TP 6 : Routage statique

SOMMAIRE

1. Visualisation de la table de routage.

En suivant l'énoncé du TP 6 j'ai cliqué sur R11 et j'ai fait la commande (sh ip route)

```
R11>sh ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
       i - IS-IS, 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

     10.0.0.0/24 is subnetted, 2 subnets
C       10.0.8.0 is directly connected, FastEthernet0/0
C       10.0.11.0 is directly connected, FastEthernet0/1
```

Sur le PC 11 j'ai ping R11 coté réseau 8 et R11 coté réseau 11 :

```
Pinging 10.0.11.1 with 32 bytes of data:

Reply from 10.0.11.1: bytes=32 time<1ms TTL=255
Reply from 10.0.11.1: bytes=32 time<1ms TTL=255
Reply from 10.0.11.1: bytes=32 time<1ms TTL=255
Reply from 10.0.11.1: bytes=32 time<1ms TTL=255

Ping statistics for 10.0.11.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 10.0.8.11

Pinging 10.0.8.11 with 32 bytes of data:

Reply from 10.0.8.11: bytes=32 time<1ms TTL=255
Reply from 10.0.8.11: bytes=32 time<1ms TTL=255
Reply from 10.0.8.11: bytes=32 time<1ms TTL=255
Reply from 10.0.8.11: bytes=32 time<1ms TTL=255

Ping statistics for 10.0.8.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

après avoir ping R12 coté réseau 8 je me suis rendu compte que ça ne passait pas :

```
C:\>ping 10.0.8.12

Pinging 10.0.8.12 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 10.0.8.12:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

2. Ajout d'une route statique sur R12.

J'ai crée une ip route :

```
R12>en
R12#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R12(config)#ip route 10.0.11.0 255.255.255.0 10.0.8.11
R12(config)#exit
```

et j'ai ensuite effectué la commande sh run pour pouvoir voir la configuration en cours du routeur :

```
ip classless
ip route 10.0.11.0 255.255.255.0 10.0.8.11
```

on peut voir ici la route que j'ai ajouté.

Après avoir tapé la commande (sh ip route) nous voyons bien la route que nous avons ajouté :

```
R12#sh ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
       i - IS-IS, 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

     10.0.0.0/24 is subnetted, 3 subnets
C       10.0.8.0 is directly connected, FastEthernet0/0
S       10.0.11.0 [1/0] via 10.0.8.11
C       10.0.12.0 is directly connected, FastEthernet0/1
```

Pour enregistrer la configuration j'ai tapé la commande (copy run start) comme si dessous :

```
R12#copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
```

3. Ajout d'une route statique sur R11.

Nous voyons bien maintenant que le ping 10.0.8.12 depuis PC 11 marche :

```
C:\>ping 10.0.8.12

Pinging 10.0.8.12 with 32 bytes of data:

Reply from 10.0.8.12: bytes=32 time=1ms TTL=254
Reply from 10.0.8.12: bytes=32 time<1ms TTL=254
Reply from 10.0.8.12: bytes=32 time<1ms TTL=254
Reply from 10.0.8.12: bytes=32 time=1ms TTL=254

Ping statistics for 10.0.8.12:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

En revanche le ping 10.0.12.1 ne marche pas :

```
C:\>ping 10.0.12.1

Pinging 10.0.12.1 with 32 bytes of data:

Reply from 10.0.11.1: Destination host unreachable.
Reply from 10.0.11.1: Destination host unreachable.
Reply from 10.0.11.1: Destination host unreachable.
Reply from 10.0.11.1: Destination host unreachable.

Ping statistics for 10.0.12.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Pour que le ping fonctionne j'ai fait ceci :

```
R11>en
R11#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R11(config)#ip route 10.0.12.0 255.255.255.0 10.0.8.12
```

Dorénavant nous voyons donc que le ping marche :

```
C:\>ping 10.0.12.1

Pinging 10.0.12.1 with 32 bytes of data:

Reply from 10.0.12.1: bytes=32 time=1ms TTL=254
Reply from 10.0.12.1: bytes=32 time<1ms TTL=254
Reply from 10.0.12.1: bytes=32 time<1ms TTL=254
Reply from 10.0.12.1: bytes=32 time<1ms TTL=254

Ping statistics for 10.0.12.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Après avoir verifié si tout était bon j'ai enregistré la configuration avec la commande

(copy run start) :

```
R11#sh ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
       i - IS-IS, 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

     10.0.0.0/24 is subnetted, 3 subnets
C       10.0.8.0 is directly connected, FastEthernet0/0
C       10.0.11.0 is directly connected, FastEthernet0/1
S       10.0.12.0 [1/0] via 10.0.8.12

R11#copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
```

On constate bien que l'ip route (S) à été mise.

4. A vous de jouer.

PC21 voulant accéder à PC 22

J'ai reproduis le schéma sur R21 vers R22

```
R21>en
R21#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R21(config)#ip route 10.0.22.0 255.255.255.0 10.0.16.22
R21(config)#exit
R21#
%SYS-5-CONFIG_I: Configured from console by console
show ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
       i - IS-IS, 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

     10.0.0.0/24 is subnetted, 3 subnets
C       10.0.16.0 is directly connected, FastEthernet0/0
C       10.0.21.0 is directly connected, FastEthernet0/1
S       10.0.22.0 [1/0] via 10.0.16.22
```

```
R22>en
R22#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R22(config)#ip route 10.0.21.0 255.255.255.0 10.0.16.21
R22(config)#exit
R22#
%SYS-5-CONFIG_I: Configured from console by console
show ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
       i - IS-IS, 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

     10.0.0.0/24 is subnetted, 3 subnets
C       10.0.16.0 is directly connected, FastEthernet0/0
S       10.0.21.0 [1/0] via 10.0.16.21
C       10.0.22.0 is directly connected, FastEthernet0/1
```

Après avoir crée les routes je constate donc que les PC 21 et PC 22 communiques bien entres eux

```
C:\>ping 10.0.22.2

Pinging 10.0.22.2 with 32 bytes of data:

Reply from 10.0.22.2: bytes=32 time<1ms TTL=126
Reply from 10.0.22.2: bytes=32 time<1ms TTL=126
Reply from 10.0.22.2: bytes=32 time<1ms TTL=126
Reply from 10.0.22.2: bytes=32 time<1ms TTL=126

Ping statistics for 10.0.22.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 10.0.21.2

Pinging 10.0.21.2 with 32 bytes of data:

Reply from 10.0.21.2: bytes=32 time=5ms TTL=128
Reply from 10.0.21.2: bytes=32 time<1ms TTL=128
Reply from 10.0.21.2: bytes=32 time=2ms TTL=128
Reply from 10.0.21.2: bytes=32 time<1ms TTL=128

Ping statistics for 10.0.21.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 5ms, Average = 1ms
```

Voici ma table de routage pour R11 :

```
R11(config)#ip route 0.0.0.0 255.255.255.0 10.0.8.8
R11(config)#exit
R11#
%SYS-5-CONFIG_I: Configured from console by console
copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
R11#sh ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
       i - IS-IS, 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 10.0.8.8 to network 0.0.0.0

 *   0.0.0.0/24 is subnetted, 1 subnets
S*      0.0.0.0 [1/0] via 10.0.8.8
     10.0.0.0/24 is subnetted, 3 subnets
C       10.0.8.0 is directly connected, FastEthernet0/0
C       10.0.11.0 is directly connected, FastEthernet0/1
S       10.0.12.0 [1/0] via 10.0.8.12
```

Voici ma table de routage pour R12 :

```
R12>en
R12#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R12(config)#ip route 0.0.0.0 255.255.255.0 10.0.8.8
R12(config)#exit
R12#
%SYS-5-CONFIG_I: Configured from console by console
copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
R12#sh ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
       i - IS-IS, 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 10.0.8.8 to network 0.0.0.0

 *   0.0.0.0/24 is subnetted, 1 subnets
S*      0.0.0.0 [1/0] via 10.0.8.8
     10.0.0.0/24 is subnetted, 3 subnets
C       10.0.8.0 is directly connected, FastEthernet0/0
S       10.0.11.0 [1/0] via 10.0.8.11
C       10.0.12.0 is directly connected, FastEthernet0/1
```

Voici ma table de routage pour R21 :

```
R21#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R21(config)#ip route 0.0.0.0 255.255.255.0 10.0.16.16
R21(config)#exit
R21#
%SYS-5-CONFIG_I: Configured from console by console
copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
R21#sh ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
       i - IS-IS, 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 10.0.16.16 to network 0.0.0.0

 *   0.0.0.0/24 is subnetted, 1 subnets
S*      0.0.0.0 [1/0] via 10.0.16.16
     10.0.0.0/24 is subnetted, 3 subnets
C       10.0.16.0 is directly connected, FastEthernet0/0
C       10.0.21.0 is directly connected, FastEthernet0/1
S       10.0.22.0 [1/0] via 10.0.16.22
```

Voici ma table de routage pour R22 :

```
R22>en
R22#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R22(config)#ip route 0.0.0.0 255.255.255.0 10.0.16.16
R22(config)#exit
R22#
%SYS-5-CONFIG_I: Configured from console by console
copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
R22#sh ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
       i - IS-IS, 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 10.0.16.16 to network 0.0.0.0

 *   0.0.0.0/24 is subnetted, 1 subnets
S*      0.0.0.0 [1/0] via 10.0.16.16
     10.0.0.0/24 is subnetted, 3 subnets
C       10.0.16.0 is directly connected, FastEthernet0/0
S       10.0.21.0 [1/0] via 10.0.16.21
C       10.0.22.0 is directly connected, FastEthernet0/1
```

Voici ma table de routage pour R8 :

```
R8>en
R8#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R8(config)#ip route 10.0.22.0 255.255.255.0 10.0.2.16
R8(config)#ip route 10.0.21.0 255.255.255.0 10.0.2.16
R8(config)#ip route 10.0.11.0 255.255.255.0 10.0.8.11
R8(config)#ip route 10.0.12.0 255.255.255.0 10.0.8.12
R8(config)#exit
R8#
%SYS-5-CONFIG_I: Configured from console by console
copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
R8#sh ip route
Codes: C - connected, S - static, I - IGRP, 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, E - EGP
       i - IS-IS, 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

     10.0.0.0/24 is subnetted, 7 subnets
C       10.0.1.0 is directly connected, FastEthernet0/0
C       10.0.2.0 is directly connected, Serial0/0/0
C       10.0.8.0 is directly connected, FastEthernet0/1
S       10.0.11.0 [1/0] via 10.0.8.11
S       10.0.12.0 [1/0] via 10.0.8.12
S       10.0.21.0 [1/0] via 10.0.2.16
S       10.0.22.0 [1/0] via 10.0.2.16
```

Voici ma table de routage pour R16 :

```
R16#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R16(config)#ip route 10.0.12.0 255.255.255.0 10.0.2.8
R16(config)#ip route 10.0.11.0 255.255.255.0 10.0.2.8
R16(config)#ip route 10.0.22.0 255.255.255.0 10.0.16.22
R16(config)#ip route 10.0.21.0 255.255.255.0 10.0.16.21
R16(config)#exit
R16#
%SYS-5-CONFIG_I: Configured from console by console
copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
```

Depuis le PC 22 j'ai ping le PC 11 et PC 22 :

```
C:\>ping 10.0.11.2

Pinging 10.0.11.2 with 32 bytes of data:

Request timed out.
Request timed out.
Reply from 10.0.11.2: bytes=32 time=1ms TTL=124
Reply from 10.0.11.2: bytes=32 time=1ms TTL=124

Ping statistics for 10.0.11.2:
    Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>ping 10.0.12.2

Pinging 10.0.12.2 with 32 bytes of data:

Request timed out.
Reply from 10.0.12.2: bytes=32 time=1ms TTL=124
Reply from 10.0.12.2: bytes=32 time=1ms TTL=124
Reply from 10.0.12.2: bytes=32 time=1ms TTL=124

Ping statistics for 10.0.12.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms
```

Depuis le PC 21 j'ai ping le PC 11 et PC 22 :

```
C:\>ping 10.0.11.2

Pinging 10.0.11.2 with 32 bytes of data:

Request timed out.
Reply from 10.0.11.2: bytes=32 time=1ms TTL=124
Reply from 10.0.11.2: bytes=32 time=1ms TTL=124
Reply from 10.0.11.2: bytes=32 time=1ms TTL=124

Ping statistics for 10.0.11.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>ping 10.0.12.2

Pinging 10.0.12.2 with 32 bytes of data:

Reply from 10.0.12.2: bytes=32 time=1ms TTL=124
Reply from 10.0.12.2: bytes=32 time=1ms TTL=124
Reply from 10.0.12.2: bytes=32 time=1ms TTL=124
Reply from 10.0.12.2: bytes=32 time=1ms TTL=124

Ping statistics for 10.0.12.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms
```

Depuis le PC 11 j'ai ping le PC 21 et PC 12 :

```
C:\>ping 10.0.21.2

Pinging 10.0.21.2 with 32 bytes of data:

Reply from 10.0.21.2: bytes=32 time=1ms TTL=124
Reply from 10.0.21.2: bytes=32 time=15ms TTL=124
Reply from 10.0.21.2: bytes=32 time=1ms TTL=124
Reply from 10.0.21.2: bytes=32 time=1ms TTL=124

Ping statistics for 10.0.21.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 15ms, Average = 4ms

C:\>ping 10.0.22.2

Pinging 10.0.22.2 with 32 bytes of data:

Reply from 10.0.22.2: bytes=32 time=2ms TTL=124
Reply from 10.0.22.2: bytes=32 time=1ms TTL=124
Reply from 10.0.22.2: bytes=32 time=2ms TTL=124
Reply from 10.0.22.2: bytes=32 time=1ms TTL=124

Ping statistics for 10.0.22.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms
```

Depuis le PC 12 j'ai ping le PC 21 et PC 12 :

```
C:\>ping 10.0.21.2

Pinging 10.0.21.2 with 32 bytes of data:

Reply from 10.0.21.2: bytes=32 time=1ms TTL=124
Reply from 10.0.21.2: bytes=32 time=2ms TTL=124
Reply from 10.0.21.2: bytes=32 time=1ms TTL=124
Reply from 10.0.21.2: bytes=32 time=1ms TTL=124

Ping statistics for 10.0.21.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\>ping 10.0.22.2

Pinging 10.0.22.2 with 32 bytes of data:

Reply from 10.0.22.2: bytes=32 time=2ms TTL=124
Reply from 10.0.22.2: bytes=32 time=1ms TTL=124
Reply from 10.0.22.2: bytes=32 time=2ms TTL=124
Reply from 10.0.22.2: bytes=32 time=1ms TTL=124

Ping statistics for 10.0.22.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms
```