

TP2– Intégration au réseau

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1. Fichiers de configuration

```
root@DEB13Server: ~#cat /etc/hosts
127.0.0.1    localhost
127.0.1.1    DEB13Server

# The following lines are desirable for IPv6 capable hosts
::1        localhost ip6-localhost ip6-loopback
ff02::1    ip6-allnodes
ff02::2    ip6-allrouters
root@DEB13Server: ~#cat /etc/resolv.conf
# Generated by dhcpd from enp0s3.dhcp
# /etc/resolv.conf.head can replace this line
nameserver 192.168.0.254
# /etc/resolv.conf.tail can replace this line
root@DEB13Server: ~#cat /etc/network/interfaces
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

source /etc/network/interfaces.d/*

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
allow-hotplug enp0s3
iface enp0s3 inet dhcp
# This is an autoconfigured IPv6 interface
iface enp0s3 inet6 auto
root@DEB13Server: ~#
```

1. Disparition de la commande ifconfig

```
root@DEB13Server: ~#ifconfig
-bash: ifconfig : commande introuvable
```

```
IP (8) Linux IP (8)
NDM
ip - Afficher et manipuler le routage, les périphériques réseau, les interfaces et les tunnels
SYNOPSIS
ip [ OPTIONS ] OBJET { COMMANDE | help }
ip [ -force ] -batch NOM_FICHER
OBJET := { address | addrlabel | fou | help | ila | ioam | l2tp | link | macsec | maddress | monitor | mptcp | mroute | mrule | neighbor | neighbour |
netconf | netns | nexthop | ntable | ntbl | route | rule | sr | tap | tcpmetrics | token | tunnel | tuntap | vrf | xfrm }
OPTIONS := { -V[ersion] | -h[uman-readable] | -s[tatistics] | -d[etails] | -r[esolve] | -iec | -f[amily] { inet | inet6 | link } | -4 | -6 | -B | -0 |
-l[oops] { maximum-addr-flush-attempts } | -o[neline] | -rc[vbuf] [size] | -t[imestamp] | -ts[hort] | -n[etns] nom | -N[umeric] | -a[ll] |
-c[olor] | -br[lief] | -j[son] | -p[rettu] }
```

```

root@DEB13Server: ~#
root@DEB13Server: ~#ip address
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:e2:3c:ce brd ff:ff:ff:ff:ff:ff
    altname enx080027e23cce
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 85622sec preferred_lft 74822sec
    inet6 fd17:625c:f037:2:a00:27ff:fee2:3cce/64 scope global dynamic mngtmpaddr proto kernel_ra
        valid_lft 86319sec preferred_lft 14319sec
    inet6 fd17:625c:f037:2:d74b:3b25:bdf4:b0ff/64 scope global dynamic mngtmpaddr noprefixroute
        valid_lft 86319sec preferred_lft 14319sec
    inet6 fe80::6f90:437a:29bc:7764/64 scope link
        valid_lft forever preferred_lft forever

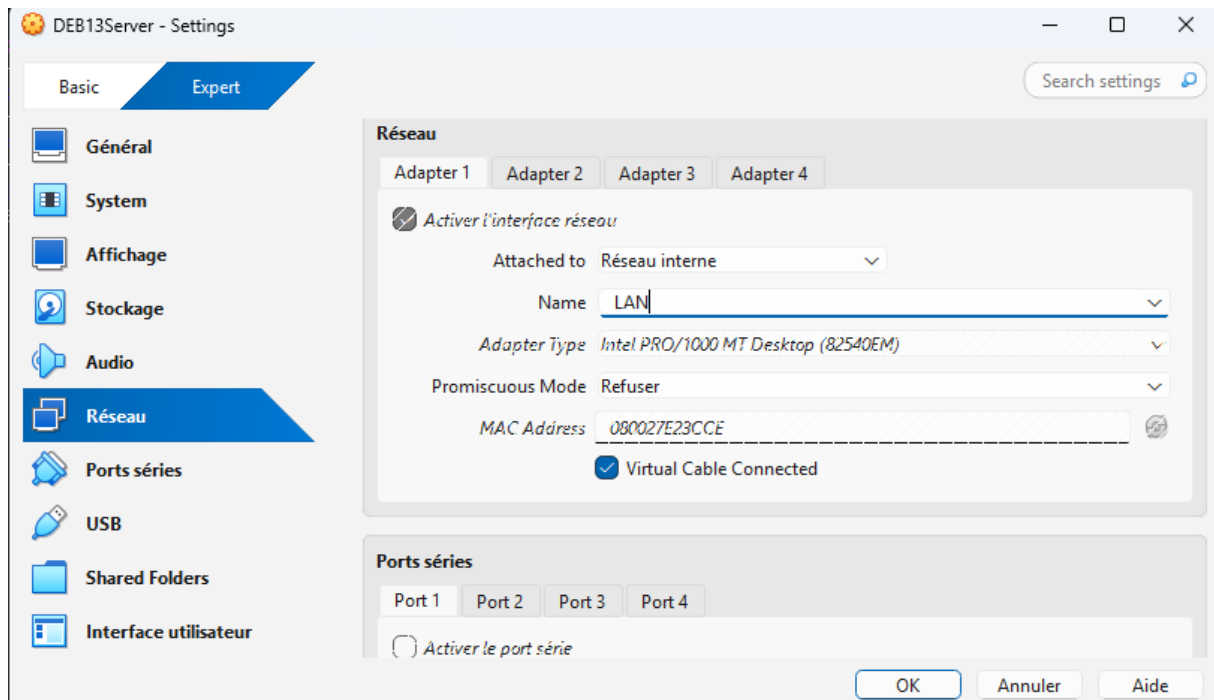
```

```

root@DEB13Server: ~#ip -c a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:e2:3c:ce brd ff:ff:ff:ff:ff:ff
    altname enx080027e23cce
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 85554sec preferred_lft 74754sec
    inet6 fd17:625c:f037:2:a00:27ff:fee2:3cce/64 scope global dynamic mngtmpaddr proto kernel_ra
        valid_lft 86251sec preferred_lft 14251sec
    inet6 fd17:625c:f037:2:d74b:3b25:bdf4:b0ff/64 scope global dynamic mngtmpaddr noprefixroute
        valid_lft 86251sec preferred_lft 14251sec
    inet6 fe80::6f90:437a:29bc:7764/64 scope link
        valid_lft forever preferred_lft forever

```

2. Mise en réseau des deux VM (réseau interne)



```
root@DEB13Server: ~#ifdown enp0s3
sending signal ALRM to pid 616
waiting for pid 616 to exit
```

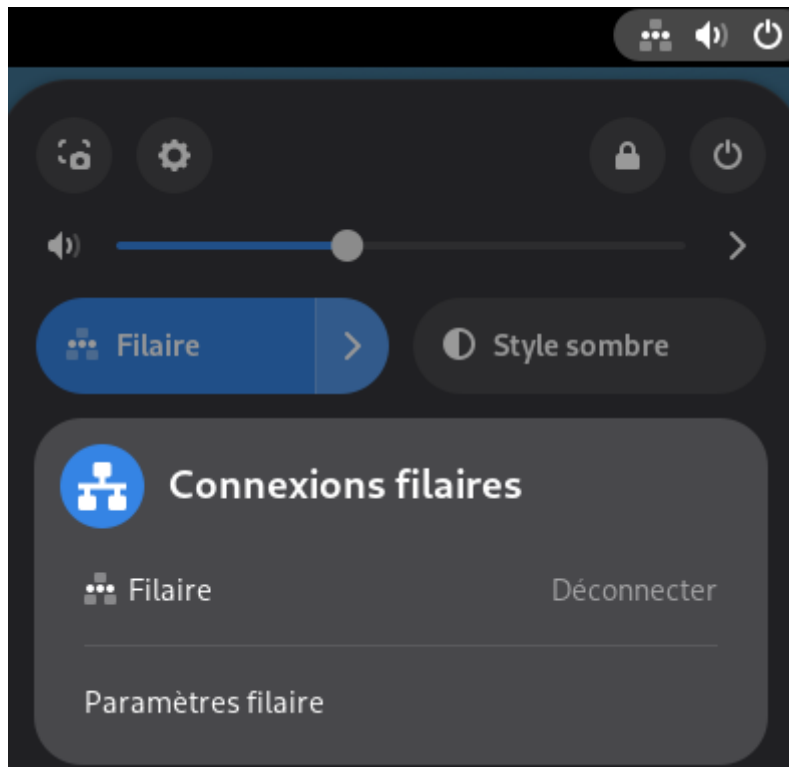
```
GNU nano 8.4
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

source /etc/network/interfaces.d/*

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
allow-hotplug enp0s3
iface enp0s3 inet static
address 192.168.0.100
netmask 255.255.255.0
network 192.168.0.0
broadcast 192.168.0.255
```

```
root@DEB13Server: ~#ifup enp0s3
root@DEB13Server: ~#ip -c a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:e2:3c:ce brd ff:ff:ff:ff:ff:ff
    altname enx080027e23cce
    inet 192.168.0.100/24 brd 192.168.0.255 scope global enp0s3
        valid_lft forever preferred_lft forever
```



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	
192.168.0.200	255.255.255.0		✕
			✕

Paramètres **Réseau** ✕

Réseau

Filaire +

Connecté - 1000 Mb/s 🔵 ⚙️

VPN +

Non configuré

Serveur mandataire

🔌 Serveur mandataire Désactivé >

```

sio@DEB13Desktop:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:5a:68:e4 brd ff:ff:ff:ff:ff:ff
    altname enx0800275a68e4
    inet 192.168.0.200/24 brd 192.168.0.255 scope global noprefixroute enp0s3
        valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:fe5a:68e4/64 scope link noprefixroute
        valid_lft forever preferred_lft forever

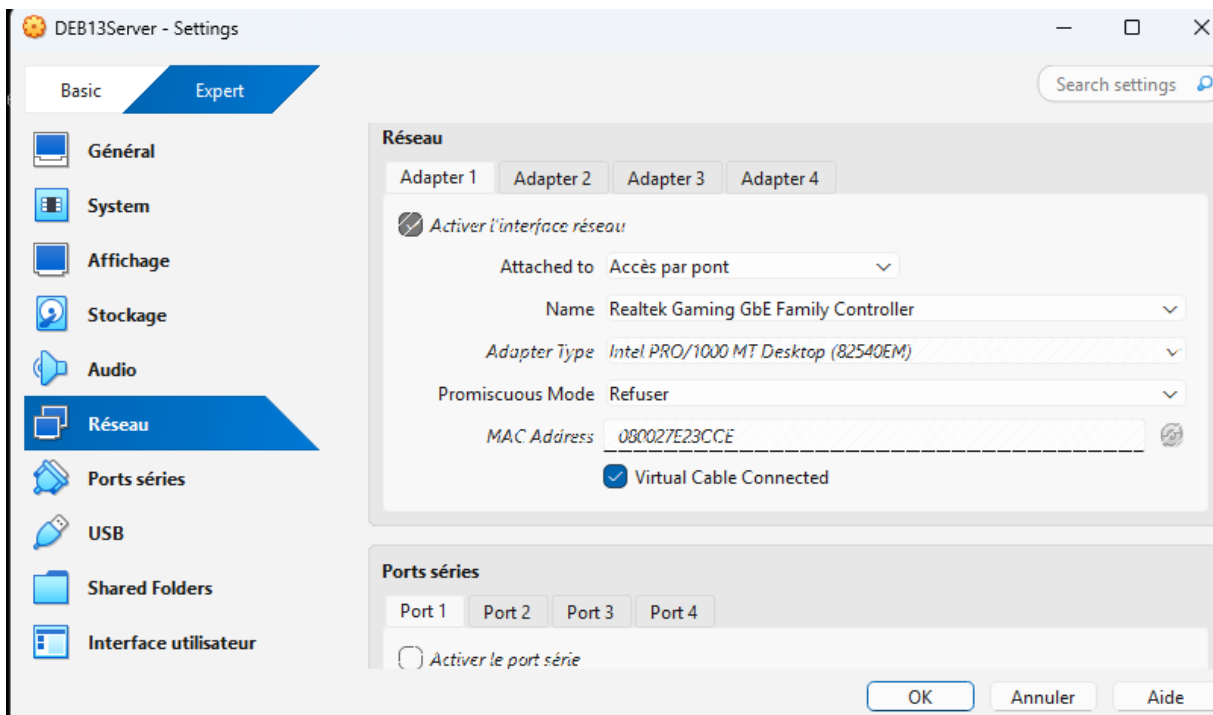
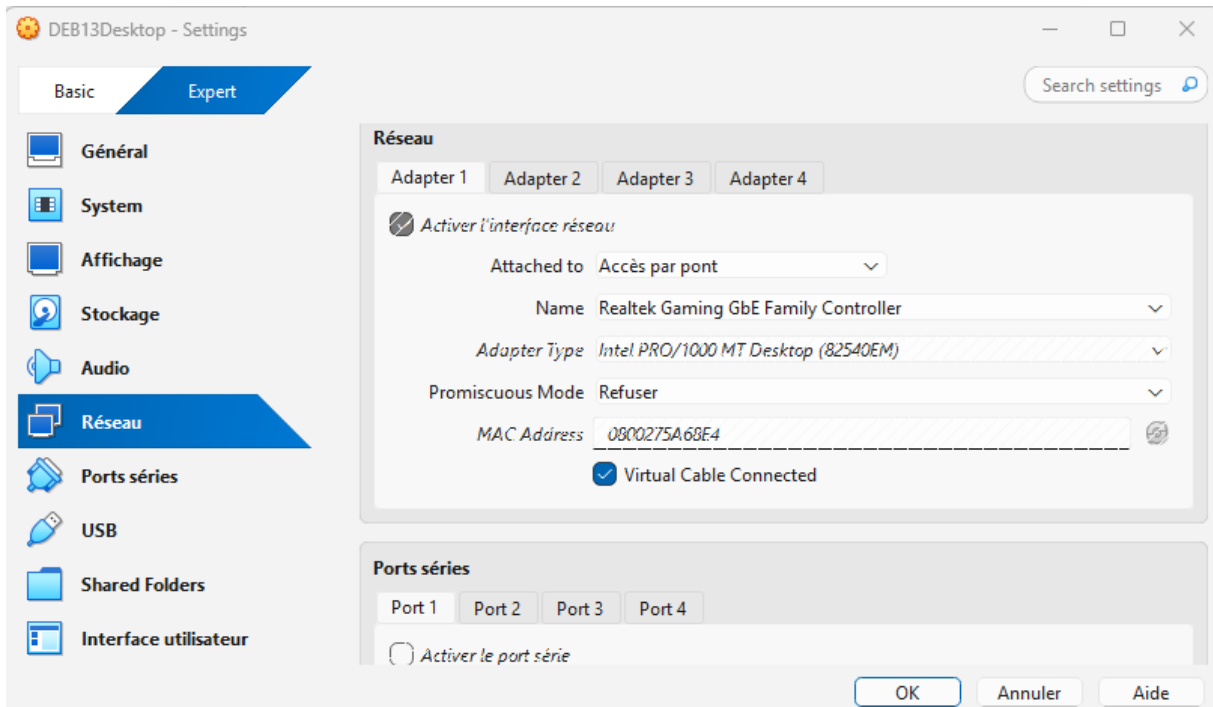
```

```

sio@DEB13Desktop:~$ ping 192.168.0.100
PING 192.168.0.100 (192.168.0.100) 56(84) bytes of data.
64 bytes from 192.168.0.100: icmp_seq=1 ttl=64 time=0.774 ms
64 bytes from 192.168.0.100: icmp_seq=2 ttl=64 time=0.579 ms
64 bytes from 192.168.0.100: icmp_seq=3 ttl=64 time=0.744 ms
64 bytes from 192.168.0.100: icmp_seq=4 ttl=64 time=0.655 ms
64 bytes from 192.168.0.100: icmp_seq=5 ttl=64 time=0.701 ms
64 bytes from 192.168.0.100: icmp_seq=6 ttl=64 time=0.453 ms
64 bytes from 192.168.0.100: icmp_seq=7 ttl=64 time=0.515 ms
64 bytes from 192.168.0.100: icmp_seq=8 ttl=64 time=0.666 ms
64 bytes from 192.168.0.100: icmp_seq=9 ttl=64 time=0.504 ms
64 bytes from 192.168.0.100: icmp_seq=10 ttl=64 time=0.484 ms
64 bytes from 192.168.0.100: icmp_seq=11 ttl=64 time=0.499 ms
64 bytes from 192.168.0.100: icmp_seq=12 ttl=64 time=0.599 ms
^C
--- 192.168.0.100 ping statistics ---
12 packets transmitted, 12 received, 0% packet loss, time 11258ms
rtt min/avg/max/mdev = 0.453/0.597/0.774/0.104 ms

```

3. VM en accès pont



Annuler Filaire Appliquer

Détails Identité **IPv4** IPv6 Sécurité

Méthode IPv4

Automatique (DHCP) Réseau local seulement

Manuel Désactiver

Partagée avec d'autres ordinateurs

DNS Automatique

Séparer les adresses IP avec des virgules

Routes Automatique

Adresse	Masque de réseau	Passerelle	Métrique
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

N'utiliser cette connexion que pour les ressources sur ce réseau

```
sio@DEB13Desktop:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:5a:68:e4 brd ff:ff:ff:ff:ff:ff
    altname enx0800275a68e4
    inet 192.168.0.44/24 brd 192.168.0.255 scope global dynamic noprefixroute enp0s3
        valid_lft 43180sec preferred_lft 43180sec
    inet6 2a01:e0a:464:e880:dd86:dfd4:8081:2f3a/64 scope global temporary dynamic
        valid_lft 86382sec preferred_lft 86340sec
    inet6 2a01:e0a:464:e880:a00:27ff:fe5a:68e4/64 scope global dynamic mngtmpdr noprofixroute
        valid_lft 86382sec preferred_lft 86382sec
    inet6 fe80::a00:27ff:fe5a:68e4/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
```

```
sio@DEB13Desktop:~$ ip route
default via 192.168.0.254 dev enp0s3 proto dhcp src 192.168.0.44 metric 100
192.168.0.0/24 dev enp0s3 proto kernel scope link src 192.168.0.44 metric 100
```

```
GNU nano 8.4
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

source /etc/network/interfaces.d/*

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
allow-hotplug enp0s3
auto enp0s3
iface enp0s3 inet dhcp

# This is an autoconfigured IPv6 interface
iface enp0s3 inet6 auto
```

```
root@DEB13Server: ~#ifup enp0s3
dhcpcd-10.1.0 starting
DUID 00:01:00:01:30:86:b4:a5:08:00:27:e2:3c:ce
enp0s3: waiting for carrier
enp0s3: carrier acquired
enp0s3: IAID 27:e2:3c:ce
enp0s3: adding address fe80::6f90:437a:29bc:7764
enp0s3: soliciting a DHCP lease
enp0s3: offered 192.168.0.29 from 192.168.0.254
enp0s3: soliciting an IPv6 router
enp0s3: Router Advertisement from fe80::6aa3:78ff:fe76:8ea2
enp0s3: adding address 2a01:e0a:464:e880:c8cd:5b1:b41f:1cb5/64
enp0s3: adding route to 2a01:e0a:464:e880::/64
enp0s3: adding default route via fe80::6aa3:78ff:fe76:8ea2
enp0s3: probing address 192.168.0.29/24
```

```
root@DEB13Server: ~#ip -c a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:e2:3c:ce brd ff:ff:ff:ff:ff:ff
    altname enx080027e23cce
    inet 192.168.0.100/24 brd 192.168.0.255 scope global enp0s3
        valid_lft forever preferred_lft forever
    inet 192.168.0.29/24 brd 192.168.0.255 scope global secondary dynamic noprefixroute enp0s3
        valid_lft 43151sec preferred_lft 37751sec
    inet6 2a01:e0a:464:e880:c8cd:5b1:b41f:1cb5/64 scope global dynamic mngtmpaddr noprefixroute
        valid_lft 86344sec preferred_lft 86344sec
    inet6 fe80::6f90:437a:29bc:7764/64 scope link
        valid_lft forever preferred_lft forever
```

```
root@DEB13Server: ~#ip route
default via 192.168.0.254 dev enp0s3 proto dhcp src 192.168.0.29 metric 1002
192.168.0.0/24 dev enp0s3 proto dhcp scope link src 192.168.0.29 metric 1002
```

```
root@DEB13Server: ~#ping 192.168.0.44
PING 192.168.0.44 (192.168.0.44) 56(84) bytes of data.
64 bytes from 192.168.0.44: icmp_seq=1 ttl=64 time=0.907 ms
64 bytes from 192.168.0.44: icmp_seq=2 ttl=64 time=0.598 ms
64 bytes from 192.168.0.44: icmp_seq=3 ttl=64 time=0.480 ms
64 bytes from 192.168.0.44: icmp_seq=4 ttl=64 time=0.580 ms
^C
--- 192.168.0.44 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3063ms
rtt min/avg/max/mdev = 0.480/0.641/0.907/0.159 ms
```

Ping de la passerelle :

```
root@DEB13Server: ~#ping 192.168.0.254
PING 192.168.0.254 (192.168.0.254) 56(84) bytes of data.
64 bytes from 192.168.0.254: icmp_seq=1 ttl=64 time=1.18 ms
64 bytes from 192.168.0.254: icmp_seq=2 ttl=64 time=0.442 ms
64 bytes from 192.168.0.254: icmp_seq=3 ttl=64 time=0.530 ms
64 bytes from 192.168.0.254: icmp_seq=4 ttl=64 time=0.594 ms
^C
--- 192.168.0.254 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3107ms
rtt min/avg/max/mdev = 0.442/0.687/1.182/0.290 ms
```

4. La commande ss

Installation du serveur ssh :

```
3072 SHA256:0cJ0sFJh04g7zckp79L0ed40Bg+S0xjMdhB95bkGaY4 root@DEB13Server (RSA)
Creating SSH2 ECDSA key; this may take some time ...
256 SHA256:8cTITG29YptQmkH10yK92VM3SPqAw4JoxqHf12MrhCE root@DEB13Server (ECDSA)
Creating SSH2 ED25519 key; this may take some time ...
256 SHA256:Tm010GKm6adFk27z0+eIRSDa4fblriFET9yiJBZ1LTg root@DEB13Server (ED25519)
Creating user 'sshd' (sshd user) with UID 987 and GID 65534.
Created symlink '/etc/systemd/system/ssh.service' → '/usr/lib/systemd/system/ssh.service'.
Created symlink '/etc/systemd/system/multi-user.target.wants/ssh.service' → '/usr/lib/systemd/system/ssh.service'.
ssh.socket is a disabled or a static unit, not starting it.
Created symlink '/etc/systemd/system/ssh.service.wants/sshd-keygen.service' → '/usr/lib/systemd/system/sshd-keygen.service'.
Created symlink '/etc/systemd/system/ssh.service.wants/sshd-keygen.service' → '/usr/lib/systemd/system/sshd-keygen.service'.
Created symlink '/etc/systemd/system/sshd@.service.wants/sshd-keygen.service' → '/usr/lib/systemd/system/sshd-keygen.service'.
Created symlink '/etc/systemd/system/ssh.socket.wants/sshd-keygen.service' → '/usr/lib/systemd/system/sshd-keygen.service'.
Traitement des actions différées (« triggers ») pour man-db (2.13.1-1) ...
Traitement des actions différées (« triggers ») pour libc-bin (2.41-12) ...
```

```

root@DEB13Server: ~# ss -t
State      Recv-Q      Send-Q      Local Address:Port      Peer Address:Port
root@DEB13Server: ~# ss -lt
State      Recv-Q      Send-Q      Local Address:Port      Peer Address:Port
LISTEN    0           128        0.0.0.0:ssh             0.0.0.0:*
LISTEN    0           128        [::]:ssh                [::]:*
root@DEB13Server: ~# ss -ltn
State      Recv-Q      Send-Q      Local Address:Port      Peer Address:Port
LISTEN    0           128        0.0.0.0:22              0.0.0.0:*
LISTEN    0           128        [::]:22                  [::]:*
root@DEB13Server: ~# ss -ltnp
State      Recv-Q      Send-Q      Local Address:Port      Peer Address:Port      Process
LISTEN    0           128        0.0.0.0:22              0.0.0.0:*              users:(("sshd",pid=1973,fd=6))
LISTEN    0           128        [::]:22                  [::]:*                  users:(("sshd",pid=1973,fd=7))

```

Connexion ssh au serveur. La connexion a réussi car elle s'est établie avec l'utilisateur sio.

```

sio@DEB13Desktop:~$ ssh 192.168.0.29
The authenticity of host '192.168.0.29 (192.168.0.29)' can't be established.
ED25519 key fingerprint is SHA256:Tm8i0Gwm6adFk27z0+eIRSDa4fblriFET9yiJBZlLTg.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.0.29' (ED25519) to the list of known hosts.
sio@192.168.0.29's password:
Linux DEB13Server 6.12.48+deb13-amd64 #1 SMP PREEMPT_DYNAMIC Debian 6.12.48-1 (2
025-09-20) 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.

```

Avec l'utilisateur root la connexion est bien refusée.

```

sio@DEB13Desktop:~$ ssh root@192.168.0.29
root@192.168.0.29's password:
Permission denied, please try again.

```

```

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

```

```

root@DEB13Server: ~# systemctl restart sshd
root@DEB13Server: ~#

```

```

sio@DEB13Desktop: ~
sio@DEB13Desktop:~$ ssh root@192.168.0.29
root@192.168.0.29's password:
Linux DEB13Server 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@DEB13Server: ~#ls -l
total 0
root@DEB13Server: ~#ls -la
total 32
drwx----- 4 root root 4096 18 oct. 22:56 .
drwxr-xr-x 18 root root 4096 18 oct. 22:19 ..
-rw----- 1 root root 237 18 oct. 22:49 .bash_history
-rw-r--r-- 1 root root 679 18 oct. 22:49 .bashrc
-rw----- 1 root root 20 18 oct. 22:56 .lesshst
drwxr-xr-x 3 root root 4096 18 oct. 22:29 .local
-rw-r--r-- 1 root root 132 24 août 18:20 .profile
drwx----- 2 root root 4096 18 oct. 22:14 .ssh

```

```

root@DEB13Server: ~#ss -tn
State      Recv-Q      Send-Q      Local Address:Port      Peer Address:Port
ESTAB      0            0           192.168.0.29:22        192.168.0.44:36844
root@DEB13Server: ~#ss -t
State      Recv-Q      Send-Q      Local Address:Port      Peer Address:Port
ESTAB      0            0           192.168.0.29:ssh       192.168.0.44:36844
root@DEB13Server: ~#ss -tan
State      Recv-Q      Send-Q      Local Address:Port      Peer Address:Port
LISTEN    128         0           0.0.0.0:22             0.0.0.0:*
ESTAB      0            0           192.168.0.29:22        192.168.0.44:36844
LISTEN    128         0           [::]:22                [::]:*
root@DEB13Server: ~#ss -tan4
State      Recv-Q      Send-Q      Local Address:Port      Peer Address:Port
LISTEN    128         0           0.0.0.0:22             0.0.0.0:*
ESTAB      0            0           192.168.0.29:22        192.168.0.44:36844
root@DEB13Server: ~#

```

```

root@DEB13Server: ~#exit
déconnexion
Connection to 192.168.0.29 closed.

```

On voit que la connexion n'est plus active.

```

root@DEB13Server: ~#ss -tan4
State      Recv-Q      Send-Q      Local Address:Port      Peer Address:Port
LISTEN    128         0           0.0.0.0:22             0.0.0.0:*

```

Bienvenue - Atrium x +

atrium-paca.fr

ATRIUM L'environnement numérique éducatif régional [Ouvrir une session](#)

sio@DEB13Desktop: ~

```
sio@DEB13Desktop:~$ ss -tn
```

State	Recv-Q	Send-Q	Local Address:Port	Peer Address:Port
ESTAB	0	0	192.168.0.44:42044	34.107.243.93:443
ESTAB	0	0	192.168.0.44:43404	194.199.224.46:443
ESTAB	0	0	192.168.0.44:42042	34.107.243.93:443
ESTAB	0	0	192.168.0.44:43396	194.199.224.46:443
ESTAB	0	0	192.168.0.44:36024	34.49.51.44:443
ESTAB	0	0	192.168.0.44:59764	194.199.224.30:443
ESTAB	0	0	192.168.0.44:47670	194.199.224.32:443
ESTAB	0	0	192.168.0.44:43412	194.199.224.46:443
ESTAB	0	0	192.168.0.44:59830	194.199.224.30:443
ESTAB	0	0	192.168.0.44:57320	34.107.221.82:80
ESTAB	0	0	192.168.0.44:46748	35.190.72.216:443
ESTAB	0	0	192.168.0.44:59792	194.199.224.30:443
ESTAB	0	0	192.168.0.44:59814	194.199.224.30:443