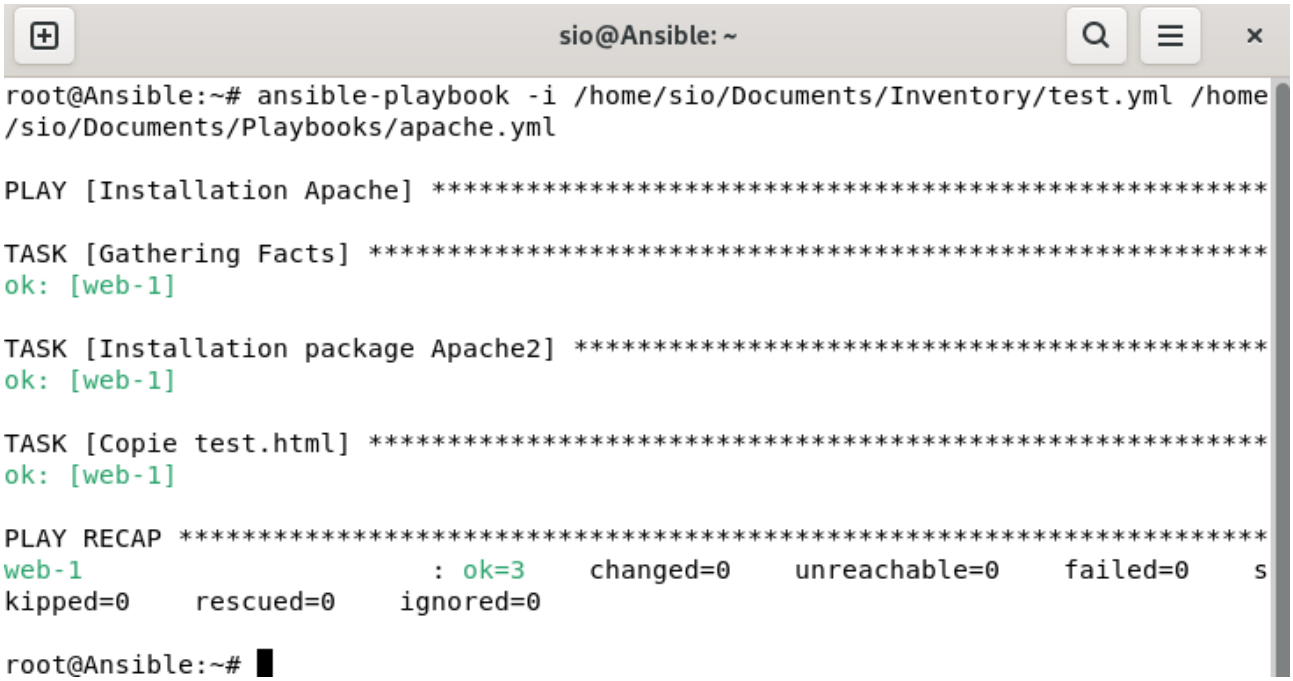
Page test.html à créer pour la copier dans le répertoire de publication avec Ansible (module copy) :



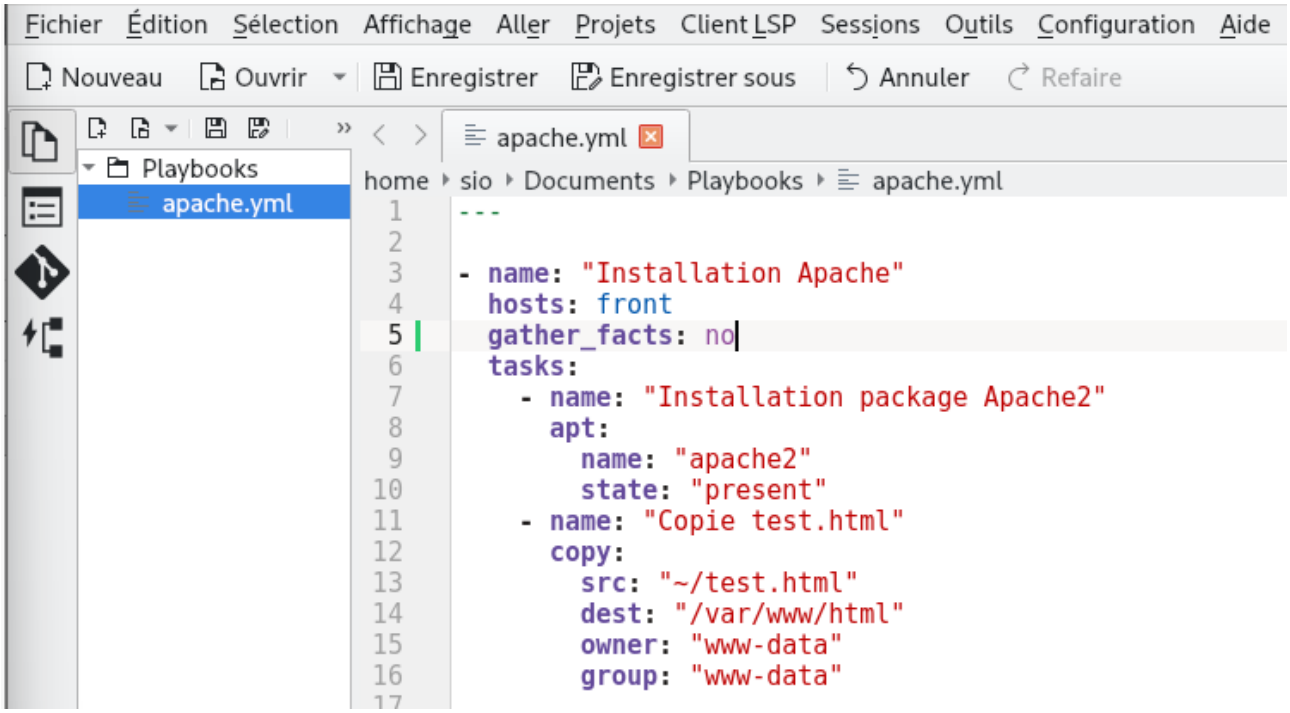
9. Premier playbook

Playbook apache.yml : modules apt et copy





Pas de récupération des informations concernant les machines (gather_facts : no) :

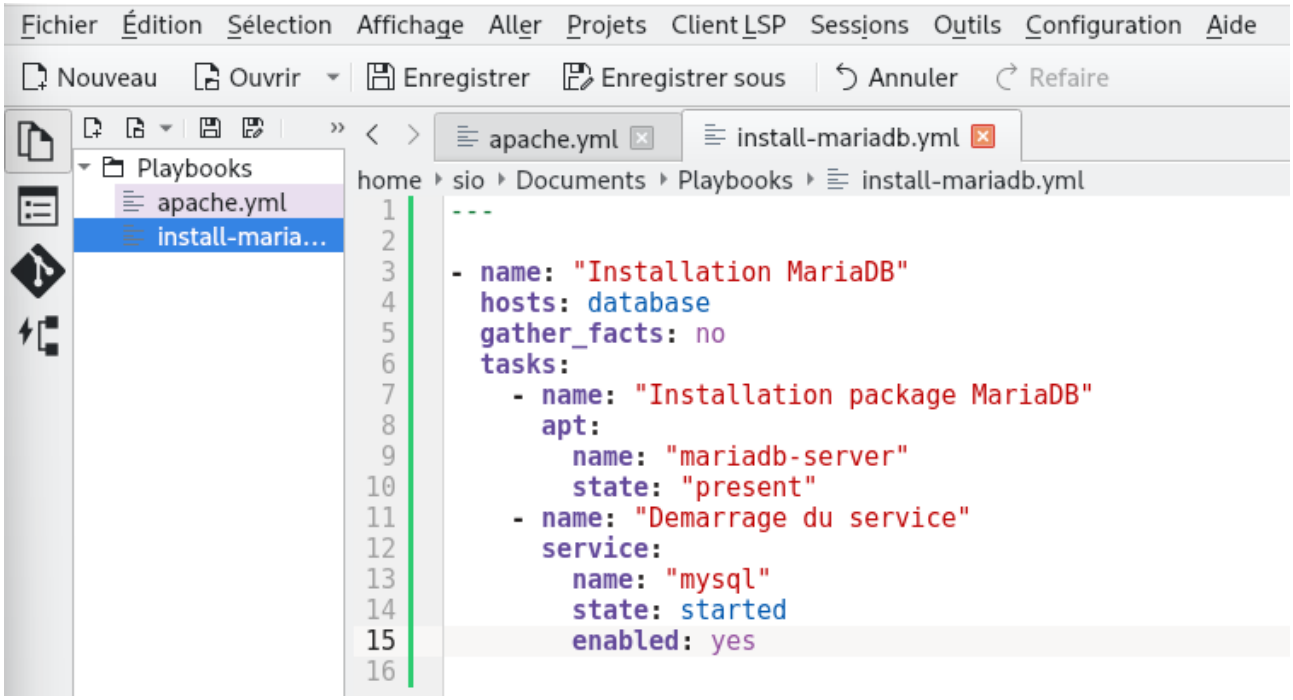


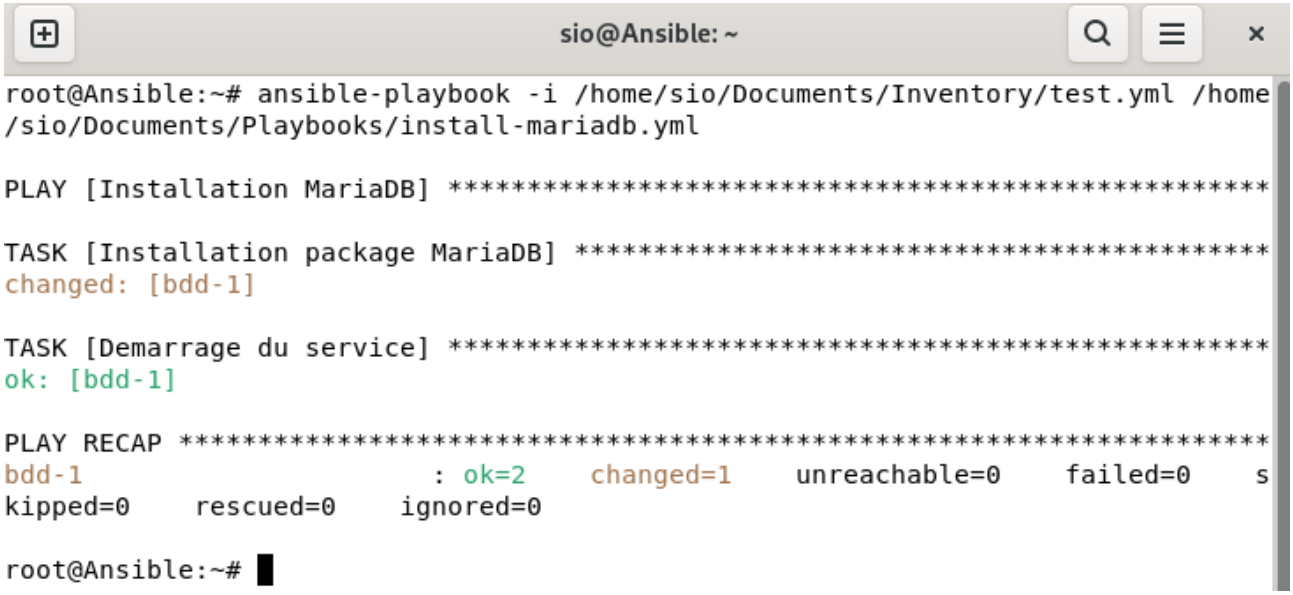

```
root@Ansible:~# ansible-playbook -i /home/sio/Documents/Inventory/test.yml /home
/sio/Documents/Playbooks/apache.yml

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

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

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

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

root@Ansible:~#
```

10. Installation d’un serveur MariaDB

Installation du serveur MariaDB sur les machines du groupe database :

Playbook install-mariadb.yml : modules apt et service





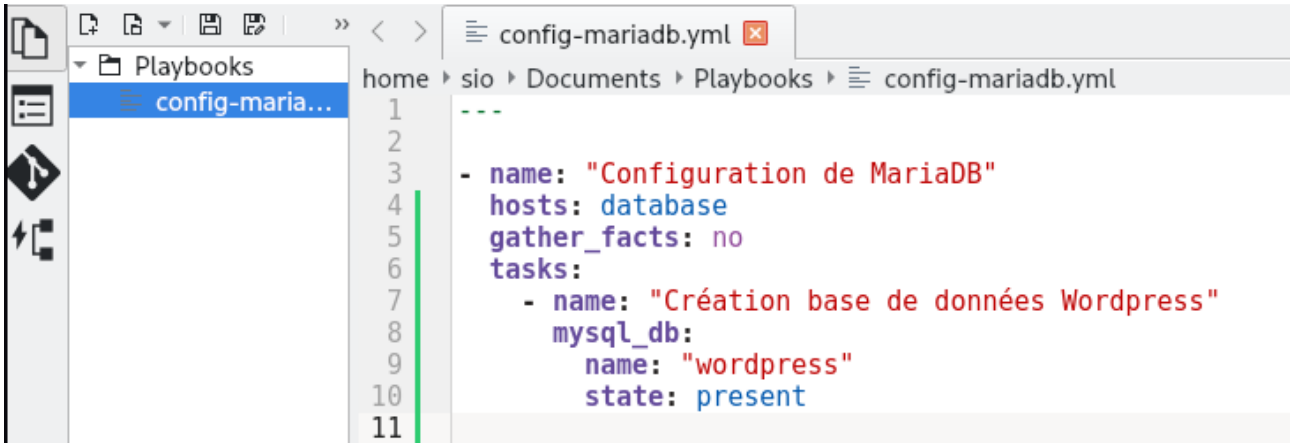
Vérification sur la VM bdd-1 :

```
root@bdd-1:~# ss -antp4
State      Recv-Q     Send-Q         Local Address:Port          Peer Address:Port
Process
LISTEN     0          80                 127.0.0.1:3306               0.0.0.0:*
 users:(("mariadbd",pid=4259,fd=28))
LISTEN     0          128                  0.0.0.0:22                 0.0.0.0:*
 users:(("sshd",pid=1008,fd=6))
LISTEN     0          4096               127.0.0.1:631                0.0.0.0:*
 users:(("cupsd",pid=2647,fd=7))
root@bdd-1:~# systemctl status mariadb
● mariadb.service - MariaDB 11.8.3 database server
     Loaded: loaded (/usr/lib/systemd/system/mariadb.service; enabled; preset:
     Active: active (running) since Wed 2025-12-17 15:03:12 CET; 2min 30s ago
 Invocation: 3e30d2270ef745e1a2e6e767dfa382a2
       Docs: man:mariadbd(8)
             https://mariadb.com/kb/en/library/systemd/
   Main PID: 4259 (mariadbd)
     Status: "Taking your SQL requests now..."
      Tasks: 10 (limit: 30491)
     Memory: 125.4M (peak: 130.1M)
        CPU: 2.066s
     CGroup: /system.slice/mariadb.service
             └─4259 /usr/sbin/mariadbd
```

11. Configuration de la base de données

Création de la base de données wordpress

Playbook config-mariadb.yml : module mysql_db



```
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]: Deprecation warnings can be disabled by setting `deprecation_warnings
=False` in ansible.cfg.
[DEPRECATION WARNING]: Importing 'to_native' from 'ansible.module_utils._text' i
s deprecated. This feature will be removed from ansible-core version 2.24. Use a
nsible.module_utils.common.text.converters instead.
[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. Consi
der setting ansible_python_interpreter to use the 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 Py
```

Installation du module avant la création de la base de données :