Compte-Rendu TP6 : Routage Statique

1. Visualisation de la table de routage

- On utilise la commande **sh ip route** sur R11 afin d'obtenir sa table de routage.

```
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
```

- Ensuite, à partir du PC11, on va effectuer des ping vers toutes les interfaces qui séparent PC11 et PC12. On constate que le ping vers R12 ne fonctionne pas.

```
C:\>ping 10.0.11.2

Pinging 10.0.11.2 with 32 bytes of data:

Reply from 10.0.11.2: bytes=32 time<1ms TTL=128
Reply from 10.0.11.2: bytes=32 time<1ms TTL=128
Reply from 10.0.11.2: bytes=32 time=2ms TTL=128
Reply from 10.0.11.2: bytes=32 time<1ms TTL=128

Ping statistics for 10.0.11.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 2ms, Average = 0ms
```

```
C:\>ping 10.0.11.1

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 = 1ms, Average = 0ms
```

```
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

- On se place sur R12, puis dans l'onglet CLI. On rentre la commande **en** dans le prompt « R12> » pour passer en mode privilégié, puis on rentre la commande **conf t** pour passer en mode configuration.

  Ensuite, on tape la commande **ip route 10.0.11.0 255.255.255.0 10.0.8.11**, afin d'ajouter la route statique sur R12.

```
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
R12#
```

- On écrit la commande **exit** pour quitter le mode configuration (screen précédent). On entre la commande **sh run** depuis le mode privilégié afin d'afficher la configuration en cours du routeur.

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

- On affiche la table de routage avec la commande **sh ip route**.

```
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
```

- On enregistre la configuration en utilisant la commande **copy run start**.

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

3. Ajout d'une route statique sur R11

- On va effectuer un ping vers R12 depuis PC11 dans l'invite de commande.

```
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 = 0ms, Average = 0ms
```

- Le ping vers 10.0.12.1 ne fonctionne 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),
```

- On va donc ajouter une route statique sur R11.

  On va donc passer en mode privilégié avec la commande **en**, puis en mode configuration avec **conf t** pour rentrer la route nécessaire **ip route 10.0.12.0 255.255.255.0 10.0.8.12.**

```
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
R11(config)#
```

  Désormais le ping de PC11 vers 10.0.12.1 fonctionne.

```
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
```

- On quitte le mode configuration avec **exit**, puis on affiche la table de routage avec **sh ip route.**

```
R11(config)#exit
R11#
%SYS-5-CONFIG_I: Configured from console by console

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
```

- On enregistre les modifications avec **copy run start**.

4. A vous de jouer

- On passe en mode privilégié sur R21 avec la commande **en**, puis en mode configuration avec la commande **conf t**, puis on rentre la route par défaut passant par le réseau 16 vers R16.

```
R21>en
R21#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R21(config)#ip route 0.0.0.0 0.0.0.0 10.0.16.16
R21(config)#sh ip route
```

- On quitte le mode configuration avec **exit** puis on affiche la table de routage avec **sh ip route**. On constate que la route par défaut est bien présente.

```
R21(config)#exit
R21#
%SYS-5-CONFIG_I: Configured from console by console

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

     10.0.0.0/24 is subnetted, 2 subnets
C       10.0.16.0 is directly connected, FastEthernet0/0
C       10.0.21.0 is directly connected, FastEthernet0/1
S*   0.0.0.0/0 [1/0] via 10.0.16.16
```

- Même opération sur R22.

```
R22>en
R22#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R22(config)#ip route 0.0.0.0 0.0.0.0 10.0.16.16
```

```
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

     10.0.0.0/24 is subnetted, 2 subnets
C       10.0.16.0 is directly connected, FastEthernet0/0
C       10.0.22.0 is directly connected, FastEthernet0/1
S*   0.0.0.0/0 [1/0] via 10.0.16.16
```

- Même opération sur R11, mais cette fois-ci la route par défaut passe par le réseau 8 vers R8.

```
R11>en
R11#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R11(config)#ip route 0.0.0.0 0.0.0.0 10.0.8.8
```

```
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

     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
S*   0.0.0.0/0 [1/0] via 10.0.8.8
```

- Même opération que pour R11.

```
R12>en
R12#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R12(config)#ip route 0.0.0.0 0.0.0.0 10.0.8.8


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

     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
S*   0.0.0.0/0 [1/0] via 10.0.8.8
```

- Pour que R11 et R12 puissent communiquer avec R21 et R22 on va ajouter des routes sur R16.

  On ajoute également une route par défaut pour que R16 puisse communiquer avec R8 en passant par le réseau 1.

```
R16#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R16(config)#ip route 10.0.21.0 255.255.255.0 10.0.16.21
R16(config)#ip route 10.0.22.0 255.255.255.0 10.0.16.22


R16(config)#ip route 0.0.0.0 0.0.0.0 10.0.1.8
```

- On affiche la table de routage de R16 avec **sh ip route**. Les routes ajoutées sont bien présentes.

```
R16#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 10.0.1.8 to network 0.0.0.0

     10.0.0.0/24 is subnetted, 5 subnets
C       10.0.1.0 is directly connected, FastEthernet0/0
C       10.0.2.0 is directly connected, Serial0/0/0
C       10.0.16.0 is directly connected, FastEthernet0/1
S       10.0.21.0 [1/0] via 10.0.16.21
S       10.0.22.0 [1/0] via 10.0.16.22
S*   0.0.0.0/0 [1/0] via 10.0.1.8
```

- Pour que R21 et R22 puissent communiquer avec R11 et R12 on va ajouter des routes sur R8.

  On ajoute également une route par défaut pour que R8 puisse communiquer avec R16 en passant par le réseau 1.

```
R8>en
R8#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
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)#ip route 0.0.0.0 0.0.0.0 10.0.1.16
```

- On affiche la table de routage de R8 avec **sh ip route**. Les routes ajoutées sont bien présentes.

```
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 10.0.1.16 to network 0.0.0.0

     10.0.0.0/24 is subnetted, 5 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*   0.0.0.0/0 [1/0] via 10.0.1.16
```

- On ping les 3 autres PC depuis PC21, il arrive à communiquer avec tous les autres.

```
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=125
Reply from 10.0.22.2: bytes=32 time<1ms TTL=125
Reply from 10.0.22.2: bytes=32 time=1ms TTL=125
Reply from 10.0.22.2: bytes=32 time=1ms TTL=125

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 = 1ms, Average = 0ms
```

```
C:\>ping 10.0.11.2

Pinging 10.0.11.2 with 32 bytes of data:

Reply from 10.0.11.2: bytes=32 time=7ms 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
Reply from 10.0.11.2: bytes=32 time<1ms TTL=124

Ping statistics for 10.0.11.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 7ms, Average = 2ms
```

```
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=10ms 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 = 0ms, Maximum = 10ms, Average = 2ms
```

- On ping les 3 autres PC depuis PC22, il arrive à communiquer avec tous les autres.

```
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=125
Reply from 10.0.21.2: bytes=32 time=13ms TTL=125
Reply from 10.0.21.2: bytes=32 time=12ms TTL=125
Reply from 10.0.21.2: bytes=32 time<1ms TTL=125

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 = 13ms, Average = 6ms
```

```
C:\>ping 10.0.11.2

Pinging 10.0.11.2 with 32 bytes of data:

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=12ms 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 = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 12ms, Average = 3ms
```

```
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 = 0ms, Maximum = 0ms, Average = 0ms
```

- On ping les 3 autres PC depuis PC11, il arrive à communiquer avec tous les autres.

```
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=8ms TTL=126
Reply from 10.0.12.2: bytes=32 time<1ms TTL=126
Reply from 10.0.12.2: bytes=32 time<1ms TTL=126
Reply from 10.0.12.2: bytes=32 time<1ms TTL=126

Ping statistics for 10.0.12.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 8ms, Average = 2ms
```

```
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<1ms 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 = 0ms, Maximum = 1ms, Average = 0ms
```

```
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=124
Reply from 10.0.22.2: bytes=32 time<1ms TTL=124
Reply from 10.0.22.2: bytes=32 time<1ms 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 = 0ms, Maximum = 0ms, Average = 0ms
```

- On ping les 3 autres PC depuis PC11, il arrive à communiquer avec tous les autres.

```
C:\>ping 10.0.11.2

Pinging 10.0.11.2 with 32 bytes of data:

Reply from 10.0.11.2: bytes=32 time=1ms TTL=126
Reply from 10.0.11.2: bytes=32 time<1ms TTL=126
Reply from 10.0.11.2: bytes=32 time<1ms TTL=126
Reply from 10.0.11.2: bytes=32 time=1ms TTL=126

Ping statistics for 10.0.11.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, 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=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
```

```
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=124
Reply from 10.0.22.2: bytes=32 time<1ms TTL=124
Reply from 10.0.22.2: bytes=32 time<1ms 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 = 0ms, Maximum = 1ms, Average = 0ms
```