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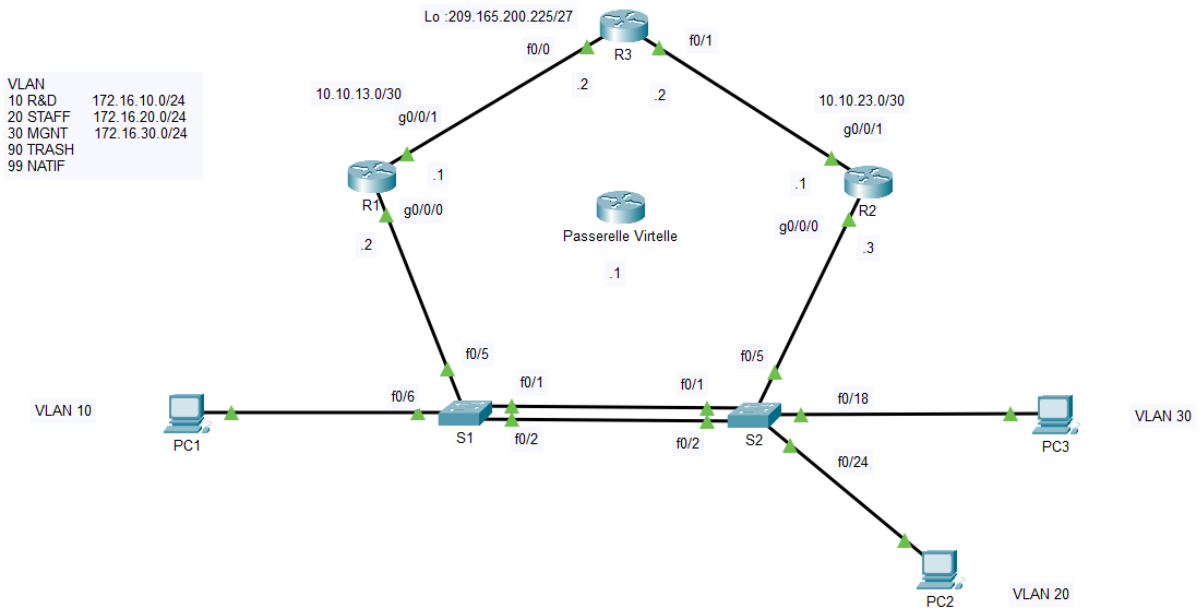
Labo ACL



ip r sur pc1 :

```
root@podd-1:~# ip r
default via 172.16.10.1 dev eth0 proto dhcp src 172.16.10.11 metric 1024
8.8.8.8 via 172.16.10.1 dev eth0 proto dhcp src 172.16.10.11 metric 1024
172.16.10.0/24 dev eth0 proto kernel scope link src 172.16.10.11 metric 1024
172.16.10.1 dev eth0 proto dhcp scope link src 172.16.10.11 metric 1024
root@podd-1:~#
```

ip a sur pc1 :

```
root@podd-1:~# 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: eth0@if158: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether a6:cc:b1:3f:e9:e6 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 172.16.10.11/24 metric 1024 brd 172.16.10.255 scope global dynamic eth0
       valid_lft 80148sec preferred_lft 80148sec
    inet6 fe80::a4cc:b1ff:fe3f:e9e6/64 scope link
       valid_lft forever preferred_lft forever
root@podd-1:~#
```

ip r sur pc2 :

```
root@podd-2:~# ip r
default via 172.16.20.1 dev eth0 proto dhcp src 172.16.20.11 metric 1024
8.8.8.8 via 172.16.20.1 dev eth0 proto dhcp src 172.16.20.11 metric 1024
172.16.20.0/24 dev eth0 proto kernel scope link src 172.16.20.11 metric 1024
172.16.20.1 dev eth0 proto dhcp scope link src 172.16.20.11 metric 1024
root@podd-2:~#
```

ip a sur pc2 :

```
root@podd-2:~# 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: eth0@if238: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether 1a:1a:a2:55:da:90 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 172.16.20.11/24 metric 1024 brd 172.16.20.255 scope global dynamic eth0
       valid_lft 80951sec preferred_lft 80951sec
    inet6 fe80::181a:a2ff:fe55:da90/64 scope link
       valid_lft forever preferred_lft forever
root@podd-2:~#
```

ip r sur pc3 :

```
root@podd-3:~# ip r
default via 172.16.30.1 dev eth0 proto dhcp src 172.16.30.13 metric 1024
8.8.8.8 via 172.16.30.1 dev eth0 proto dhcp src 172.16.30.13 metric 1024
172.16.30.0/24 dev eth0 proto kernel scope link src 172.16.30.13 metric 1024
172.16.30.1 dev eth0 proto dhcp scope link src 172.16.30.13 metric 1024
root@podd-3:~#
```

ip a sur pc3 :

```
root@podd-3:~# 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: eth0@if246: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether 2e:2f:f9:3c:19:e2 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 172.16.30.13/24 metric 1024 brd 172.16.30.255 scope global dynamic eth0
       valid_lft 80972sec preferred_lft 80972sec
    inet6 fe80::2c2f:f9ff:fe3c:19e2/64 scope link
       valid_lft forever preferred_lft forever
root@podd-3:~#
```

ping depuis PC1 vers PC2

```
root@podd-1:~# ping 172.16.20.11
PING 172.16.20.11 (172.16.20.11) 56(84) bytes of data.
From 172.16.10.2 icmp_seq=1 Packet filtered
From 172.16.10.2 icmp_seq=2 Packet filtered
From 172.16.10.2 icmp_seq=3 Packet filtered
From 172.16.10.2 icmp_seq=4 Packet filtered
From 172.16.10.2 icmp_seq=5 Packet filtered
From 172.16.10.2 icmp_seq=6 Packet filtered
^C
--- 172.16.20.11 ping statistics ---
6 packets transmitted, 0 received, +6 errors, 100% packet loss, time 5125ms

root@podd-1:~#
```

ping depuis PC1 vers PC3

```
root@podd-1:~# ping 172.16.30.13
PING 172.16.30.13 (172.16.30.13) 56(84) bytes of data.
From 172.16.10.2 icmp_seq=1 Packet filtered
From 172.16.10.2 icmp_seq=2 Packet filtered
From 172.16.10.2 icmp_seq=3 Packet filtered
From 172.16.10.2 icmp_seq=4 Packet filtered
From 172.16.10.2 icmp_seq=5 Packet filtered
From 172.16.10.2 icmp_seq=6 Packet filtered
^C
--- 172.16.30.13 ping statistics ---
6 packets transmitted, 0 received, +6 errors, 100% packet loss, time 5107ms

root@podd-1:~#
```

ping depuis PC1 vers S1

```
root@podd-1:~# ping 172.16.30.11
PING 172.16.30.11 (172.16.30.11) 56(84) bytes of data.
From 172.16.10.2 icmp_seq=1 Packet filtered
From 172.16.10.2 icmp_seq=2 Packet filtered
From 172.16.10.2 icmp_seq=3 Packet filtered
From 172.16.10.2 icmp_seq=4 Packet filtered
From 172.16.10.2 icmp_seq=5 Packet filtered
From 172.16.10.2 icmp_seq=6 Packet filtered
From 172.16.10.2 icmp_seq=7 Packet filtered
^C
--- 172.16.30.11 ping statistics ---
7 packets transmitted, 0 received, +7 errors, 100% packet loss, time 6123ms

root@podd-1:~#
```

ping depuis PC1 vers S2 :

```
root@podd-1:~# ping 172.16.30.12
PING 172.16.30.12 (172.16.30.12) 56(84) bytes of data.
From 172.16.10.2 icmp_seq=1 Packet filtered
From 172.16.10.2 icmp_seq=2 Packet filtered
From 172.16.10.2 icmp_seq=3 Packet filtered
From 172.16.10.2 icmp_seq=4 Packet filtered
From 172.16.10.2 icmp_seq=5 Packet filtered
From 172.16.10.2 icmp_seq=6 Packet filtered
^C
--- 172.16.30.12 ping statistics ---
6 packets transmitted, 0 received, +6 errors, 100% packet loss, time 5098ms

root@podd-1:~#
```

ping depuis PC1 vers R1 (interface LAN (VLAN 10))

```
root@podd-1:~# ping 172.16.10.2
PING 172.16.10.2 (172.16.10.2) 56(84) bytes of data.
64 bytes from 172.16.10.2: icmp_seq=1 ttl=255 time=0.419 ms
64 bytes from 172.16.10.2: icmp_seq=2 ttl=255 time=0.430 ms
64 bytes from 172.16.10.2: icmp_seq=3 ttl=255 time=0.398 ms
64 bytes from 172.16.10.2: icmp_seq=4 ttl=255 time=0.358 ms
64 bytes from 172.16.10.2: icmp_seq=5 ttl=255 time=0.356 ms
64 bytes from 172.16.10.2: icmp_seq=6 ttl=255 time=0.525 ms
^C
--- 172.16.10.2 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5119ms
rtt min/avg/max/mdev = 0.356/0.414/0.525/0.056 ms
root@podd-1:~#
```

ping depuis PC1 vers interface WAN (vers R3) :

```
root@podd-1:~# ping 10.10.13.1
PING 10.10.13.1 (10.10.13.1) 56(84) bytes of data.
64 bytes from 10.10.13.1: icmp_seq=1 ttl=255 time=0.461 ms
64 bytes from 10.10.13.1: icmp_seq=2 ttl=255 time=0.356 ms
64 bytes from 10.10.13.1: icmp_seq=3 ttl=255 time=0.355 ms
64 bytes from 10.10.13.1: icmp_seq=4 ttl=255 time=0.340 ms
64 bytes from 10.10.13.1: icmp_seq=5 ttl=255 time=0.408 ms
64 bytes from 10.10.13.1: icmp_seq=6 ttl=255 time=0.587 ms
^C
--- 10.10.13.1 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5112ms
rtt min/avg/max/mdev = 0.340/0.417/0.587/0.086 ms
root@podd-1:~#
```

ping depuis PC1 vers R2 (Interface LAN (VLAN 10)) :

```
root@podd-1:~# ping 172.16.10.3
PING 172.16.10.3 (172.16.10.3) 56(84) bytes of data.
64 bytes from 172.16.10.3: icmp_seq=2 ttl=255 time=0.700 ms
64 bytes from 172.16.10.3: icmp_seq=3 ttl=255 time=0.857 ms
64 bytes from 172.16.10.3: icmp_seq=4 ttl=255 time=0.705 ms
64 bytes from 172.16.10.3: icmp_seq=5 ttl=255 time=0.885 ms
64 bytes from 172.16.10.3: icmp_seq=6 ttl=255 time=1.01 ms
64 bytes from 172.16.10.3: icmp_seq=7 ttl=255 time=0.733 ms
^C
--- 172.16.10.3 ping statistics ---
7 packets transmitted, 6 received, 14.2857% packet loss, time 6122ms
rtt min/avg/max/mdev = 0.700/0.815/1.011/0.113 ms
root@podd-1:~#
```

ping depuis PC1 vers R2 (Interface WAN (Vers R3)) :

```
root@podd-1:~# ping 10.10.23.1
PING 10.10.23.1 (10.10.23.1) 56(84) bytes of data.
64 bytes from 10.10.23.1: icmp_seq=1 ttl=255 time=1.18 ms
64 bytes from 10.10.23.1: icmp_seq=2 ttl=255 time=0.852 ms
64 bytes from 10.10.23.1: icmp_seq=3 ttl=255 time=1.18 ms
64 bytes from 10.10.23.1: icmp_seq=4 ttl=255 time=1.20 ms
64 bytes from 10.10.23.1: icmp_seq=5 ttl=255 time=0.968 ms
64 bytes from 10.10.23.1: icmp_seq=6 ttl=255 time=1.09 ms
^C
--- 10.10.23.1 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5032ms
rtt min/avg/max/mdev = 0.852/1.078/1.200/0.128 ms
root@podd-1:~#
```

ping depuis PC1 vers R3 (Interface WAN (Lien R1)) :

```
root@podd-1:~# ping 10.10.13.2
PING 10.10.13.2 (10.10.13.2) 56(84) bytes of data.
64 bytes from 10.10.13.2: icmp_seq=1 ttl=254 time=1.21 ms
64 bytes from 10.10.13.2: icmp_seq=2 ttl=254 time=1.06 ms
64 bytes from 10.10.13.2: icmp_seq=3 ttl=254 time=1.01 ms
64 bytes from 10.10.13.2: icmp_seq=4 ttl=254 time=1.05 ms
64 bytes from 10.10.13.2: icmp_seq=5 ttl=254 time=1.09 ms
64 bytes from 10.10.13.2: icmp_seq=6 ttl=254 time=1.20 ms
^C
--- 10.10.13.2 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5006ms
rtt min/avg/max/mdev = 1.011/1.103/1.206/0.075 ms
root@podd-1:~#
```

ping depuis PC1 vers R3 (Loopback 0)):

```
root@podd-1:~# ping 209.165.200.225
PING 209.165.200.225 (209.165.200.225) 56(84) bytes of data.
64 bytes from 209.165.200.225: icmp_seq=1 ttl=254 time=1.25 ms
64 bytes from 209.165.200.225: icmp_seq=2 ttl=254 time=0.958 ms
64 bytes from 209.165.200.225: icmp_seq=3 ttl=254 time=1.05 ms
64 bytes from 209.165.200.225: icmp_seq=4 ttl=254 time=1.27 ms
64 bytes from 209.165.200.225: icmp_seq=5 ttl=254 time=1.19 ms
64 bytes from 209.165.200.225: icmp_seq=6 ttl=254 time=1.07 ms
^C
--- 209.165.200.225 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5006ms
rtt min/avg/max/mdev = 0.958/1.131/1.274/0.114 ms
root@podd-1:~#
```

ping depuis PC1 vers R3 (Réseau Privé (Loopback 1)):

```
root@podd-1:~# ping 10.10.10.1
PING 10.10.10.1 (10.10.10.1) 56(84) bytes of data.
64 bytes from 10.10.10.1: icmp_seq=1 ttl=254 time=1.13 ms
64 bytes from 10.10.10.1: icmp_seq=2 ttl=254 time=1.14 ms
64 bytes from 10.10.10.1: icmp_seq=3 ttl=254 time=1.13 ms
64 bytes from 10.10.10.1: icmp_seq=4 ttl=254 time=1.18 ms
64 bytes from 10.10.10.1: icmp_seq=5 ttl=254 time=1.09 ms
64 bytes from 10.10.10.1: icmp_seq=6 ttl=254 time=1.01 ms
^C
--- 10.10.10.1 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5006ms
rtt min/avg/max/mdev = 1.014/1.111/1.182/0.051 ms
root@podd-1:~#
```

ping depuis PC1 vers la passerelle virtuelle

```
root@podd-1:~# ping 172.16.10.1
PING 172.16.10.1 (172.16.10.1) 56(84) bytes of data.
64 bytes from 172.16.10.1: icmp_seq=1 ttl=255 time=1.15 ms
64 bytes from 172.16.10.1: icmp_seq=2 ttl=255 time=0.873 ms
64 bytes from 172.16.10.1: icmp_seq=3 ttl=255 time=0.921 ms
64 bytes from 172.16.10.1: icmp_seq=4 ttl=255 time=1.08 ms
64 bytes from 172.16.10.1: icmp_seq=5 ttl=255 time=0.911 ms
64 bytes from 172.16.10.1: icmp_seq=6 ttl=255 time=0.956 ms
^C
--- 172.16.10.1 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5070ms
rtt min/avg/max/mdev = 0.873/0.982/1.147/0.099 ms
root@podd-1:~#
```

ping depuis PC2 vers PC1

```
root@podd-2:~# ping 172.16.10.11
PING 172.16.10.11 (172.16.10.11) 56(84) bytes of data.
From 172.16.20.2 icmp_seq=1 Packet filtered
From 172.16.20.2 icmp_seq=2 Packet filtered
From 172.16.20.2 icmp_seq=3 Packet filtered
From 172.16.20.2 icmp_seq=4 Packet filtered
From 172.16.20.2 icmp_seq=5 Packet filtered
From 172.16.20.2 icmp_seq=6 Packet filtered
^C
--- 172.16.10.11 ping statistics ---
6 packets transmitted, 0 received, +6 errors, 100% packet loss, time 5114ms

root@podd-2:~#
```

ping depuis PC2 vers PC3

```
root@podd-2:~# ping 172.16.30.13
PING 172.16.30.13 (172.16.30.13) 56(84) bytes of data.
From 172.16.20.2 icmp_seq=1 Packet filtered
From 172.16.20.2 icmp_seq=2 Packet filtered
From 172.16.20.2 icmp_seq=3 Packet filtered
From 172.16.20.2 icmp_seq=4 Packet filtered
From 172.16.20.2 icmp_seq=5 Packet filtered
From 172.16.20.2 icmp_seq=6 Packet filtered
From 172.16.20.2 icmp_seq=7 Packet filtered
^C
--- 172.16.30.13 ping statistics ---
7 packets transmitted, 0 received, +7 errors, 100% packet loss, time 6121ms

root@podd-2:~#
```

ping depuis PC2 vers S1

```
root@podd-2:~# ping 172.16.30.11
PING 172.16.30.11 (172.16.30.11) 56(84) bytes of data.
From 172.16.20.2 icmp_seq=1 Packet filtered
From 172.16.20.2 icmp_seq=2 Packet filtered
From 172.16.20.2 icmp_seq=3 Packet filtered
From 172.16.20.2 icmp_seq=4 Packet filtered
From 172.16.20.2 icmp_seq=5 Packet filtered
From 172.16.20.2 icmp_seq=6 Packet filtered
From 172.16.20.2 icmp_seq=7 Packet filtered
From 172.16.20.2 icmp_seq=8 Packet filtered
^C
--- 172.16.30.11 ping statistics ---
8 packets transmitted, 0 received, +8 errors, 100% packet loss, time 7154ms

root@podd-2:~#
```

ping depuis PC2 vers S2

```
root@podd-2:~# ping 172.16.30.12
PING 172.16.30.12 (172.16.30.12) 56(84) bytes of data.
From 172.16.20.2 icmp_seq=1 Packet filtered
From 172.16.20.2 icmp_seq=2 Packet filtered
From 172.16.20.2 icmp_seq=3 Packet filtered
From 172.16.20.2 icmp_seq=4 Packet filtered
From 172.16.20.2 icmp_seq=5 Packet filtered
From 172.16.20.2 icmp_seq=6 Packet filtered
From 172.16.20.2 icmp_seq=7 Packet filtered
From 172.16.20.2 icmp_seq=8 Packet filtered
^C
--- 172.16.30.12 ping statistics ---
8 packets transmitted, 0 received, +8 errors, 100% packet loss, time 7176ms

root@podd-2:~#
```

ping depuis PC2 vers R1

```
root@podd-2:~# ping 172.16.20.2
PING 172.16.20.2 (172.16.20.2) 56(84) bytes of data.
64 bytes from 172.16.20.2: icmp_seq=1 ttl=255 time=0.562 ms
64 bytes from 172.16.20.2: icmp_seq=2 ttl=255 time=0.431 ms
64 bytes from 172.16.20.2: icmp_seq=3 ttl=255 time=0.366 ms
64 bytes from 172.16.20.2: icmp_seq=4 ttl=255 time=0.413 ms
64 bytes from 172.16.20.2: icmp_seq=5 ttl=255 time=0.376 ms
64 bytes from 172.16.20.2: icmp_seq=6 ttl=255 time=0.396 ms
^C
--- 172.16.20.2 ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5112ms
rtt min/avg/max/mdev = 0.366/0.424/0.562/0.065 ms
root@podd-2:~#
```

ping depuis PC2 vers R2

```
root@podd-2:~# ping 172.16.20.3
PING 172.16.20.3 (172.16.20.3) 56(84) bytes of data.
64 bytes from 172.16.20.3: icmp_seq=1 ttl=255 time=0.694 ms
64 bytes from 172.16.20.3: icmp_seq=2 ttl=255 time=0.999 ms
64 bytes from 172.16.20.3: icmp_seq=3 ttl=255 time=0.835 ms
64 bytes from 172.16.20.3: icmp_seq=4 ttl=255 time=0.809 ms
64 bytes from 172.16.20.3: icmp_seq=5 ttl=255 time=0.843 ms
64 bytes from 172.16.20.3: icmp_seq=6 ttl=255 time=0.624 ms
64 bytes from 172.16.20.3: icmp_seq=7 ttl=255 time=0.667 ms
^C
--- 172.16.20.3 ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 6115ms
rtt min/avg/max/mdev = 0.624/0.781/0.999/0.119 ms
root@podd-2:~#
```

ping depuis PC2 vers R3 (WAN) :

```
root@podd-2:~# ping 10.10.23.2
PING 10.10.23.2 (10.10.23.2) 56(84) bytes of data.
64 bytes from 10.10.23.2: icmp_seq=1 ttl=254 time=1.42 ms
64 bytes from 10.10.23.2: icmp_seq=2 ttl=254 time=1.52 ms
64 bytes from 10.10.23.2: icmp_seq=3 ttl=254 time=1.27 ms
64 bytes from 10.10.23.2: icmp_seq=4 ttl=254 time=1.32 ms
64 bytes from 10.10.23.2: icmp_seq=5 ttl=254 time=1.38 ms
64 bytes from 10.10.23.2: icmp_seq=6 ttl=254 time=1.32 ms
64 bytes from 10.10.23.2: icmp_seq=7 ttl=254 time=1.32 ms
^C
--- 10.10.23.2 ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 6009ms
rtt min/avg/max/mdev = 1.266/1.364/1.520/0.078 ms
root@podd-2:~#
```

ping depuis PC2 vers Internet 209.165.200.225 :

```
root@podd-2:~# ping 209.165.200.225
PING 209.165.200.225 (209.165.200.225) 56(84) bytes of data.
64 bytes from 209.165.200.225: icmp_seq=1 ttl=254 time=1.45 ms
64 bytes from 209.165.200.225: icmp_seq=2 ttl=254 time=1.16 ms
64 bytes from 209.165.200.225: icmp_seq=3 ttl=254 time=1.21 ms
64 bytes from 209.165.200.225: icmp_seq=4 ttl=254 time=1.05 ms
64 bytes from 209.165.200.225: icmp_seq=5 ttl=254 time=1.21 ms
64 bytes from 209.165.200.225: icmp_seq=6 ttl=254 time=1.16 ms
64 bytes from 209.165.200.225: icmp_seq=7 ttl=254 time=1.14 ms
^C
--- 209.165.200.225 ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 6006ms
rtt min/avg/max/mdev = 1.054/1.196/1.449/0.113 ms
root@podd-2:~#
```

ping depuis PC2 vers R&D Privé 10.10.10.1 :

```
root@podd-2:~# ping 10.10.10.1
PING 10.10.10.1 (10.10.10.1) 56(84) bytes of data.
From 172.16.20.2 icmp_seq=1 Packet filtered
From 172.16.20.2 icmp_seq=2 Packet filtered
From 172.16.20.2 icmp_seq=3 Packet filtered
From 172.16.20.2 icmp_seq=4 Packet filtered
From 172.16.20.2 icmp_seq=5 Packet filtered
From 172.16.20.2 icmp_seq=6 Packet filtered
From 172.16.20.2 icmp_seq=7 Packet filtered
^C
--- 10.10.10.1 ping statistics ---
7 packets transmitted, 0 received, +7 errors, 100% packet loss, time 6143ms

root@podd-2:~#
```

ping depuis PC2 vers la passerelle virtuelle

```
root@podd-2:~# ping 172.16.20.1
PING 172.16.20.1 (172.16.20.1) 56(84) bytes of data.
64 bytes from 172.16.20.1: icmp_seq=1 ttl=255 time=1.07 ms
64 bytes from 172.16.20.1: icmp_seq=2 ttl=255 time=0.954 ms
64 bytes from 172.16.20.1: icmp_seq=3 ttl=255 time=1.15 ms
64 bytes from 172.16.20.1: icmp_seq=4 ttl=255 time=0.967 ms
64 bytes from 172.16.20.1: icmp_seq=5 ttl=255 time=1.00 ms
64 bytes from 172.16.20.1: icmp_seq=6 ttl=255 time=0.974 ms
64 bytes from 172.16.20.1: icmp_seq=7 ttl=255 time=0.843 ms
^C
--- 172.16.20.1 ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 6007ms
rtt min/avg/max/mdev = 0.843/0.994/1.149/0.088 ms
root@podd-2:~#
```

ping depuis PC3 vers PC1

```
root@podd-3:~# ping 172.16.10.11
PING 172.16.10.11 (172.16.10.11) 56(84) bytes of data.
From 172.16.30.2 icmp_seq=1 Packet filtered
From 172.16.30.2 icmp_seq=2 Packet filtered
From 172.16.30.2 icmp_seq=3 Packet filtered
From 172.16.30.2 icmp_seq=4 Packet filtered
From 172.16.30.2 icmp_seq=5 Packet filtered
From 172.16.30.2 icmp_seq=6 Packet filtered
From 172.16.30.2 icmp_seq=7 Packet filtered
^C
--- 172.16.10.11 ping statistics ---
7 packets transmitted, 0 received, +7 errors, 100% packet loss, time 6131ms

root@podd-3:~#
```

ping depuis PC3 vers PC2

```
root@podd-3:~# ping 172.16.20.11
PING 172.16.20.11 (172.16.20.11) 56(84) bytes of data.
From 172.16.30.2 icmp_seq=1 Packet filtered
From 172.16.30.2 icmp_seq=2 Packet filtered
From 172.16.30.2 icmp_seq=3 Packet filtered
From 172.16.30.2 icmp_seq=4 Packet filtered
From 172.16.30.2 icmp_seq=5 Packet filtered
From 172.16.30.2 icmp_seq=6 Packet filtered
From 172.16.30.2 icmp_seq=7 Packet filtered
^C
--- 172.16.20.11 ping statistics ---
7 packets transmitted, 0 received, +7 errors, 100% packet loss, time 6152ms

root@podd-3:~#
```

ping depuis PC3 vers s1

```
root@podd-3:~# ping 172.16.30.11
PING 172.16.30.11 (172.16.30.11) 56(84) bytes of data.
64 bytes from 172.16.30.11: icmp_seq=2 ttl=255 time=0.593 ms
64 bytes from 172.16.30.11: icmp_seq=3 ttl=255 time=0.630 ms
64 bytes from 172.16.30.11: icmp_seq=4 ttl=255 time=0.612 ms
64 bytes from 172.16.30.11: icmp_seq=5 ttl=255 time=0.585 ms
64 bytes from 172.16.30.11: icmp_seq=6 ttl=255 time=0.642 ms
64 bytes from 172.16.30.11: icmp_seq=7 ttl=255 time=0.651 ms
64 bytes from 172.16.30.11: icmp_seq=8 ttl=255 time=0.632 ms
^C
--- 172.16.30.11 ping statistics ---
8 packets transmitted, 7 received, 12.5% packet loss, time 7177ms
rtt min/avg/max/mdev = 0.585/0.620/0.651/0.023 ms
root@podd-3:~#
```

ping depuis PC3 vers s2

```
root@podd-3:~# ping 172.16.30.12
PING 172.16.30.12 (172.16.30.12) 56(84) bytes of data.
64 bytes from 172.16.30.12: icmp_seq=2 ttl=255 time=0.583 ms
64 bytes from 172.16.30.12: icmp_seq=3 ttl=255 time=0.605 ms
64 bytes from 172.16.30.12: icmp_seq=4 ttl=255 time=0.617 ms
64 bytes from 172.16.30.12: icmp_seq=5 ttl=255 time=0.598 ms
64 bytes from 172.16.30.12: icmp_seq=6 ttl=255 time=2.37 ms
64 bytes from 172.16.30.12: icmp_seq=7 ttl=255 time=0.603 ms
64 bytes from 172.16.30.12: icmp_seq=8 ttl=255 time=0.602 ms
64 bytes from 172.16.30.12: icmp_seq=9 ttl=255 time=0.581 ms
^C
--- 172.16.30.12 ping statistics ---
9 packets transmitted, 8 received, 11.1111% packet loss, time 8152ms
rtt min/avg/max/mdev = 0.581/0.820/2.372/0.586 ms
root@podd-3:~#
```

ping depuis PC3 vers R1

```
root@podd-3:~# ping 172.16.30.2
PING 172.16.30.2 (172.16.30.2) 56(84) bytes of data.
64 bytes from 172.16.30.2: icmp_seq=1 ttl=255 time=0.403 ms
64 bytes from 172.16.30.2: icmp_seq=2 ttl=255 time=0.365 ms
64 bytes from 172.16.30.2: icmp_seq=3 ttl=255 time=0.488 ms
64 bytes from 172.16.30.2: icmp_seq=4 ttl=255 time=0.464 ms
64 bytes from 172.16.30.2: icmp_seq=5 ttl=255 time=0.475 ms
64 bytes from 172.16.30.2: icmp_seq=6 ttl=255 time=0.442 ms
64 bytes from 172.16.30.2: icmp_seq=7 ttl=255 time=0.456 ms
64 bytes from 172.16.30.2: icmp_seq=8 ttl=255 time=0.356 ms
64 bytes from 172.16.30.2: icmp_seq=9 ttl=255 time=0.405 ms
^C
--- 172.16.30.2 ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 8181ms
rtt min/avg/max/mdev = 0.356/0.428/0.488/0.045 ms
root@podd-3:~#
```

ping depuis PC3 vers R2

```
root@podd-3:~# ping 172.16.30.3
PING 172.16.30.3 (172.16.30.3) 56(84) bytes of data.
64 bytes from 172.16.30.3: icmp_seq=1 ttl=255 time=0.700 ms
64 bytes from 172.16.30.3: icmp_seq=2 ttl=255 time=0.900 ms
64 bytes from 172.16.30.3: icmp_seq=3 ttl=255 time=0.844 ms
64 bytes from 172.16.30.3: icmp_seq=4 ttl=255 time=0.945 ms
64 bytes from 172.16.30.3: icmp_seq=5 ttl=255 time=0.708 ms
64 bytes from 172.16.30.3: icmp_seq=6 ttl=255 time=0.697 ms
64 bytes from 172.16.30.3: icmp_seq=7 ttl=255 time=0.812 ms
64 bytes from 172.16.30.3: icmp_seq=8 ttl=255 time=0.805 ms
64 bytes from 172.16.30.3: icmp_seq=9 ttl=255 time=0.812 ms
^C
--- 172.16.30.3 ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 8105ms
rtt min/avg/max/mdev = 0.697/0.802/0.945/0.083 ms
root@podd-3:~#
```

ping depuis PC3 vers R3 (Loopback 0)

```
root@podd-3:~# ping 209.165.200.225
PING 209.165.200.225 (209.165.200.225) 56(84) bytes of data.
64 bytes from 209.165.200.225: icmp_seq=1 ttl=254 time=1.08 ms
64 bytes from 209.165.200.225: icmp_seq=2 ttl=254 time=1.13 ms
64 bytes from 209.165.200.225: icmp_seq=3 ttl=254 time=1.24 ms
64 bytes from 209.165.200.225: icmp_seq=4 ttl=254 time=1.23 ms
64 bytes from 209.165.200.225: icmp_seq=5 ttl=254 time=1.20 ms
64 bytes from 209.165.200.225: icmp_seq=6 ttl=254 time=1.26 ms
64 bytes from 209.165.200.225: icmp_seq=7 ttl=254 time=1.24 ms
64 bytes from 209.165.200.225: icmp_seq=8 ttl=254 time=1.11 ms
64 bytes from 209.165.200.225: icmp_seq=9 ttl=254 time=1.25 ms
^C
--- 209.165.200.225 ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 8011ms
rtt min/avg/max/mdev = 1.077/1.191/1.257/0.064 ms
root@podd-3:~#
```

ping depuis PC3 vers R3 (Loopback 1)

```
root@podd-3:~# ping 10.10.10.1
PING 10.10.10.1 (10.10.10.1) 56(84) bytes of data.
64 bytes from 10.10.10.1: icmp_seq=1 ttl=254 time=1.10 ms
64 bytes from 10.10.10.1: icmp_seq=2 ttl=254 time=1.10 ms
64 bytes from 10.10.10.1: icmp_seq=3 ttl=254 time=1.15 ms
64 bytes from 10.10.10.1: icmp_seq=4 ttl=254 time=1.11 ms
64 bytes from 10.10.10.1: icmp_seq=5 ttl=254 time=1.16 ms
64 bytes from 10.10.10.1: icmp_seq=6 ttl=254 time=1.12 ms
64 bytes from 10.10.10.1: icmp_seq=7 ttl=254 time=1.17 ms
64 bytes from 10.10.10.1: icmp_seq=8 ttl=254 time=1.19 ms
^C
--- 10.10.10.1 ping statistics ---
8 packets transmitted, 8 received, 0% packet loss, time 7009ms
rtt min/avg/max/mdev = 1.095/1.135/1.192/0.033 ms
root@podd-3:~#
```

ping depuis PC3 vers l'interface WAN de R3 :

```
root@podd-3:~# ping 10.10.23.2
PING 10.10.23.2 (10.10.23.2) 56(84) bytes of data.
64 bytes from 10.10.23.2: icmp_seq=1 ttl=254 time=1.22 ms
64 bytes from 10.10.23.2: icmp_seq=2 ttl=254 time=1.12 ms
64 bytes from 10.10.23.2: icmp_seq=3 ttl=254 time=1.15 ms
64 bytes from 10.10.23.2: icmp_seq=4 ttl=254 time=1.26 ms
64 bytes from 10.10.23.2: icmp_seq=5 ttl=254 time=1.20 ms
64 bytes from 10.10.23.2: icmp_seq=6 ttl=254 time=1.14 ms
64 bytes from 10.10.23.2: icmp_seq=7 ttl=254 time=1.11 ms
64 bytes from 10.10.23.2: icmp_seq=8 ttl=254 time=1.37 ms
^C
--- 10.10.23.2 ping statistics ---
8 packets transmitted, 8 received, 0% packet loss, time 7008ms
rtt min/avg/max/mdev = 1.106/1.193/1.366/0.081 ms
root@podd-3:~#
```

ping depuis PC3 vers la passerelle virtuelle

```
root@podd-3:~# ping 172.16.30.1
PING 172.16.30.1 (172.16.30.1) 56(84) bytes of data.
64 bytes from 172.16.30.1: icmp_seq=1 ttl=255 time=1.13 ms
64 bytes from 172.16.30.1: icmp_seq=2 ttl=255 time=1.01 ms
64 bytes from 172.16.30.1: icmp_seq=3 ttl=255 time=0.951 ms
64 bytes from 172.16.30.1: icmp_seq=4 ttl=255 time=0.931 ms
64 bytes from 172.16.30.1: icmp_seq=5 ttl=255 time=0.956 ms
64 bytes from 172.16.30.1: icmp_seq=6 ttl=255 time=0.915 ms
64 bytes from 172.16.30.1: icmp_seq=7 ttl=255 time=0.902 ms
64 bytes from 172.16.30.1: icmp_seq=8 ttl=255 time=0.961 ms
64 bytes from 172.16.30.1: icmp_seq=9 ttl=255 time=0.842 ms
64 bytes from 172.16.30.1: icmp_seq=10 ttl=255 time=0.931 ms
^C
--- 172.16.30.1 ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9024ms
rtt min/avg/max/mdev = 0.842/0.953/1.134/0.072 ms
root@podd-3:~#
```

Test SSH (Pour prouver l'accès admin) depuis PC3 vers S1 :

```
root@podd-3:~# ssh -o KexAlgorithms=+diffie-hellman-group1-sha1 -o HostKeyAlgorithms=+ssh-rsa -c aes128-cbc admin@172.16.30.11
The authenticity of host '172.16.30.11 (172.16.30.11)' can't be established.
RSA key fingerprint is SHA256:6L0ZAIoR4til9A0nFbuy7YDEDS7wR3Cj+0kjpeYIvx0.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '172.16.30.11' (RSA) to the list of known hosts.
(admin@172.16.30.11) Password:
Acces reserve aux administrateurs - S1
S1>
```

Test SSH (Pour prouver l'accès admin) depuis PC3 vers S2 :

```
root@podd-3:~# ssh -o KexAlgorithms=+diffie-hellman-group1-sha1 -o HostKeyAlgorithms=+ssh-rsa -c aes128-cbc admin
@172.16.30.12
The authenticity of host '172.16.30.12 (172.16.30.12)' can't be established.
RSA key fingerprint is SHA256:LjQUka0ABJdh2Kg6wz9MDQ5DVSRPF10UXUb4FQr7Rds.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '172.16.30.12' (RSA) to the list of known hosts.
(admin@172.16.30.12) Password:
Acces reserve aux administrateurs - S2
S2>
```

Test SSH (Pour prouver l'accès admin) depuis PC3 vers R1 :

```
root@podd-3:~# ssh admin@172.16.30.2
The authenticity of host '172.16.30.2 (172.16.30.2)' can't be established.
RSA key fingerprint is SHA256:c0IKgNpMQn6LCmeQu5Djv8TAoN9iOwG9gLwLrzPsqgc.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '172.16.30.2' (RSA) to the list of known hosts.
(admin@172.16.30.2) Password:
Acces reserve aux administrateurs - R1


R1>
```

Test SSH (Pour prouver l'accès admin) depuis PC3 vers R2 :

```
root@podd-3:~# ssh -o KexAlgorithms=+diffie-hellman-group14-sha1 -o HostKeyAlgorithms=+ssh-rsa -c aes128-ctr admi
n@172.16.30.3
The authenticity of host '172.16.30.3 (172.16.30.3)' can't be established.
RSA key fingerprint is SHA256:RHOdT8Y1/rALqxldMVlue0ydphwtMHr5dE6/P0pqNAo.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '172.16.30.3' (RSA) to the list of known hosts.
(admin@172.16.30.3) Password:
Acces reserve aux administrateurs - R2
R2>
```

Test SSH (Pour prouver l'accès admin) depuis PC1 vers S1 :

Ce test confirme l'étanchéité du réseau. Bien que PC1 ait une connectivité IP vers certaines destinations, toute tentative d'administration SSH vers le VLAN de Management (172.16.30.11) est rejetée. Cela prouve que seul le personnel autorisé (VLAN 30) peut configurer les équipements d'infrastructure

```
root@podd-1:~# ssh admin@172.16.30.11
ssh: connect to host 172.16.30.11 port 22: No route to host
root@podd-1:~#
```

show etherchannel summary sur S1 :

```
S1#sh eth sum
Flags:  D - down        P - bundled in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator

        M - not in use, minimum links not met
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 1
Number of aggregators:           1

Group  Port-channel  Protocol    Ports
------+-------------+-----------+-----------------------------------------------
1      Po1(SU)         LACP      Fa0/1(P)    Fa0/2(P)

S1#
```

show etherchannel summary sur S2 :

```
S2#sh eth sum
Flags:  D - down        P - bundled in port-channel
        I - stand-alone s - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator

        M - not in use, minimum links not met
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port


Number of channel-groups in use: 1
Number of aggregators:           1

Group  Port-channel  Protocol    Ports
------+-------------+-----------+-----------------------------------------------
1      Po1(SU)         LACP      Fa0/1(P)    Fa0/2(P)

S2#
```

show interfaces trunk sur S1 :

```
S1#show interfaces trunk

Port        Mode             Encapsulation  Status        Native vlan
Fa0/5       on               802.1q         trunking      99
Po1         on               802.1q         trunking      99

Port        Vlans allowed on trunk
Fa0/5       1-4094
Po1         1-4094

Port        Vlans allowed and active in management domain
Fa0/5       1,10,20,30,90,99
Po1         1,10,20,30,90,99

Port        Vlans in spanning tree forwarding state and not pruned
Fa0/5       1,10,20,30,90,99
Po1         1,10,20,30,90,99
S1#
```

show interfaces trunk sur S2 :

```
S2#show interfaces trunk

Port        Mode             Encapsulation  Status        Native vlan
Fa0/5       on               802.1q         trunking      99
Po1         on               802.1q         trunking      99

Port        Vlans allowed on trunk
Fa0/5       1-4094
Po1         1-4094

Port        Vlans allowed and active in management domain
Fa0/5       1,10,20,30,90,99
Po1         1,10,20,30,90,99

Port        Vlans in spanning tree forwarding state and not pruned
Fa0/5       1,10,20,30,90,99
Po1         1,10,20,30,90,99
S2#
```

show vlan brief sur S1 :

```
S1#sh vlan br

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active
10   RD                               active    Fa0/6
20   STAFF                            active
30   MGNT                             active
90   TRASH                            active    Fa0/3, Fa0/4, Fa0/7, Fa0/8
                                                Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                                Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                                Fa0/21, Fa0/22, Fa0/23, Fa0/24
                                                Gi0/1, Gi0/2
99   NATIF                            active
1002 fddi-default                     act/unsup
1003 token-ring-default               act/unsup
1004 fddinet-default                  act/unsup
1005 trnet-default                    act/unsup
S1#
```

show vlan brief sur S2 :

```
S2#sh vlan br

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active
10   RD                               active
20   STAFF                            active    Fa0/24
30   MGNT                             active    Fa0/18
90   TRASH                            active    Fa0/3, Fa0/4, Fa0/6, Fa0/7
                                                Fa0/8, Fa0/9, Fa0/10, Fa0/11
                                                Fa0/12, Fa0/13, Fa0/14, Fa0/15
                                                Fa0/16, Fa0/17, Fa0/19, Fa0/20
                                                Fa0/21, Fa0/22, Fa0/23, Gi0/1
                                                Gi0/2
99   NATIF                            active
1002 fddi-default                     act/unsup
1003 token-ring-default               act/unsup
1004 fddinet-default                  act/unsup
1005 trnet-default                    act/unsup
S2#
```

sh ip int br sur S1 :

```
S1#sh ip int br
Interface              IP-Address      OK? Method Status                Protocol
Vlan1                  unassigned      YES NVRAM  up                    up
Vlan30                 172.16.30.11    YES NVRAM  up                    up
FastEthernet0/1        unassigned      YES unset  up                    up
FastEthernet0/2        unassigned      YES unset  up                    up
FastEthernet0/3        unassigned      YES unset  administratively down down
FastEthernet0/4        unassigned      YES unset  administratively down down
FastEthernet0/5        unassigned      YES unset  up                    up
FastEthernet0/6        unassigned      YES unset  up                    up
FastEthernet0/7        unassigned      YES unset  administratively down down
FastEthernet0/8        unassigned      YES unset  administratively down down
FastEthernet0/9        unassigned      YES unset  administratively down down
FastEthernet0/10       unassigned      YES unset  administratively down down
FastEthernet0/11       unassigned      YES unset  administratively down down
FastEthernet0/12       unassigned      YES unset  administratively down down
FastEthernet0/13       unassigned      YES unset  administratively down down
FastEthernet0/14       unassigned      YES unset  administratively down down
FastEthernet0/15       unassigned      YES unset  administratively down down
FastEthernet0/16       unassigned      YES unset  administratively down down
FastEthernet0/17       unassigned      YES unset  administratively down down
FastEthernet0/18       unassigned      YES unset  administratively down down
FastEthernet0/19       unassigned      YES unset  administratively down down
FastEthernet0/20       unassigned      YES unset  administratively down down
FastEthernet0/21       unassigned      YES unset  administratively down down
FastEthernet0/22       unassigned      YES unset  administratively down down
FastEthernet0/23       unassigned      YES unset  administratively down down
FastEthernet0/24       unassigned      YES unset  administratively down down
GigabitEthernet0/1     unassigned      YES unset  administratively down down
GigabitEthernet0/2     unassigned      YES unset  administratively down down
Port-channel1          unassigned      YES unset  up                    up
S1#
```

sh ip int br sur S2:

```
S2#sh ip int br
Interface              IP-Address      OK? Method Status                Protocol
Vlan1                  unassigned      YES NVRAM  administratively down down
Vlan30                 172.16.30.12    YES NVRAM  up                    up
FastEthernet0/1        unassigned      YES unset  up                    up
FastEthernet0/2        unassigned      YES unset  up                    up
FastEthernet0/3        unassigned      YES unset  administratively down down
FastEthernet0/4        unassigned      YES unset  administratively down down
FastEthernet0/5        unassigned      YES unset  up                    up
FastEthernet0/6        unassigned      YES unset  administratively down down
FastEthernet0/7        unassigned      YES unset  administratively down down
FastEthernet0/8        unassigned      YES unset  administratively down down
FastEthernet0/9        unassigned      YES unset  administratively down down
FastEthernet0/10       unassigned      YES unset  administratively down down
FastEthernet0/11       unassigned      YES unset  administratively down down
FastEthernet0/12       unassigned      YES unset  administratively down down
FastEthernet0/13       unassigned      YES unset  administratively down down
FastEthernet0/14       unassigned      YES unset  administratively down down
FastEthernet0/15       unassigned      YES unset  administratively down down
FastEthernet0/16       unassigned      YES unset  administratively down down
FastEthernet0/17       unassigned      YES unset  administratively down down
FastEthernet0/18       unassigned      YES unset  up                    up
FastEthernet0/19       unassigned      YES unset  administratively down down
FastEthernet0/20       unassigned      YES unset  administratively down down
FastEthernet0/21       unassigned      YES unset  administratively down down
FastEthernet0/22       unassigned      YES unset  administratively down down
FastEthernet0/23       unassigned      YES unset  administratively down down
FastEthernet0/24       unassigned      YES unset  up                    up
GigabitEthernet0/1     unassigned      YES unset  administratively down down
GigabitEthernet0/2     unassigned      YES unset  administratively down down
Port-channel1          unassigned      YES unset  up                    up
S2#
```

show access-list sur R1 :

```
R1#show access-list
Standard IP access list ACL-ADMIN-ONLY
    10 permit 172.16.30.0, wildcard bits 0.0.0.255 (6 matches)
Extended IP access list ACL-VLAN10
    10 permit ip 172.16.10.0 0.0.0.255 host 10.10.10.1 (6 matches)
    20 deny ip 172.16.10.0 0.0.0.255 172.16.20.0 0.0.0.255 (61 matches)
    30 deny ip 172.16.10.0 0.0.0.255 172.16.30.0 0.0.0.255 (20 matches)
    40 permit ip any any (5319 matches)
Extended IP access list ACL-VLAN20
    10 deny ip 172.16.20.0 0.0.0.255 172.16.10.0 0.0.0.255 (6 matches)
    20 deny ip 172.16.20.0 0.0.0.255 172.16.30.0 0.0.0.255 (23 matches)
    30 deny ip 172.16.20.0 0.0.0.255 host 10.10.10.1 (7 matches)
    40 permit ip any any (5214 matches)
Extended IP access list ACL-VLAN30
    10 deny ip 172.16.30.0 0.0.0.255 172.16.10.0 0.0.0.255 (13 matches)
    20 deny ip 172.16.30.0 0.0.0.255 172.16.20.0 0.0.0.255 (7 matches)
    30 permit ip any any (5286 matches)
Extended IP access list CISCO-CWA-URL-REDIRECT-ACL
    100 deny udp any any eq domain
    101 deny tcp any any eq domain
    102 deny udp any eq bootps any
    103 deny udp any any eq bootpc
    104 deny udp any eq bootpc any
    105 permit tcp any any eq www
Extended IP access list meraki-fqdn-dns
R1#
```

sh ip inter br sur R1

```
Password:
R1#sh ip inter br
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0/0   unassigned      YES unset  up                    up
Gi0/0/0.10             172.16.10.2     YES manual up                    up
Gi0/0/0.20             172.16.20.2     YES manual up                    up
Gi0/0/0.30             172.16.30.2     YES manual up                    up
Gi0/0/0.99             unassigned      YES unset  up                    up
GigabitEthernet0/0/1   10.10.13.1      YES manual up                    up
GigabitEthernet0/0/2   unassigned      YES unset  administratively down down
GigabitEthernet0       unassigned      YES unset  administratively down down
R1#
```

sh ip route sur R1

```
R1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, m - OMP
       n - NAT, Ni - NAT inside, No - NAT outside, Nd - NAT DIA
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       H - NHRP, G - NHRP registered, g - NHRP registration summary
       o - ODR, P - periodic downloaded static route, l - LISP
       a - application route
       + - replicated route, % - next hop override, p - overrides from PfR
       & - replicated local route overrides by connected

Gateway of last resort is 10.10.13.2 to network 0.0.0.0

O*E2  0.0.0.0/0 [110/1] via 10.10.13.2, 00:00:15, GigabitEthernet0/0/1
      10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
O        10.10.10.1/32 [110/2] via 10.10.13.2, 02:03:18, GigabitEthernet0/0/1
C        10.10.13.0/30 is directly connected, GigabitEthernet0/0/1
L        10.10.13.1/32 is directly connected, GigabitEthernet0/0/1
O        10.10.23.0/30
           [110/2] via 172.16.30.3, 01:55:12, GigabitEthernet0/0/0.30
           [110/2] via 172.16.20.3, 01:55:12, GigabitEthernet0/0/0.20
           [110/2] via 172.16.10.3, 01:55:12, GigabitEthernet0/0/0.10
           [110/2] via 10.10.13.2, 02:11:30, GigabitEthernet0/0/1
      172.16.0.0/16 is variably subnetted, 6 subnets, 2 masks
C        172.16.10.0/24 is directly connected, GigabitEthernet0/0/0.10
L        172.16.10.2/32 is directly connected, GigabitEthernet0/0/0.10
C        172.16.20.0/24 is directly connected, GigabitEthernet0/0/0.20
L        172.16.20.2/32 is directly connected, GigabitEthernet0/0/0.20
C        172.16.30.0/24 is directly connected, GigabitEthernet0/0/0.30
L        172.16.30.2/32 is directly connected, GigabitEthernet0/0/0.30
      209.165.200.0/32 is subnetted, 1 subnets
O        209.165.200.225
           [110/2] via 10.10.13.2, 02:14:03, GigabitEthernet0/0/1
R1#
R1#
```

sh standby brief sur R1

```
R1#sh standby brief
                     P indicates configured to preempt.
                     |
Interface   Grp  Pri P State   Active          Standby         Virtual IP
Gi0/0/0.10  10   110 P Active  local           172.16.10.3     172.16.10.1
Gi0/0/0.20  20   110 P Active  local           172.16.20.3     172.16.20.1
Gi0/0/0.30  30   110 P Active  local           172.16.30.3     172.16.30.1
R1#
```

sh ip inter br sur R2

```
R2#sh ip inter br
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0/0   unassigned      YES unset  up                    up
Gi0/0/0.10             172.16.10.3     YES manual up                    up
Gi0/0/0.20             172.16.20.3     YES manual up                    up
Gi0/0/0.30             172.16.30.3     YES manual up                    up
Gi0/0/0.99             unassigned      YES unset  up                    up
GigabitEthernet0/0/1   10.10.23.1      YES manual up                    up
GigabitEthernet0/0/2   unassigned      YES unset  administratively down down
GigabitEthernet0       unassigned      YES unset  administratively down down
R2#
```

sh ip route sur R2

```
R2#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is 10.10.23.2 to network 0.0.0.0

O*E2  0.0.0.0/0 [110/1] via 10.10.23.2, 00:04:21, GigabitEthernet0/0/1
      10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
O        10.10.10.1/32 [110/2] via 10.10.23.2, 02:07:24, GigabitEthernet0/0/1
O        10.10.13.0/30
           [110/2] via 172.16.30.2, 01:59:17, GigabitEthernet0/0/0.30
           [110/2] via 172.16.20.2, 01:59:17, GigabitEthernet0/0/0.20
           [110/2] via 172.16.10.2, 01:59:17, GigabitEthernet0/0/0.10
           [110/2] via 10.10.23.2, 02:14:40, GigabitEthernet0/0/1
C        10.10.23.0/30 is directly connected, GigabitEthernet0/0/1
L        10.10.23.1/32 is directly connected, GigabitEthernet0/0/1
      172.16.0.0/16 is variably subnetted, 6 subnets, 2 masks
C        172.16.10.0/24 is directly connected, GigabitEthernet0/0/0.10
L        172.16.10.3/32 is directly connected, GigabitEthernet0/0/0.10
C        172.16.20.0/24 is directly connected, GigabitEthernet0/0/0.20
L        172.16.20.3/32 is directly connected, GigabitEthernet0/0/0.20
C        172.16.30.0/24 is directly connected, GigabitEthernet0/0/0.30
L        172.16.30.3/32 is directly connected, GigabitEthernet0/0/0.30
      209.165.200.0/32 is subnetted, 1 subnets
O        209.165.200.225
           [110/2] via 10.10.23.2, 02:14:40, GigabitEthernet0/0/1
R2#
R2#
```

sh ip dhcp binding sur R2

c'est R3 qui gère l'attribution des adresses IP pour tout mon réseau, et non R1 ou R2. Alors ce résultat est normal

```
R2#sh ip dhcp binding
Bindings from all pools not associated with VRF:
IP address      Client-ID/              Lease expiration        Type       State      Interface
                Hardware address/
                User name
R2#
```

sh standby brief sur R2

```
R2#sh standby brief
                     P indicates configured to preempt.
                     |
Interface   Grp  Pri P State   Active          Standby         Virtual IP
Gi0/0/0.10  10   100 P Standby 172.16.10.2     local           172.16.10.1
Gi0/0/0.20  20   100 P Standby 172.16.20.2     local           172.16.20.1
Gi0/0/0.30  30   100 P Standby 172.16.30.2     local           172.16.30.1
R2#
```

sh ip dhcp binding sur R3

```
R3#sh ip dhcp binding
Bindings from all pools not associated with VRF:
IP address          Client-ID/              Lease expiration        Type
                    Hardware address/
                    User name
172.16.10.11        ffbd.0603.3b00.0200.    Jan 16 1970 11:36 PM    Automatic
                    00ab.1119.cc66.9d3f.
                    8e29.e3
172.16.20.11        ff5f.ae27.3000.0200.    Jan 16 1970 11:51 PM    Automatic
                    00ab.11bc.4d22.e42d.
                    a1a6.eb
172.16.30.13        ff16.1c30.6c00.0200.    Jan 16 1970 11:52 PM    Automatic
                    00ab.1178.eac7.707a.
                    64ec.1d
R3#
```

sh ip inter br sur R3

```
R3#sh ip inter br
Interface                  IP-Address      OK? Method Status                Protocol
FastEthernet0/0            10.10.13.2      YES manual up                    up
FastEthernet0/1            10.10.23.2      YES manual up                    up
Serial0/0/0                unassigned      YES unset  administratively down down
Serial0/0/1                unassigned      YES unset  administratively down down
Loopback0                  209.165.200.225 YES manual up                    up
Loopback1                  10.10.10.1      YES manual up                    up
R3#
```

sh ip interface sur R3 :

```
R3#sh ip interface
FastEthernet0/0 is up, line protocol is up
  Internet address is 10.10.13.2/30
  Broadcast address is 255.255.255.255
  Address determined by setup command
  MTU is 1500 bytes
  Helper address is not set
  Directed broadcast forwarding is disabled
  Multicast reserved groups joined: 224.0.0.5 224.0.0.6
  Outgoing access list is not set
  Inbound  access list is not set
  Proxy ARP is enabled
  Local Proxy ARP is disabled
  Security level is default
  Split horizon is enabled
  ICMP redirects are always sent
  ICMP unreachables are always sent
  ICMP mask replies are never sent
  IP fast switching is enabled
  IP fast switching on the same interface is disabled
  IP Flow switching is disabled
  IP CEF switching is enabled
  IP CEF switching turbo vector
  IP multicast fast switching is enabled
  IP multicast distributed fast switching is disabled
  IP route-cache flags are Fast, CEF
  Router Discovery is disabled
  IP output packet accounting is disabled
  IP access violation accounting is disabled
  TCP/IP header compression is disabled
  RTP/IP header compression is disabled
  Policy routing is disabled
  Network address translation is disabled
  BGP Policy Mapping is disabled
  Input features: MCI Check
  WCCP Redirect outbound is disabled
  WCCP Redirect inbound is disabled
  WCCP Redirect exclude is disabled
FastEthernet0/1 is up, line protocol is up
  Internet address is 10.10.23.2/30
  Broadcast address is 255.255.255.255
  Address determined by setup command
  MTU is 1500 bytes
  Helper address is not set
  Directed broadcast forwarding is disabled
  Multicast reserved groups joined: 224.0.0.5 224.0.0.6
  Outgoing access list is not set
  Inbound  access list is not set
  Proxy ARP is enabled
  Local Proxy ARP is disabled
  Security level is default
  Split horizon is enabled
  ICMP redirects are always sent
  ICMP unreachables are always sent
```

```
  ICMP mask replies are never sent
  IP fast switching is enabled
  IP fast switching on the same interface is disabled
  IP Flow switching is disabled
  IP CEF switching is enabled
  IP CEF switching turbo vector
  IP multicast fast switching is enabled
  IP multicast distributed fast switching is disabled
  IP route-cache flags are Fast, CEF
  Router Discovery is disabled
  IP output packet accounting is disabled
  IP access violation accounting is disabled
  TCP/IP header compression is disabled
  RTP/IP header compression is disabled
  Policy routing is disabled
  Network address translation is disabled
  BGP Policy Mapping is disabled
  Input features: MCI Check
  WCCP Redirect outbound is disabled
  WCCP Redirect inbound is disabled
  WCCP Redirect exclude is disabled
Serial0/0/0 is administratively down, line protocol is down
  Internet protocol processing disabled
Serial0/0/1 is administratively down, line protocol is down
  Internet protocol processing disabled
Loopback0 is up, line protocol is up
  Internet address is 209.165.200.225/27
  Broadcast address is 255.255.255.255
  Address determined by setup command
  MTU is 1514 bytes
  Helper address is not set
  Directed broadcast forwarding is disabled
  Multicast reserved groups joined: 224.0.0.5
  Outgoing access list is not set
  Inbound  access list is not set
  Proxy ARP is enabled
  Local Proxy ARP is disabled
  Security level is default
  Split horizon is enabled
  ICMP redirects are always sent
  ICMP unreachables are always sent
  ICMP mask replies are never sent
  IP fast switching is enabled

R3#
```

sh ip route sur R3 :

```
R3#sh ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

     172.16.0.0/24 is subnetted, 3 subnets
O       172.16.30.0 [110/2] via 10.10.23.1, 02:05:09, FastEthernet0/1
                    [110/2] via 10.10.13.1, 02:24:01, FastEthernet0/0
O       172.16.20.0 [110/2] via 10.10.23.1, 02:05:09, FastEthernet0/1
                    [110/2] via 10.10.13.1, 02:24:01, FastEthernet0/0
O       172.16.10.0 [110/2] via 10.10.23.1, 02:05:09, FastEthernet0/1
                    [110/2] via 10.10.13.1, 02:24:01, FastEthernet0/0
     209.165.200.0/27 is subnetted, 1 subnets
C       209.165.200.224 is directly connected, Loopback0
     10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
C       10.10.10.0/24 is directly connected, Loopback1
C       10.10.13.0/30 is directly connected, FastEthernet0/0
C       10.10.23.0/30 is directly connected, FastEthernet0/1
R3#
```

sh ip route | begin Gateway sur R1 :

```
R1#sh ip route | begin Gateway
Gateway of last resort is 10.10.13.2 to network 0.0.0.0

O*E2  0.0.0.0/0 [110/1] via 10.10.13.2, 00:12:30, GigabitEthernet0/0/1
      10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
O        10.10.10.1/32 [110/2] via 10.10.13.2, 02:15:33, GigabitEthernet0/0/1
C        10.10.13.0/30 is directly connected, GigabitEthernet0/0/1
L        10.10.13.1/32 is directly connected, GigabitEthernet0/0/1
O        10.10.23.0/30
           [110/2] via 172.16.30.3, 02:07:27, GigabitEthernet0/0/0.30
           [110/2] via 172.16.20.3, 02:07:27, GigabitEthernet0/0/0.20
           [110/2] via 172.16.10.3, 02:07:27, GigabitEthernet0/0/0.10
           [110/2] via 10.10.13.2, 02:23:45, GigabitEthernet0/0/1
      172.16.0.0/16 is variably subnetted, 6 subnets, 2 masks
C        172.16.10.0/24 is directly connected, GigabitEthernet0/0/0.10
L        172.16.10.2/32 is directly connected, GigabitEthernet0/0/0.10
C        172.16.20.0/24 is directly connected, GigabitEthernet0/0/0.20
L        172.16.20.2/32 is directly connected, GigabitEthernet0/0/0.20
C        172.16.30.0/24 is directly connected, GigabitEthernet0/0/0.30
L        172.16.30.2/32 is directly connected, GigabitEthernet0/0/0.30
      209.165.200.0/32 is subnetted, 1 subnets
O        209.165.200.225
           [110/2] via 10.10.13.2, 02:26:18, GigabitEthernet0/0/1
R1#
```

sh ip route | begin Gateway sur R2 :

```
R2#sh ip route | begin Gateway
Gateway of last resort is 10.10.23.2 to network 0.0.0.0

O*E2  0.0.0.0/0 [110/1] via 10.10.23.2, 00:13:02, GigabitEthernet0/0/1
      10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
O        10.10.10.1/32 [110/2] via 10.10.23.2, 02:16:05, GigabitEthernet0/0/1
O        10.10.13.0/30
           [110/2] via 172.16.30.2, 02:07:58, GigabitEthernet0/0/0.30
           [110/2] via 172.16.20.2, 02:07:58, GigabitEthernet0/0/0.20
           [110/2] via 172.16.10.2, 02:07:58, GigabitEthernet0/0/0.10
           [110/2] via 10.10.23.2, 02:23:21, GigabitEthernet0/0/1
C        10.10.23.0/30 is directly connected, GigabitEthernet0/0/1
L        10.10.23.1/32 is directly connected, GigabitEthernet0/0/1
      172.16.0.0/16 is variably subnetted, 6 subnets, 2 masks
C        172.16.10.0/24 is directly connected, GigabitEthernet0/0/0.10
L        172.16.10.3/32 is directly connected, GigabitEthernet0/0/0.10
C        172.16.20.0/24 is directly connected, GigabitEthernet0/0/0.20
L        172.16.20.3/32 is directly connected, GigabitEthernet0/0/0.20
C        172.16.30.0/24 is directly connected, GigabitEthernet0/0/0.30
L        172.16.30.3/32 is directly connected, GigabitEthernet0/0/0.30
      209.165.200.0/32 is subnetted, 1 subnets
O        209.165.200.225
           [110/2] via 10.10.23.2, 02:23:21, GigabitEthernet0/0/1
R2#
```

sh ip route | begin Gateway sur R3 :

```
R3#sh ip route | begin Gateway
Gateway of last resort is not set

     172.16.0.0/24 is subnetted, 3 subnets
O       172.16.30.0 [110/2] via 10.10.23.1, 02:08:24, FastEthernet0/1
                    [110/2] via 10.10.13.1, 02:27:15, FastEthernet0/0
O       172.16.20.0 [110/2] via 10.10.23.1, 02:08:24, FastEthernet0/1
                    [110/2] via 10.10.13.1, 02:27:15, FastEthernet0/0
O       172.16.10.0 [110/2] via 10.10.23.1, 02:08:24, FastEthernet0/1
                    [110/2] via 10.10.13.1, 02:27:15, FastEthernet0/0
     209.165.200.0/27 is subnetted, 1 subnets
C       209.165.200.224 is directly connected, Loopback0
     10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
C       10.10.10.0/24 is directly connected, Loopback1
C       10.10.13.0/30 is directly connected, FastEthernet0/0
C       10.10.23.0/30 is directly connected, FastEthernet0/1
R3#
```

sh ipv6 route | begin C sur R1 :

```
R1#sh ipv6 route | begin C
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
       B - BGP, R - RIP, H - NHRP, I1 - ISIS L1
       I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary, D - EIGRP
       EX - EIGRP external, ND - ND Default, NDp - ND Prefix, DCE - Destination
       NDr - Redirect, RL - RPL, O - OSPF Intra, OI - OSPF Inter
       OE1 - OSPF ext 1, OE2 - OSPF ext 2, ON1 - OSPF NSSA ext 1
       ON2 - OSPF NSSA ext 2, a - Application, m - OMP
L   FF00::/8 [0/0]
     via Null0, receive
R1#
```

sh ip route static sur R1 :

```
      via Null0, receive
R1#sh ip route static
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, m - OMP
       n - NAT, Ni - NAT inside, No - NAT outside, Nd - NAT DIA
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       H - NHRP, G - NHRP registered, g - NHRP registration summary
       o - ODR, P - periodic downloaded static route, l - LISP
       a - application route
       + - replicated route, % - next hop override, p - overrides from PfR
       & - replicated local route overrides by connected

Gateway of last resort is 10.10.13.2 to network 0.0.0.0

R1#
```

sh ip route static sur R2 :

```
          [110/2] via 10.10.23.2, 02:23:21, GigabitEthernet0/0/1
R2#sh ip route static
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is 10.10.23.2 to network 0.0.0.0

R2#
```

show ip protocols sur R1

```
R1#show ip protocols
*** IP Routing is NSF aware ***

Routing Protocol is "application"
  Sending updates every 0 seconds
  Invalid after 0 seconds, hold down 0, flushed after 0
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Maximum path: 32
  Routing for Networks:
  Routing Information Sources:
    Gateway         Distance      Last Update
  Distance: (default is 4)

Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 1.1.1.1
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    10.10.13.0 0.0.0.3 area 0
    172.16.10.0 0.0.0.255 area 0
    172.16.20.0 0.0.0.255 area 0
    172.16.30.0 0.0.0.255 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
    3.3.3.3              110      00:15:49
  Distance: (default is 110)

R1#
```

show ip ospf neighbor sur R1

```
R1#show ip ospf neighbor

Neighbor ID     Pri   State           Dead Time   Address         Interface
3.3.3.3           1   FULL/DR         00:00:33    10.10.13.2      GigabitEthernet0/0/1
2.2.2.2           1   FULL/BDR        00:00:33    172.16.30.3     GigabitEthernet0/0/0.30
2.2.2.2           1   FULL/BDR        00:00:31    172.16.20.3     GigabitEthernet0/0/0.20
2.2.2.2           1   FULL/BDR        00:00:35    172.16.10.3     GigabitEthernet0/0/0.10
R1#
```

show ip route ospf sur R1

```
R1#show ip route ospf
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, m - OMP
       n - NAT, Ni - NAT inside, No - NAT outside, Nd - NAT DIA
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       H - NHRP, G - NHRP registered, g - NHRP registration summary
       o - ODR, P - periodic downloaded static route, l - LISP
       a - application route
       + - replicated route, % - next hop override, p - overrides from PfR
       & - replicated local route overrides by connected

Gateway of last resort is 10.10.13.2 to network 0.0.0.0

O*E2  0.0.0.0/0 [110/1] via 10.10.13.2, 00:17:07, GigabitEthernet0/0/1
      10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
O        10.10.10.1/32 [110/2] via 10.10.13.2, 02:20:10, GigabitEthernet0/0/1
O        10.10.23.0/30
           [110/2] via 172.16.30.3, 02:12:04, GigabitEthernet0/0/0.30
           [110/2] via 172.16.20.3, 02:12:04, GigabitEthernet0/0/0.20
           [110/2] via 172.16.10.3, 02:12:04, GigabitEthernet0/0/0.10
           [110/2] via 10.10.13.2, 02:28:22, GigabitEthernet0/0/1
      209.165.200.0/32 is subnetted, 1 subnets
O        209.165.200.225
           [110/2] via 10.10.13.2, 02:30:55, GigabitEthernet0/0/1
R1#
```

show ip ospf interface sur R1

```
R1#show ip ospf interface
GigabitEthernet0/0/1 is up, line protocol is up
  Internet Address 10.10.13.1/30, Interface ID 7, Area 0
  Attached via Network Statement
  Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
  Topology-MTID    Cost    Disabled    Shutdown      Topology Name
        0           1         no          no            Base
  Transmit Delay is 1 sec, State BDR, Priority 1
  Designated Router (ID) 3.3.3.3, Interface address 10.10.13.2
  Backup Designated router (ID) 1.1.1.1, Interface address 10.10.13.1
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    oob-resync timeout 40
    Hello due in 00:00:08
  Supports Link-local Signaling (LLS)
  Cisco NSF helper support enabled
  IETF NSF helper support enabled
  Index 1/4/4, flood queue length 0
  Next 0x0(0)/0x0(0)/0x0(0)
  Last flood scan length is 4, maximum is 4
  Last flood scan time is 0 msec, maximum is 1 msec
  Neighbor Count is 1, Adjacent neighbor count is 1
    Adjacent with neighbor 3.3.3.3  (Designated Router)
  Suppress hello for 0 neighbor(s)
GigabitEthernet0/0/0.30 is up, line protocol is up
  Internet Address 172.16.30.2/24, Interface ID 12, Area 0
  Attached via Network Statement
  Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
  Topology-MTID    Cost    Disabled    Shutdown      Topology Name
        0           1         no          no            Base
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 1.1.1.1, Interface address 172.16.30.2
  Backup Designated router (ID) 2.2.2.2, Interface address 172.16.30.3
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    oob-resync timeout 40
    Hello due in 00:00:07
  Supports Link-local Signaling (LLS)
  Cisco NSF helper support enabled
  IETF NSF helper support enabled
  Index 1/3/3, flood queue length 0
  Next 0x0(0)/0x0(0)/0x0(0)
  Last flood scan length is 4, maximum is 4
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 1, Adjacent neighbor count is 1
    Adjacent with neighbor 2.2.2.2  (Backup Designated Router)
  Suppress hello for 0 neighbor(s)
GigabitEthernet0/0/0.20 is up, line protocol is up
  Internet Address 172.16.20.2/24, Interface ID 11, Area 0
  Attached via Network Statement
  Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
  Topology-MTID    Cost    Disabled    Shutdown      Topology Name
        0           1         no          no            Base
```

```
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 1.1.1.1, Interface address 172.16.20.2
  Backup Designated router (ID) 2.2.2.2, Interface address 172.16.20.3
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    oob-resync timeout 40
    Hello due in 00:00:01
  Supports Link-local Signaling (LLS)
  Cisco NSF helper support enabled
  IETF NSF helper support enabled
  Index 1/2/2, flood queue length 0
  Next 0x0(0)/0x0(0)/0x0(0)
  Last flood scan length is 4, maximum is 4
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 1, Adjacent neighbor count is 1
    Adjacent with neighbor 2.2.2.2  (Backup Designated Router)
  Suppress hello for 0 neighbor(s)
GigabitEthernet0/0/0.10 is up, line protocol is up
  Internet Address 172.16.10.2/24, Interface ID 10, Area 0
  Attached via Network Statement
  Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
  Topology-MTID    Cost    Disabled    Shutdown      Topology Name
        0           1         no          no            Base
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 1.1.1.1, Interface address 172.16.10.2
  Backup Designated router (ID) 2.2.2.2, Interface address 172.16.10.3
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    oob-resync timeout 40
    Hello due in 00:00:05
  Supports Link-local Signaling (LLS)
  Cisco NSF helper support enabled
  IETF NSF helper support enabled
  Index 1/1/1, flood queue length 0
  Next 0x0(0)/0x0(0)/0x0(0)
  Last flood scan length is 4, maximum is 4
  Last flood scan time is 0 msec, maximum is 1 msec
  Neighbor Count is 1, Adjacent neighbor count is 1
    Adjacent with neighbor 2.2.2.2  (Backup Designated Router)

R1#
```

show ip ospf interface brief sur R1

```
R1#show ip ospf interface brief
Interface    PID   Area            IP Address/Mask    Cost  State Nbrs F/C
Gi0/0/1      1     0               10.10.13.1/30      1     BDR   1/1
Gi0/0/0.30   1     0               172.16.30.2/24     1     DR    1/1
Gi0/0/0.20   1     0               172.16.20.2/24     1     DR    1/1
Gi0/0/0.10   1     0               172.16.10.2/24     1     DR    1/1
R1#
```

show ip route ospf | begin 10 sur R1

```
R1#show ip route ospf | begin 10
Gateway of last resort is 10.10.13.2 to network 0.0.0.0

O*E2  0.0.0.0/0 [110/1] via 10.10.13.2, 00:19:43, GigabitEthernet0/0/1
      10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
O        10.10.10.1/32 [110/2] via 10.10.13.2, 02:22:46, GigabitEthernet0/0/1
O        10.10.23.0/30
           [110/2] via 172.16.30.3, 02:14:40, GigabitEthernet0/0/0.30
           [110/2] via 172.16.20.3, 02:14:40, GigabitEthernet0/0/0.20
           [110/2] via 172.16.10.3, 02:14:40, GigabitEthernet0/0/0.10
           [110/2] via 10.10.13.2, 02:30:58, GigabitEthernet0/0/1
      209.165.200.0/32 is subnetted, 1 subnets
O        209.165.200.225
           [110/2] via 10.10.13.2, 02:33:31, GigabitEthernet0/0/1
R1#
```

show ip route ospf sur R3

```
R3#show ip route ospf
     172.16.0.0/24 is subnetted, 3 subnets
O       172.16.30.0 [110/2] via 10.10.23.1, 02:15:12, FastEthernet0/1
                    [110/2] via 10.10.13.1, 02:34:03, FastEthernet0/0
O       172.16.20.0 [110/2] via 10.10.23.1, 02:15:12, FastEthernet0/1
                    [110/2] via 10.10.13.1, 02:34:03, FastEthernet0/0
O       172.16.10.0 [110/2] via 10.10.23.1, 02:15:12, FastEthernet0/1
                    [110/2] via 10.10.13.1, 02:34:03, FastEthernet0/0
R3#
```

traceroute 172.16.10.1 depuis pc1 :

```
root@podd-1:~# traceroute 172.16.10.1
traceroute to 172.16.10.1 (172.16.10.1), 30 hops max, 60 byte packets
 1  172.16.10.2 (172.16.10.2)  16.309 ms * *
root@podd-1:~#
```

traceroute 209.165.200.225 depuis pc1 :

```
root@podd-1:~# traceroute 209.165.200.225
traceroute to 209.165.200.225 (209.165.200.225), 30 hops max, 60 byte
packets
 1  172.16.10.2 (172.16.10.2)  0.444 ms  0.400 ms  0.367 ms
 2  10.10.13.2 (10.10.13.2)  1.745 ms * *
root@podd-1:~#
```

traceroute 172.16.20.3 depuis pc1 :

```
root@podd-1:~# traceroute 172.16.20.3
traceroute to 172.16.20.3 (172.16.20.3), 30 hops max, 60 byte packets
 1  172.16.10.2 (172.16.10.2)  0.386 ms  0.317 ms  0.284 ms
 2  172.16.10.2 (172.16.10.2)  0.283 ms !X * *
root@podd-1:~#
```

ping depuis PC1 vers la passerelle virtuelle avant enlever le câble entre R1 et S1

```
root@podd-1:~# ping 172.16.10.1
PING 172.16.10.1 (172.16.10.1) 56(84) bytes of data.
64 bytes from 172.16.10.1: icmp_seq=2 ttl=255 time=0.871 ms
64 bytes from 172.16.10.1: icmp_seq=3 ttl=255 time=1.04 ms
64 bytes from 172.16.10.1: icmp_seq=4 ttl=255 time=0.845 ms
64 bytes from 172.16.10.1: icmp_seq=5 ttl=255 time=0.943 ms
64 bytes from 172.16.10.1: icmp_seq=6 ttl=255 time=1.00 ms
64 bytes from 172.16.10.1: icmp_seq=7 ttl=255 time=0.860 ms
64 bytes from 172.16.10.1: icmp_seq=8 ttl=255 time=0.894 ms
64 bytes from 172.16.10.1: icmp_seq=9 ttl=255 time=0.910 ms
64 bytes from 172.16.10.1: icmp_seq=10 ttl=255 time=1.03 ms
64 bytes from 172.16.10.1: icmp_seq=11 ttl=255 time=1.04 ms
64 bytes from 172.16.10.1: icmp_seq=12 ttl=255 time=0.933 ms
```

ping depuis PC1 vers la passerelle virtuelle avant et après enlever le câble entre R1 et S1

```
root@podd-1:~# ping 172.16.10.1
PING 172.16.10.1 (172.16.10.1) 56(84) bytes of data.
64 bytes from 172.16.10.1: icmp_seq=2 ttl=255 time=0.871 ms
64 bytes from 172.16.10.1: icmp_seq=3 ttl=255 time=1.04 ms
64 bytes from 172.16.10.1: icmp_seq=4 ttl=255 time=0.845 ms
64 bytes from 172.16.10.1: icmp_seq=5 ttl=255 time=0.943 ms
64 bytes from 172.16.10.1: icmp_seq=6 ttl=255 time=1.00 ms
64 bytes from 172.16.10.1: icmp_seq=7 ttl=255 time=0.860 ms
64 bytes from 172.16.10.1: icmp_seq=8 ttl=255 time=0.894 ms
64 bytes from 172.16.10.1: icmp_seq=9 ttl=255 time=0.910 ms
64 bytes from 172.16.10.1: icmp_seq=10 ttl=255 time=1.03 ms
64 bytes from 172.16.10.1: icmp_seq=11 ttl=255 time=1.04 ms
64 bytes from 172.16.10.1: icmp_seq=12 ttl=255 time=0.933 ms
64 bytes from 172.16.10.1: icmp_seq=23 ttl=255 time=0.955 ms
64 bytes from 172.16.10.1: icmp_seq=24 ttl=255 time=0.821 ms
64 bytes from 172.16.10.1: icmp_seq=25 ttl=255 time=0.824 ms
64 bytes from 172.16.10.1: icmp_seq=26 ttl=255 time=0.883 ms
64 bytes from 172.16.10.1: icmp_seq=27 ttl=255 time=0.866 ms
64 bytes from 172.16.10.1: icmp_seq=28 ttl=255 time=0.893 ms
64 bytes from 172.16.10.1: icmp_seq=29 ttl=255 time=0.796 ms
64 bytes from 172.16.10.1: icmp_seq=30 ttl=255 time=1.02 ms
64 bytes from 172.16.10.1: icmp_seq=31 ttl=255 time=0.970 ms
64 bytes from 172.16.10.1: icmp_seq=32 ttl=255 time=1.17 ms
64 bytes from 172.16.10.1: icmp_seq=33 ttl=255 time=1.17 ms
64 bytes from 172.16.10.1: icmp_seq=34 ttl=255 time=1.17 ms
64 bytes from 172.16.10.1: icmp_seq=35 ttl=255 time=1.12 ms
64 bytes from 172.16.10.1: icmp_seq=36 ttl=255 time=1.03 ms
64 bytes from 172.16.10.1: icmp_seq=37 ttl=255 time=1.17 ms
64 bytes from 172.16.10.1: icmp_seq=38 ttl=255 time=1.11 ms
64 bytes from 172.16.10.1: icmp_seq=39 ttl=255 time=1.15 ms
64 bytes from 172.16.10.1: icmp_seq=40 ttl=255 time=1.09 ms
64 bytes from 172.16.10.1: icmp_seq=41 ttl=255 time=1.09 ms
64 bytes from 172.16.10.1: icmp_seq=42 ttl=255 time=1.22 ms
64 bytes from 172.16.10.1: icmp_seq=43 ttl=255 time=1.09 ms
64 bytes from 172.16.10.1: icmp_seq=44 ttl=255 time=1.03 ms
^C
--- 172.16.10.1 ping statistics ---
44 packets transmitted, 33 received, 25% packet loss, time 43417ms
rtt min/avg/max/mdev = 0.796/1.000/1.219/0.120 ms
root@podd-1:~#
```

traceroute 172.16.10.1 sur pc1 après reconnecter le câble

le routeur **R1** (`172.16.10.2`) a automatiquement repris son rôle de passerelle active. Ce résultat démontre que l'architecture est non seulement résiliente face aux pannes, mais qu'elle est aussi capable de **revenir d'elle-même à son état nominal** sans intervention humaine, garantissant ainsi une gestion optimale des flux de données.

```
root@podd-1:~# traceroute 172.16.10.1
traceroute to 172.16.10.1 (172.16.10.1), 30 hops max, 60 byte packets
 1  172.16.10.2 (172.16.10.2)  1.207 ms * *
root@podd-1:~#
```