

TP6 : Routage statique

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Sommaire :

1. Visualisation de la table de routage.....	1
2. Ajout d'une route statique sur R12.....	3
3. Ajout d'une route statique sur R11.....	4
4. A vous de jouer.....	5

1. Visualisation de la table de routage.

On clique une fois sur le routeur R11 puis on active l'onglet CLI (Command Line Interface). On appuie sur la touche [Entrée], le prompt R11> apparaît. Puis on tape la commande : R11> sh ip route. La commande « sh » est l'abrégié de « show ».

```
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

R11>
```

Copy Paste

On clique une fois sur PC11 puis on active l'onglet Desktop (Bureau) et sur Command Prompt (Invite de commande).

Ici, on veut ping :

-PC> ping 10.0.11.1 (R11 côté réseau 11)

-PC> ping 10.0.8.11 (R11 côté réseau 8)

```

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:\>

```

ici, on ping R11 du coté réseau 11.

```

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=5ms 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 = 5ms, Average = 1ms

C:\>

```

Puis, R11 coté réseau 8.

On tape ensuite la commande suivante : PC> ping 10.0.8.12 (R12 côté réseau 8)

```

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),

C:\>

```

On voit que l'on arrive pas à ping R12 coté réseau 8 car l'interface 10.0.8.12 appartient au routeur R12 et c'est R12 qui doit émettre l'écho en retour mais ce routeur ne dispose pas d'une route vers le réseau de PC11 car le réseau 10.0.11.0 ne lui est pas directement connecté.

2. Ajout d'une route statique sur R12.

On clique une fois sur le routeur R12 puis activez l'onglet CLI (Command Line Interface).

Puis on tape la commande suivante : R12> en

(Cette commande « en » est l'abrégé de « enable » et permet de passer en mode privilégié, prérequis pour passer ensuite en mode de configuration)

Ensuite la commande suivante : R12# conf t .

(La commande « conf t » est l'abrégé de configure terminal et permet de passer dans le mode de configuration.)

```
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#
%SYS-5-CONFIG_I: Configured from console by console

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

R12#
```

Puis on utilise la commande « sh run » :

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

La lettre S qui rappelle qu'il s'agit d'une route statique, autrement dit d'une route entrée par l'administrateur.

Puis on enregistre la configuration à l'aide de la commande « copy run start »

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

3. Ajout d'une route statique sur R11.

Sur Pc11, on ping a l'aide l'invite de commande « 10.0.8.12 »

```
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=4ms 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 = 4ms, Average = 1ms

C:\>
```

On voit ici le changement, cette fois le PC11 arrive a ping 10.0.8.12

Puis « ping 10.0.12.1 » (R12 côté réseau 12)

```
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),

C:\>
```

La commande échoue car le routeur R11 ne connaît pas le réseau 10.0.12.0/24 car sa table de routage ne comporte, pour l'instant, que les réseaux connectés directement. Il est donc nécessaire d'entrer une route statique sur R11.

Sur le Routeur R11 :

```
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)#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

R11#
```

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

4. A vous de jouer.

Dans un premier temps, on doit ajouter, les routes convenables sur les différents routeurs pour que PC22 soit joignable depuis PC21 puis, dans un deuxième temps, on assure la connectivité générale de chacun des quatre PC vers les trois autres

Etape 1 :

Pour R22 :

On met la route « 10.0.21.0 255.255.255.0 10.0.16.21 »

```

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

R22#copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
R22#

```

Pour R21 :

On met la route « 10.0.22.0 255.255.255.0 10.0.16.22 »

```

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

R21#copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
R21#

```

Puis on test si les deux machines peuvent communiquer :

Sur le PC22 :

```

C:\>ping 10.0.21.2

Pinging 10.0.21.2 with 32 bytes of data:

Request timed out.
Request timed out.
Reply from 10.0.21.2: bytes=32 time<1ms TTL=126
Reply from 10.0.21.2: bytes=32 time=1ms TTL=126

Ping statistics for 10.0.21.2:
    Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>

```

Sur le PC21 :

```
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=4ms 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 = 4ms, Average = 1ms

C:\>
```

On peut constater que les deux machines PC21 et PC22 peuvent communiquer entre elles.

Etape 2 :

ici, on configure R11 pour que PC11 puisse communiquer avec PC21 et PC22.

Pour commencer, nous allons ajouter des routes sur R11 pour qu'il puisse communiquer avec R8 :

```
R11>en
R11#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R11(config)#ip route 10.0.21.0 255.255.255.0 10.0.8.8
R11(config)#ip route 10.0.22.0 255.255.255.0 10.0.8.8
```

Ensuite, avec R8 :

```
R8>en
R8#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R8(config)#ip route 10.0.21.0 255.255.255.0 10.0.1.16
R8(config)#ip route 10.0.22.0 255.255.255.0 10.0.1.16
R8(config)#exit

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
```

Ensuite, avec R12 :

```
R12(config)#ip route 10.0.21.0 255.255.255.0 10.0.8.8
R12(config)#ip route 10.0.22.0 255.255.255.0 10.0.8.8
R12(config)#exit
```

Ensuite, avec R16 :

```
R16>en
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 10.0.11.0 255.255.255.0 10.0.1.8
R16(config)#ip route 10.0.12.0 255.255.255.0 10.0.1.8
```

Puis, avec R22 :

```
R22(config)#ip route 10.0.11.0 255.255.255.0 10.0.16.16
R22(config)#ip route 10.0.12.0 255.255.255.0 10.0.16.16
R22(config)#exit
```

Pour finir, R21 :

```
R21(config)#ip route 10.0.11.0 255.255.255.0 10.0.16.16
R21(config)#ip route 10.0.12.0 255.255.255.0 10.0.16.16
```

On regarde si les machines peuvent communiquer entre elles :

Pour PC11 :

```
C:\>ping 10.0.21.2
```

```
Pinging 10.0.21.2 with 32 bytes of data:
```

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

```
Ping statistics for 10.0.21.2:
```

```
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

```
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=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
```

```
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
```

```
C:\>
```

Ping sur PC21 depuis PC11

```
C:\>ping 10.0.22.2
```

```
Pinging 10.0.22.2 with 32 bytes of data:
```

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

```
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 = 2, Lost = 2 (50% loss),
```

```
Approximate round trip times in milli-seconds:
```

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

```
C:\>
```

Ping sur PC22 depuis PC11

```
Cisco Packet Tracer PC Command Line 1.0
```

```
C:\>ping 10.0.12.2
```

```
Pinging 10.0.12.2 with 32 bytes of data:
```

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

```
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 = 2, Lost = 2 (50% loss),
```

```
Approximate round trip times in milli-seconds:
```

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

```
C:\>|
```

Ping sur PC12 depuis PC11

Sur PC12 :

```
Cisco Packet Tracer PC Command Line 1.0
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=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 = 7ms, Average = 1ms

C:\>
```

➡ Ping sur PC11 depuis PC12

```
C:\>ping 10.0.21.2

Pinging 10.0.21.2 with 32 bytes of data:

Request timed out.
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 = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

➡ Ping sur PC21 depuis PC12

```
C:\>ping 10.0.22.2

Pinging 10.0.22.2 with 32 bytes of data:

Request timed out.
Request timed out.
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 = 2, Lost = 2 (50% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

➡ Ping sur PC22 depuis PC12

Sur PC21 :

```
Cisco Packet Tracer PC Command Line 1.0
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<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 = 0ms, Average = 0ms

C:\>
```

→ Ping sur PC11 depuis PC21

```
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 = 1ms, Average = 0ms

C:\>
```

→ Ping sur PC12 depuis PC21

```
C:\>ping 10.0.22.2

Pinging 10.0.22.2 with 32 bytes of data:

Request timed out.
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 = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

→ Ping sur PC22 depuis PC21

Sur PC22 :

```
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<1ms TTL=124  
Reply from 10.0.11.2: bytes=32 time=4ms 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 = 4ms, Average = 1ms
```

```
C:\>
```

→ Ping sur PC11 depuis PC22

```
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 = 1ms, Average = 0ms
```

```
C:\>
```

→ Ping sur PC12 depuis PC22

```
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=126  
Reply from 10.0.21.2: bytes=32 time<1ms TTL=126  
Reply from 10.0.21.2: bytes=32 time<1ms TTL=126  
Reply from 10.0.21.2: bytes=32 time=8ms TTL=126
```

```
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 = 8ms, Average = 2ms
```

→ Ping sur PC21 depuis PC22

Après de nombreux tests , on remarque tous les PC peuvent communiquer ensemble.