

TP réseau pratique

Le but de ce dernier TP est de mettre en pratique l'ensemble des concepts (adressage, routage, translation d'adresses...) abordés lors des sessions précédentes.

Rappel des commandes utiles

- Configuration des adresses IP des interfaces par la commande `ifconfig`

Chaque **interface** est identifiée par un nom :

- `eth0` : 1^{ère} carte Ethernet
- `eth1` : 2^e carte Ethernet
- `eth2` : 3^e carte Ethernet
- ...
- `lo` : *loopback* ou interface de bouclage

Liste des interfaces réseau configurées :

`ifconfig`

Pour configurer une interface réseau :

`ifconfig interface adresse_IP netmask masque_de_réseau up`

Exemple :

`ifconfig eth0 192.168.10.1 netmask 255.255.255.0 up`

- Configuration de la table de routage : la commande `route`

Affichage de la table de routage :

`route -n`

Pour ajouter une entrée de réseau à la table de routage :

`route add -net adresse_réseau_IP netmask masque_de_réseau gw
adresse_IP_routeur`

Exemple :

`route add -net 192.168.20.0 netmask 255.255.255.0 gw 192.168.200.2`

Pour ajouter un routeur par défaut à la table de routage :

`route add default gw adresse_IP_routeur`

Exemple :

`route add default gw 192.168.10.254`

Pour supprimer une entrée de réseau de la table de routage :

`route del -net adresse_réseau_IP netmask masque_de_réseau`

Exemples :

`route del -net 127.0.0.0 netmask 255.0.0.0`

`route del -net 192.168.20.0 netmask 255.255.255.0`

`route del -net 192.168.20.0 netmask /24`

Pour supprimer la route par défaut de la table de routage :

`route del default`

Le réseau est constitué des 4 hôtes *m1*, *m2*, *m3* et *m123*, des 3 routeurs *R1*, *R2* et *R3* et de la gateway *G1* d'adresse IP 198.19.80.2. A partir de la configuration des interfaces et de la table de routage obtenues respectivement à l'aide des commandes `ifconfig` et `route -n` et affichées ci-après pour chacun des hôtes et des routeurs, **reconstituez sous Marionnet le schéma logique du réseau**. Vous utiliserez le composant « nuage » pour matérialiser chacun des réseaux et les liaisons existantes entre les différents éléments.

Testez le bon fonctionnement de votre réseau, en utilisant la commande `ping` entre *m1*, *m2* et *m3*.

Hôte m1

```
eth0      Link encap:Ethernet  HWaddr 02:04:06:42:a3:13
          inet addr:10.4.25.1  Bcast:10.4.25.255  Mask:255.255.255.0
          inet6 addr: fe80::4:6ff:fe42:a313/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:79 errors:0 dropped:0 overruns:0 frame:0
          TX packets:79 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:2312 (2.2 KiB)  TX bytes:3550 (3.4 KiB)
          Interrupt:5
```

Kernel IP routing table

Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
0.0.0.0	10.4.25.254	0.0.0.0	UG	0	0	0	eth0
10.4.25.0	0.0.0.0	255.255.255.0	U	0	0	0	eth0

Hôte m2

```
eth0      Link encap:Ethernet  HWaddr 02:04:06:d4:cc:6c
          inet addr:198.10.25.1  Bcast:198.10.25.255  Mask:255.255.255.0
          inet6 addr: fe80::4:6ff:fed4:cc6c/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:88 errors:0 dropped:0 overruns:0 frame:0
          TX packets:85 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:2951 (2.8 KiB)  TX bytes:3955 (3.8 KiB)
          Interrupt:5
```

Kernel IP routing table

Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
0.0.0.0	198.10.25.254	0.0.0.0	UG	0	0	0	eth0
198.10.25.0	0.0.0.0	255.255.255.0	U	0	0	0	eth0

Hôte m3

```
eth0      Link encap:Ethernet  HWaddr 02:04:06:ad:b7:cb
          inet addr:198.10.26.1  Bcast:198.10.26.255  Mask:255.255.255.0
          inet6 addr: fe80::4:6ff:fead:b7cb/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:75 errors:0 dropped:0 overruns:0 frame:0
          TX packets:68 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:2100 (2.0 KiB)  TX bytes:2452 (2.3 KiB)
          Interrupt:5
```

Kernel IP routing table

Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
0.0.0.0	198.10.26.254	0.0.0.0	UG	0	0	0	eth0
198.10.26.0	0.0.0.0	255.255.255.0	U	0	0	0	eth0

Hôte m123

```
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.4.25.254 netmask 255.255.255.0 broadcast 10.4.25.255
    inet6 fe80::4:6ff:fe62:7edf prefixlen 64 scopeid 0x20<link>
    ether 02:04:06:62:7e:df txqueuelen 1000 (Ethernet)
    RX packets 73 bytes 2336 (2.2 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 73 bytes 3226 (3.1 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 5

eth1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 140.130.254.254 netmask 255.255.0.0 broadcast 140.130.255.255
    inet6 fe80::4:6ff:fe98:eca3 prefixlen 64 scopeid 0x20<link>
    ether 02:04:06:98:ec:a3 txqueuelen 1000 (Ethernet)
    RX packets 79 bytes 3289 (3.2 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 83 bytes 3901 (3.8 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 5
```

Kernel IP routing table

Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
0.0.0.0	140.130.254.253	0.0.0.0	UG	0	0	0	eth1
10.4.25.0	0.0.0.0	255.255.255.0	U	0	0	0	eth0
140.130.0.0	0.0.0.0	255.255.0.0	U	0	0	0	eth1

Routeur R1

```
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 140.130.254.253 netmask 255.255.0.0 broadcast 140.130.255.255
    inet6 fe80::4:6ff:fe86:5e9e prefixlen 64 scopeid 0x20<link>
    ether 02:04:06:86:5e:9e txqueuelen 1000 (Ethernet)
    RX packets 97 bytes 8562 (8.3 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 103 bytes 8961 (8.7 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 5

eth1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 200.20.20.253 netmask 255.255.255.128 broadcast 200.20.20.255
    inet6 fe80::4:6ff:fe9d:a8b4 prefixlen 64 scopeid 0x20<link>
    ether 02:04:06:9d:a8:b4 txqueuelen 1000 (Ethernet)
    RX packets 105 bytes 7641 (7.4 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 105 bytes 10580 (10.3 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 5
```

Kernel IP routing table

Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
0.0.0.0	200.20.20.254	0.0.0.0	UG	0	0	0	eth1
140.130.0.0	0.0.0.0	255.255.0.0	U	0	0	0	eth0
200.20.20.128	0.0.0.0	255.255.255.128	U	0	0	0	eth1

Routeur R2

```
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 200.20.20.125 netmask 255.255.255.128 broadcast 200.20.20.127
    inet6 fe80::4:6ff:fe5c:de2 prefixlen 64 scopeid 0x20<link>
    ether 02:04:06:5c:0d:e2 txqueuelen 1000 (Ethernet)
    RX packets 113 bytes 8014 (7.8 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 112 bytes 11017 (10.7 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 5
```

```
eth1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 200.20.20.254 netmask 255.255.255.128 broadcast 200.20.20.255
    inet6 fe80::4:6ff:feca:7fe2 prefixlen 64 scopeid 0x20<link>
    ether 02:04:06:ca:7f:e2 txqueuelen 1000 (Ethernet)
    RX packets 101 bytes 8720 (8.5 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 106 bytes 9143 (8.9 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 5
```

Kernel IP routing table

Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
0.0.0.0	200.20.20.126	0.0.0.0	UG	0	0	0	eth0
140.130.0.0	200.20.20.253	0.0.0.0	UG	0	0	0	eth1
200.20.20.0	0.0.0.0	255.255.255.128	U	0	0	0	eth0
200.20.20.128	0.0.0.0	255.255.255.128	U	0	0	0	eth1

Routeur R3

```
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 198.10.25.254 netmask 255.255.255.0 broadcast 198.10.25.255
    inet6 fe80::4:6ff:fead:2846 prefixlen 64 scopeid 0x20<link>
    ether 02:04:06:ad:28:46 txqueuelen 1000 (Ethernet)
    RX packets 57 bytes 1985 (1.9 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 56 bytes 2727 (2.6 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 5
```

```
eth1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 198.10.26.254 netmask 255.255.255.0 broadcast 198.10.26.255
    inet6 fe80::4:6ff:fele:a870 prefixlen 64 scopeid 0x20<link>
    ether 02:04:06:1e:a8:70 txqueuelen 1000 (Ethernet)
    RX packets 36 bytes 648 (648.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 41 bytes 1630 (1.5 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 5
```

```
eth2: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 200.20.20.126 netmask 255.255.255.128 broadcast 200.20.20.127
    inet6 fe80::4:6ff:fe11:f47b prefixlen 64 scopeid 0x20<link>
    ether 02:04:06:11:f4:7b txqueuelen 1000 (Ethernet)
    RX packets 108 bytes 9059 (8.8 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 114 bytes 9628 (9.4 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 5
```

```
eth3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 198.19.80.254 netmask 255.255.255.0 broadcast 198.19.80.255
    inet6 fe80::4:6ff:febe:26a5 prefixlen 64 scopeid 0x20<link>
    ether 02:04:06:be:26:a5 txqueuelen 1000 (Ethernet)
    RX packets 69 bytes 6575 (6.4 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 123 bytes 11873 (11.5 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 5
```

Kernel IP routing table

Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
0.0.0.0	198.19.80.2	0.0.0.0	UG	0	0	0	eth3
140.130.0.0	200.20.20.125	255.255.0.0	UG	0	0	0	eth2
198.10.25.0	0.0.0.0	255.255.255.0	U	0	0	0	eth0
198.10.26.0	0.0.0.0	255.255.255.0	U	0	0	0	eth1
198.19.80.0	0.0.0.0	255.255.255.0	U	0	0	0	eth3
200.20.20.0	0.0.0.0	255.255.255.128	U	0	0	0	eth2
200.20.20.128	200.20.20.125	255.255.255.128	UG	0	0	0	eth2