

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

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1. Installation d’Ansible.



```
sio@DEB13: ~  
GNU nano 8.4 /etc/hosts *  
127.0.0.1 localhost  
127.0.1.1 Ansible  
  
# The following lines are desirable for IPv6 capable hosts  
::1 localhost ip6-localhost ip6-loopback  
ff02::1 ip6-allnodes  
ff02::2 ip6-allrouters
```



```
sio@DEB13: ~  
GNU nano 8.4 /etc/hostname *  
Ansible
```



```
sio@Ansible: ~  
root@Ansible:~# apt-get update  
Atteint : 1 http://deb.debian.org/debian trixie InRelease  
Atteint : 2 http://security.debian.org/debian-security trixie-security InRelease  
Atteint : 3 http://deb.debian.org/debian trixie-updates InRelease  
Lecture des listes de paquets... Fait  
root@Ansible:~#
```

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

```
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:~# █
```

```
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 ? [0/n] █
```

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

x 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 3774 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
```

```
sio@Ansible: ~
root@Ansible:~# pipx install --include-deps ansible
installed package ansible 13.0.0, installed using Python 3.13.5
These apps are now globally available
- ansible
- ansible-community
- ansible-config
- ansible-console
- ansible-doc
- ansible-galaxy
- ansible-inventory
- ansible-playbook
- ansible-pull
- ansible-test
- ansible-vault
⚠ Note: '/root/.local/bin' is not on your PATH environment variable. These
apps will not be globally accessible until your PATH is updated. Run `pipx
ensurepath` to automatically add it, or manually modify your PATH in your
shell's config file (e.g. ~/.bashrc).
done! ✨ 🌟 ✨
root@Ansible:~#
```

```
sio@Ansible: ~
sio@Ansible:~$ su -
Mot de passe :
root@Ansible:~# ansible --version
ansible [core 2.20.0]
  config file = None
  configured module search path = ['/root/.ansible/plugins/modules', '/usr/share
/ansible/plugins/modules']
  ansible python module location = /root/.local/share/pipx/venvs/ansible/lib/pyt
hon3.13/site-packages/ansible
  ansible collection location = /root/.ansible/collections:/usr/share/ansible/co
llections
  executable location = /root/.local/bin/ansible
  python version = 3.13.5 (main, Jun 25 2025, 18:55:22) [GCC 14.2.0] (/root/.loc
al/share/pipx/venvs/ansible/bin/python)
  jinja version = 3.1.6
  pyyaml version = 6.0.3 (with libyaml v0.2.5)
root@Ansible:~# █
```

2. Premier module avec Ansible (setup).

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



```
    "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 become 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`, `factor`, `facts`, `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,!factor`. 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
```

```
sio@Ansible: ~  
root@Ansible:~# ansible -m setup -a gather_subset=min localhost  
[WARNING]: No inventory was parsed, only implicit localhost is available  
localhost | SUCCESS => {  
  "ansible_facts": {  
    "ansible_apparmor": {  
      "status": "enabled"  
    },  
    "ansible_architecture": "x86_64",  
    "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": "1764166111",  
      "epoch_int": "1764166111",  
      "hour": "15",  
      "iso8601": "2025-11-26T14:08:31Z",  
      "iso8601_basic": "20251126T150831152531",  
      "iso8601_basic_short": "20251126T150831",  
      "iso8601_micro": "2025-11-26T14:08:31.152531Z",  
      "minute": "08",  
      "month": "11",  
      "second": "31",  
      "time": "15:08:31",  
      "tz": "CET",  
      "tz_dst": "CEST",  
      "tz_offset": "+0100",  
      "weekday": "mercredi",  
      "weekday_number": "3",  
      "weeknumber": "47",  
      "year": "2025"  
    },  
    "ansible_distribution": "Debian",  
    "ansible_distribution_file_parsed": true,  
    "ansible_distribution_file_path": "/etc/os-release",  
    "ansible_distribution_file_variety": "Debian",  
    "ansible_distribution_major_version": "13",  
    "ansible_distribution_minor_version": "1",  
    "ansible_distribution_release": "trixie",  
    "ansible_distribution_version": "13.1",  
    "ansible_dns": {  
      "nameservers": [  
        "172.17.254.1"  
      ],  
    },  
  },  
}
```

3.2. Documentation officielle

<https://docs.ansible.com/>

4. Idempotence : exemple avec gestion des répertoires

```
root@Ansible:~# ansible -m file -a "path=/tmp/test state=directory" localhost
[WARNING]: No inventory was parsed, only implicit localhost is available
localhost | CHANGED => {
  "changed": true,
  "gid": 0,
  "group": "root",
  "mode": "0775",
  "owner": "root",
  "path": "/tmp/test",
  "size": 40,
  "state": "directory",
  "uid": 0
}
root@Ansible:~# ansible -m file -a "path=/tmp/test state=directory" localhost
[WARNING]: No inventory was parsed, only implicit localhost is available
localhost | SUCCESS => {
  "changed": false,
  "gid": 0,
  "group": "root",
  "mode": "0775",
  "owner": "root",
  "path": "/tmp/test",
  "size": 40,
  "state": "directory",
  "uid": 0
}
root@Ansible:~# █
```

```
root@Ansible:~# ansible -m file -a "path=/tmp/test state=directory mode=0700" localhost
[WARNING]: No inventory was parsed, only implicit localhost is available
localhost | CHANGED => {
  "changed": true,
  "gid": 0,
  "group": "root",
  "mode": "0700",
  "owner": "root",
  "path": "/tmp/test",
  "size": 40,
  "state": "directory",
  "uid": 0
}
root@Ansible:~# ls -ld /tmp/test/
drwx----- 2 root root 40 26 nov. 15:11 /tmp/test/
root@Ansible:~# █
```

5. Création d'un fichier d'inventaire

```
sio@Ansible: ~  
root@Ansible:~# apt-get install kate  
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 :  
gnome-themes-extra-data kactivitymanagerd kate-data kded6 keditbookmarks kio6 kpackageool6 kwallet6  
libb2-1 libdouble-conversion3 libhfstospell11 libkf6archive-data libkf6archive6 libkf6attica6  
libkf6auth-data libkf6authcore6 libkf6bookmarks-data libkf6bookmarks6 libkf6bookmarkswidgets6  
libkf6breezeicons6 libkf6codecs-data libkf6codecs6 libkf6colorscheme-data libkf6colorscheme6  
libkf6completion-data libkf6completion6 libkf6config-bin libkf6config-data libkf6configcore6  
libkf6configgui6 libkf6configqml6 libkf6configwidgets-data libkf6configwidgets6  
libkf6coreaddons-data libkf6coreaddons6 libkf6crash6 libkf6dbusaddons-bin libkf6dbusaddons-data  
libkf6dbusaddons6 libkf6doctools6 libkf6globalaccel-data libkf6globalaccel6 libkf6guiaddons-bin  
libkf6guiaddons-data libkf6guiaddons6 libkf6i18n-data libkf6i18n6 libkf6i18nqml6  
libkf6iconthemes-bin libkf6iconthemes-data libkf6iconthemes6 libkf6iconwidgets6 libkf6itemmodels6  
libkf6itemviews-data libkf6itemviews6 libkf6jobwidgets-data libkf6jobwidgets6 libkf6kcmutils-bin  
libkf6kcmutils-data libkf6kcmutils6 libkf6kcmutilscore6 libkf6kcmutilsquick6 libkf6kiocore6
```

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	
192.168.3.4	255.255.255.0	192.168.3.254	⊗
			⊗

DNS Automatique

192.168.3.1

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

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 :

```
Nouveau  Ouvrir  Enregistrer  Enregistrer sous  Annuler  Refaire  
Inventory  
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
```

```

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 :

```

---
all:
  hosts:
    localhost:
      ansible_connection: local

front:
  hosts:
    web-1:
      ansible_host: 192.168.2.2
      ansible_user: root

database:
  hosts:
    bdd-1:
      ansible_host: 192.168.2.3
      ansible_user: root

```

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

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 :

```
sio@Ansible: ~
root@Ansible:~# ssh-keygen -b 256 -t ecdsa
Generating public/private ecdsa key pair.
Enter file in which to save the key (/root/.ssh/id_ecdsa):
Enter passphrase for "/root/.ssh/id_ecdsa" (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /root/.ssh/id_ecdsa
Your public key has been saved in /root/.ssh/id_ecdsa.pub
The key fingerprint is:
SHA256:QzJN4/fu44By5cbKCC50HR0ZdAdwdPR/gEWo7bDXSdo root@Ansible
The key's randomart image is:
+----[ECDSA 256]----+
|      .o=B0+  oo  |
|      +* +  ..0  |
|      o.+  .00  .  |
|      0+  .0..... |
|      . oS  .+.=... |
|      . . .  *..+ E. |
|      . . .  o  =..  |
|      .. .  =  o  o.  |
|      .. .  o  .o.  |
+-----[SHA256]-----+
root@Ansible:~#
```

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 :

```
GNU nano 8.4 /etc/ssh/sshd config *
# Authentication:

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

PubkeyAuthentication yes

# Expect .ssh/authorized_keys2 to be disregarded by default in future.
AuthorizedKeysFile .ssh/authorized_keys .ssh/authorized_keys2
```

```
root@web-1:~# systemctl restart sshd
root@web-1:~# █
```

```
GNU nano 8.4 /etc/ssh/sshd config *
# Authentication:

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

PubkeyAuthentication yes

# Expect .ssh/authorized_keys2 to be disregarded by default in future.
AuthorizedKeysFile .ssh/authorized_keys .ssh/authorized_keys2
```

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

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 :

```
sio@Ansible: ~
GNU nano 8.4 /etc/ssh/ssh_config *
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
```

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`.

```
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 prompt
ed 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:~# systemctl restart ssh
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:VGQSh0WT3H8BYmK+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 :

```

sio@web-1: ~
root@web-1:~# cd .ssh/
root@web-1:~/.ssh# ls -l
total 4
-rw----- 1 root root 174  3 déc.  15:43 authorized_keys
root@web-1:~/.ssh# cat authorized_keys
ecdsa-sha2-nistp256 AAAAE2VjZHNhLXNoYTItbmlzdHAyNTYAAAAIbmlzdHAyNTYAAABBBJQ9qM20
0TYagh5yvqi5SjhomwI6AM6zs9FK0vTctJDcfXNRffxJjqKV5jd4xNj9m5bGJDiTVt9oL2jcwz74A3I=
root@Ansible
root@web-1:~/.ssh# █

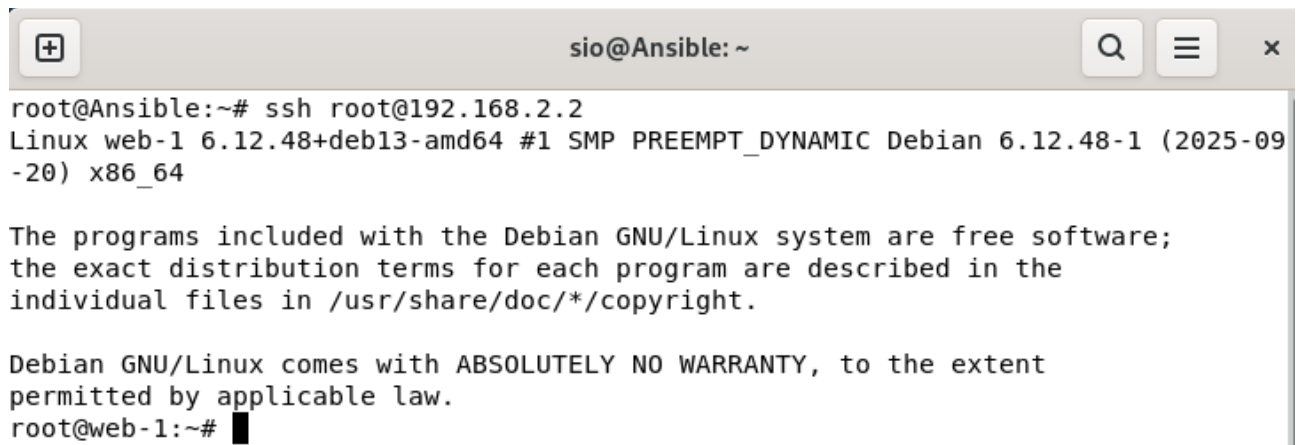
```

```

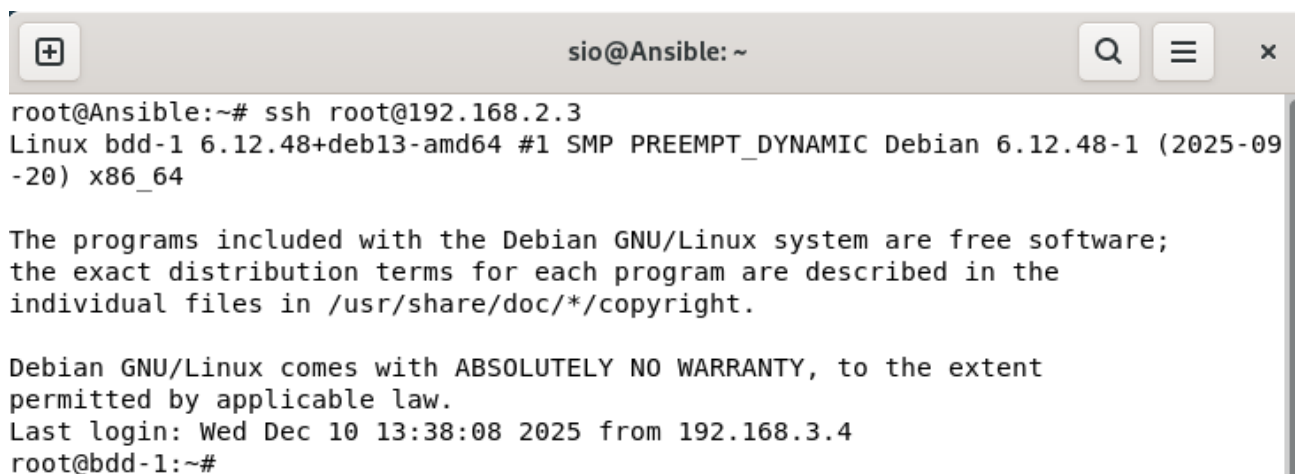
sio@bdd-1: ~
root@bdd-1:~# cd .ssh/
root@bdd-1:~/.ssh# ls -l
total 4
-rw----- 1 root root 174  3 déc.  15:46 authorized_keys
root@bdd-1:~/.ssh# cat authorized_keys
ecdsa-sha2-nistp256 AAAAE2VjZHNhLXNoYTItbmlzdHAyNTYAAAAIbmlzdHAyNTYAAABBBJQ9qM20
0TYagh5yvqi5SjhomwI6AM6zs9FK0vTctJDcfXNRffxJjqKV5jd4xNj9m5bGJDiTVt9oL2jcwz74A3I=
root@Ansible
root@bdd-1:~/.ssh# █

```

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.



```
sio@Ansible: ~  
root@Ansible:~# ssh root@192.168.2.2  
Linux web-1 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@web-1:~#
```



```
sio@Ansible: ~  
root@Ansible:~# ssh root@192.168.2.3  
Linux bdd-1 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.  
Last login: Wed Dec 10 13:38:08 2025 from 192.168.3.4  
root@bdd-1:~#
```

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`.

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

#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
```

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

#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
```

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

```
sio@web-1: ~
root@web-1:~# systemctl restart ssh
root@web-1:~#
```

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

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).

```
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

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

```
sio@Ansible: ~  
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 future installation of another Python interpreter could cause a different interpreter to be discovered. See https://docs.ansible.com/ansible-core/2.20/reference\_appendices/interpreter\_discovery.html for more information.  
Localhost | 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 https://docs.ansible.com/ansible-core/2.20/reference\_appendices/interpreter\_discovery.html for more information.  
bdd-1 | 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 https://docs.ansible.com/ansible-core/2.20/reference\_appendices/interpreter\_discovery.html for more information.  
web-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 https://docs.ansible.com/ansible-core/2.20/reference_appendices/interpreter_discovery.html for more information.
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)

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

```
root@Ansible:~# ansible -m apt -a "name=bash state=present" -i /home/sio/Documents/Inventory/test.yml 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 https://docs.ansible.com/ansible-core/2.20/reference_appendices/interpreter_discovery.html for more information.
web-1 | SUCCESS => {
  "ansible_facts": {
    "discovered_interpreter_python": "/usr/bin/python3.13"
  },
  "cache_update_time": 1764164962,
  "cache_updated": false,
  "changed": false
}
root@Ansible:~#
```

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

```
sio@Ansible: ~  
root@Ansible:~# ansible -m package -a "name=bash state=present" -i /home/sio/Documents/Inventory/test.yml front,database  
[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 https://docs.ansible.com/ansible-core/2.20/reference\_appendices/interpreter\_discovery.html for more information.  
web-1 | SUCCESS => {  
  "ansible_facts": {  
    "discovered_interpreter_python": "/usr/bin/python3.13"  
  },  
  "cache_update_time": 1764164962,  
  "cache_updated": false,  
  "changed": false  
}  
[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 https://docs.ansible.com/ansible-core/2.20/reference\_appendices/interpreter\_discovery.html for more information.  
bdd-1 | SUCCESS => {  
  "ansible_facts": {  
    "discovered_interpreter_python": "/usr/bin/python3.13"  
  },  
  "cache_update_time": 1764164962,  
  "cache_updated": false,  
  "changed": false  
}  
root@Ansible:~# █
```

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.\n\n(Reading database ... \n(Reading database ... 5%\n(Re  
ading database ... 10%\n(Reading database ... 15%\n(Reading database ... 20%\n(Reading database ... 25%\n  
(Reading database ... 30%\n(Reading database ... 35%\n(Reading database ... 40%\n(Reading database ...  
45%\n(Reading database ... 50%\n(Reading database ... 55%\n(Reading database ... 60%\n(Reading database  
... 65%\n(Reading database ... 70%\n(Reading database ... 75%\n(Reading database ... 80%\n(Reading datab  
ase ... 85%\n(Reading database ... 90%\n(Reading database ... 95%\n(Reading database ... 100%\n(Reading  
database ... 175920 files and directories currently installed.)\n\nPreparing to unpack .../apache2-data_  
2.4.65-2_all.deb ... \n\nUnpacking apache2-data (2.4.65-2) ... \n\nSelecting previously unselected package  
apache2-utils.\n\nPreparing to unpack .../apache2-utils_2.4.65-2_amd64.deb ... \n\nUnpacking apache2-uti  
ls (2.4.65-2) ... \n\nSelecting previously unselected package apache2.\n\nPreparing to unpack .../apache2  
_2.4.65-2_amd64.deb ... \n\nUnpacking apache2 (2.4.65-2) ... \n\nSetting up apache2-data (2.4.65-2) ... \n\n  
Setting up apache2-utils (2.4.65-2) ... \n\nSetting up apache2 (2.4.65-2) ... \n\nEnabling module mpm_eve  
nt.\n\nEnabling module authz_core.\n\nEnabling module authz_host.\n\nEnabling module authn_core.\n\nEnab  
ling module auth_basic.\n\nEnabling module access_compat.\n\nEnabling module authn_file.\n\nEnabling mod  
ule authz_user.\n\nEnabling module alias.\n\nEnabling module dir.\n\nEnabling module autoindex.\n\nEnabl  
ing module env.\n\nEnabling module mime.\n\nEnabling module negotiation.\n\nEnabling module setenvif.\n\n\  
Enabling module filter.\n\nEnabling module deflate.\n\nEnabling module status.\n\nEnabling module reqti  
meout.\n\nEnabling conf charset.\n\nEnabling conf localized-error-pages.\n\nEnabling conf other-vhosts-a  
ccess-log.\n\nEnabling conf security.\n\nEnabling conf serve-cgi-bin.\n\nEnabling site 000-default.\n\n\nC  
reated symlink '/etc/systemd/system/multi-user.target.wants/apache2.service' -> '/usr/lib/systemd/system/  
apache2.service'.\n\n\nCreated symlink '/etc/systemd/system/multi-user.target.wants/apache-htcacheclean.  
service' -> '/usr/lib/systemd/system/apache-htcacheclean.service'.\n\n\nProcessing triggers for man-db (2  
.13.1-1) ... \n\n",
```

```
sio@Ansible: ~
+ Q ≡ x

"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

```



```

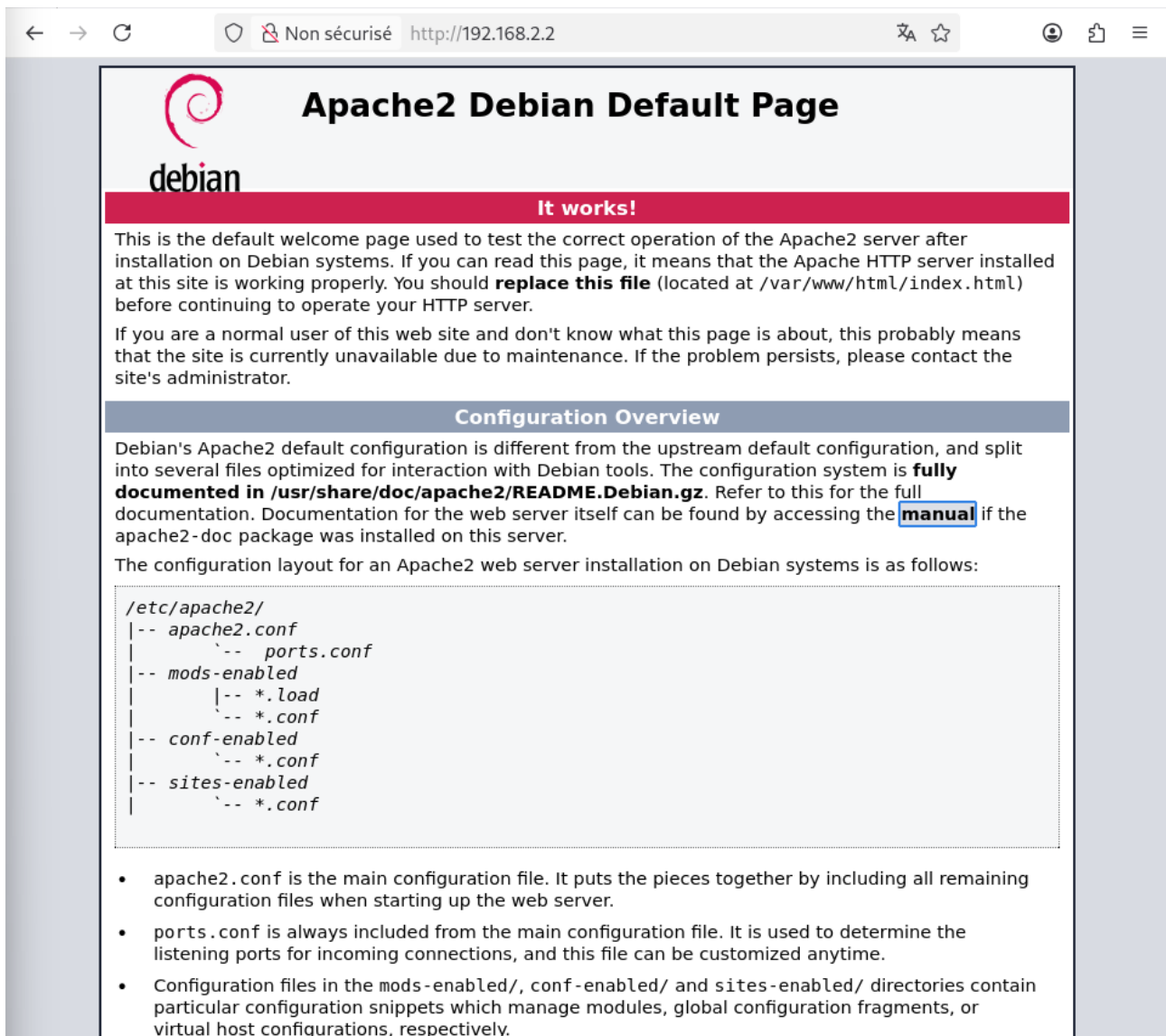
sio@Ansible: ~
root@Ansible:~# ansible -i /home/sio/Documents/Inventory/test.yml -m apt -a "name=apache2 state=present" front web-1 | SUCCESS => {
  "ansible_facts": {
    "discovered_interpreter_python": "/usr/bin/python3.13"
  },
  "cache_update_time": 1764164962,
  "cache_updated": false,
  "changed":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

```

Systemctl status apache2 sur la VM web-1 :

```
sio@web-1: ~  
● apache2.service - The Apache HTTP Server  
   Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)  
   Active: active (running) since Wed 2025-12-10 15:32:37 CET; 8min ago  
 Invocation: 79deb81ba060438ab3ac6f0ce1647f59  
    Docs: https://httpd.apache.org/docs/2.4/  
 Main PID: 5006 (apache2)  
   Tasks: 55 (limit: 4619)  
  Memory: 6.9M (peak: 7.5M)  
    CPU: 110ms  
   CGroup: /system.slice/apache2.service  
           └─5006 /usr/sbin/apache2 -k start  
             └─5008 /usr/sbin/apache2 -k start  
               └─5009 /usr/sbin/apache2 -k start  
  
déc. 10 15:32:36 web-1 systemd[1]: Starting apache2.service - The Apache HTTP Server...  
déc. 10 15:32:37 web-1 apachectl[5005]: AH00558: apache2: Could not reliably determine the server's full  
déc. 10 15:32:37 web-1 systemd[1]: Started apache2.service - The Apache HTTP Server.  
~
```

Test depuis la VM Ansible :



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



```
sio@Ansible: ~
root@Ansible:~# nano test.html
root@Ansible:~# ansible -i /home/sio/Documents/Inventory/test.yml -m copy -a "src=test.html owner=www-data group=www-data mode=644 dest=/var/www/html" front
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-1765378100.8050463-3340-239942611912744/.source.html",
  "state": "file",
  "uid": 33
}
root@Ansible:~#
```

← → ↻ Non sécurisé http://192.168.2.2/test.html ☆ ⓘ ⌵

copie de la page test.html dans /var/www/html des machines du groupe front

9. Premier playbook

Playbook apache.yml : modules apt et copy

```
Fichier Édition Sélection Affichage Aller Projets Client_LSP Sessions Outils Configuration Aide
Nouveau Ouvrir Enregistrer Enregistrer sous Annuler Refaire
Playbooks
  apache.yml
home > sio > Documents > Playbooks > apache.yml
1 ---
2
3
4 - name: "Installation Apache"
5   hosts: front
6   tasks:
7     - name: "Installation package Apache2"
8       apt:
9         name: "apache2"
10        state: "present"
11    - name: "Copie test.html"
12      copy:
13        src: "~/test.html"
14        dest: "/var/www/html"
15        owner: "www-data"
16        group: "www-data"
```

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

PLAY [Installation Apache] *****

TASK [Gathering Facts] *****
ok: [web-1]

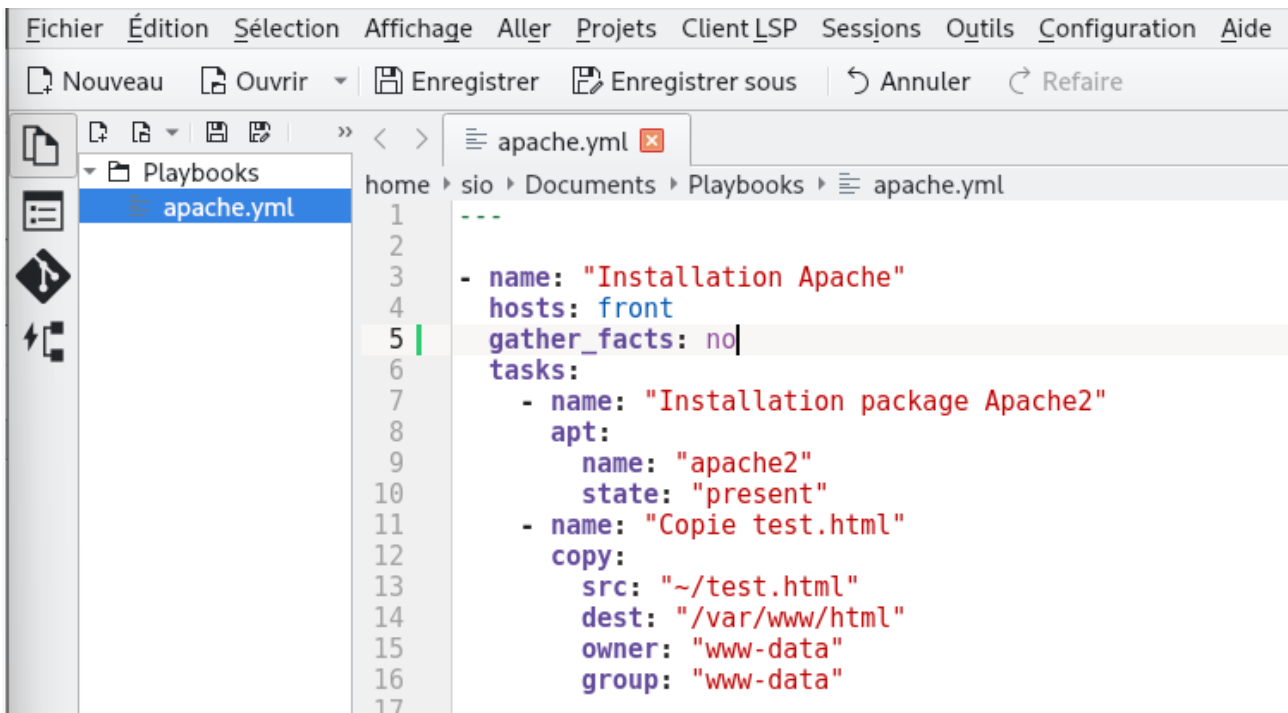
TASK [Installation package Apache2] *****
ok: [web-1]

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

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

root@Ansible:~#
```

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

```

Fichier  Édition  Sélection  Affichage  Aller  Projets  Client_LSP  Sessions  Outils  Configuration  Aide
Nouveau  Ouvrir  Enregistrer  Enregistrer sous  Annuler  Refaire
Playbooks
  apache.yml
  install-maria...
home  sio  Documents  Playbooks  install-mariadb.yml
1  ---
2
3  - name: "Installation MariaDB"
4    hosts: database
5    gather_facts: no
6    tasks:
7      - name: "Installation package MariaDB"
8        apt:
9          name: "mariadb-server"
10         state: "present"
11      - name: "Demarrage du service"
12        service:
13          name: "mysql"
14          state: started
15          enabled: yes
16

```

```

sio@Ansible: ~
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] *****
changed: [bdd-1]

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

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

root@Ansible:~# █

```

Vérification sur la VM bdd-1 :

```

sio@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: (("mariadb",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:mariadb(8)
         https://mariadb.com/kb/en/library/systemd/
 Main PID: 4259 (mariadb)
   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/mariadb

```

11. Configuration de la base de données

Création de la base de données wordpress

Playbook config-mariadb.yml : module mysql_db

```

config-mariadb.yml
1
2
3
4 - name: "Configuration de MariaDB"
5   hosts: database
6   gather_facts: no
7   tasks:
8     - name: "Création base de données Wordpress"
9       mysql_db:
10         name: "wordpress"
11         state: present

```

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

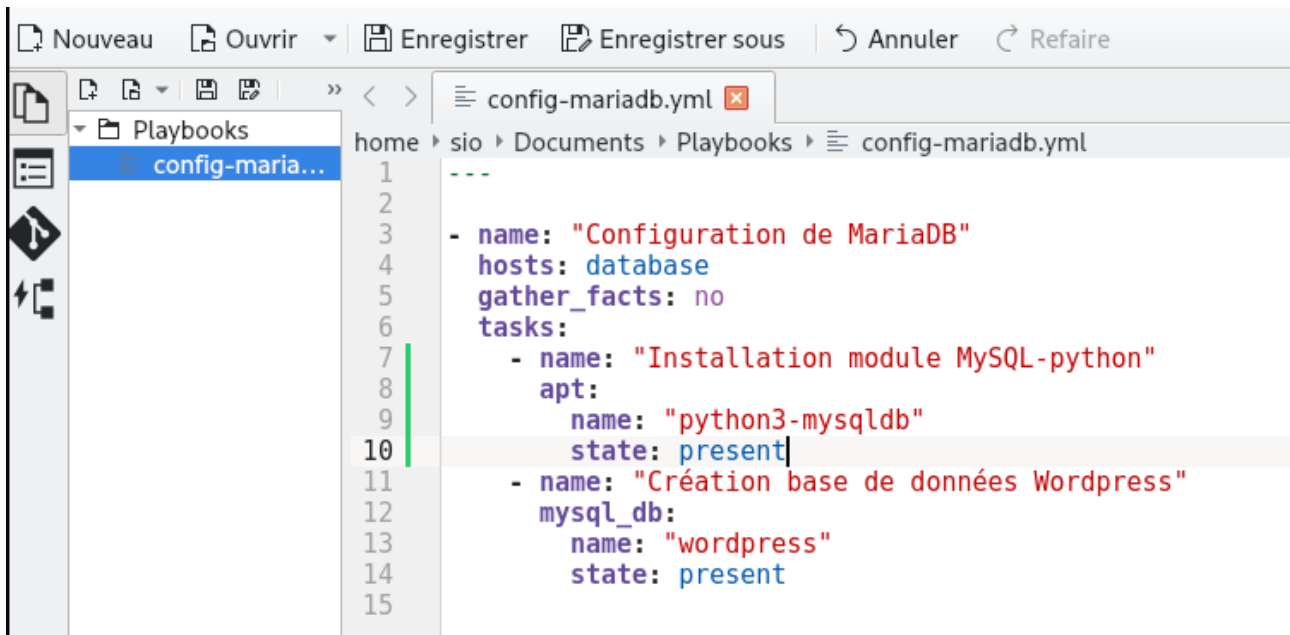
PLAY [Configuration de MariaDB] *****

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' is 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. Consider 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 PyMySQL."}
```

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



```
home > sio > Documents > Playbooks > config-mariadb.yml
1  ---
2
3  - name: "Configuration de MariaDB"
4    hosts: database
5    gather_facts: no
6    tasks:
7      - name: "Installation module MySQL-python"
8        apt:
9          name: "python3-mysqldb"
10         state: present
11      - name: "Création base de données Wordpress"
12        mysql_db:
13          name: "wordpress"
14          state: present
15
```

