

Dersim Besiktas
TP8 : Routage et sous-réseaux

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1. Visualisation des tables de routage

Depuis le routeur R11 je me mets en mode privilégié avec la commande **en** puis j'exécute la commande **sh ip interface brief** pour vérifier la table de routage

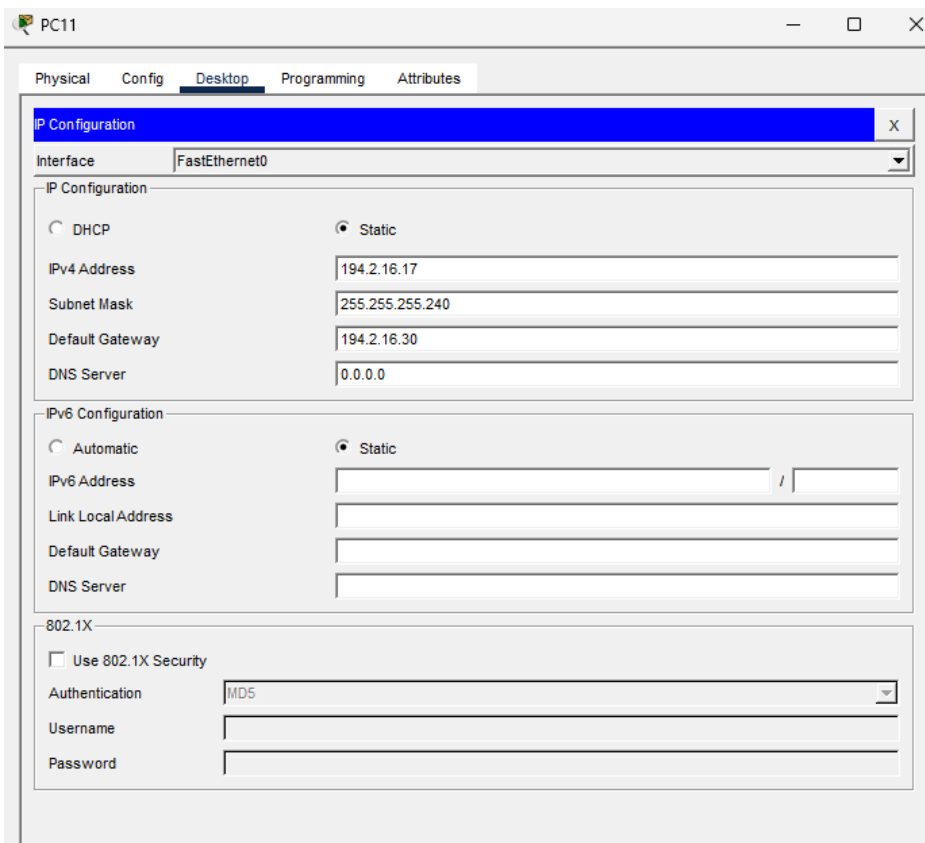
```

R11>en
R11#sh ip interface brief
Interface          IP-Address      OK? Method Status      Protocol
FastEthernet0/0    194.2.16.33     YES manual up          up
FastEthernet0/1    194.2.16.30     YES manual up          up
Vlan1              unassigned      YES unset  administratively down down
R11#

```

Copy Paste

Je vérifie également pour le PC11 Desktop dans l'onglet **Desktop**



Je vérifie la table de routage du routeur R1 en me mettant en mode privilégié avec la commande **en** et à l'aide de la commande **sh ip route**

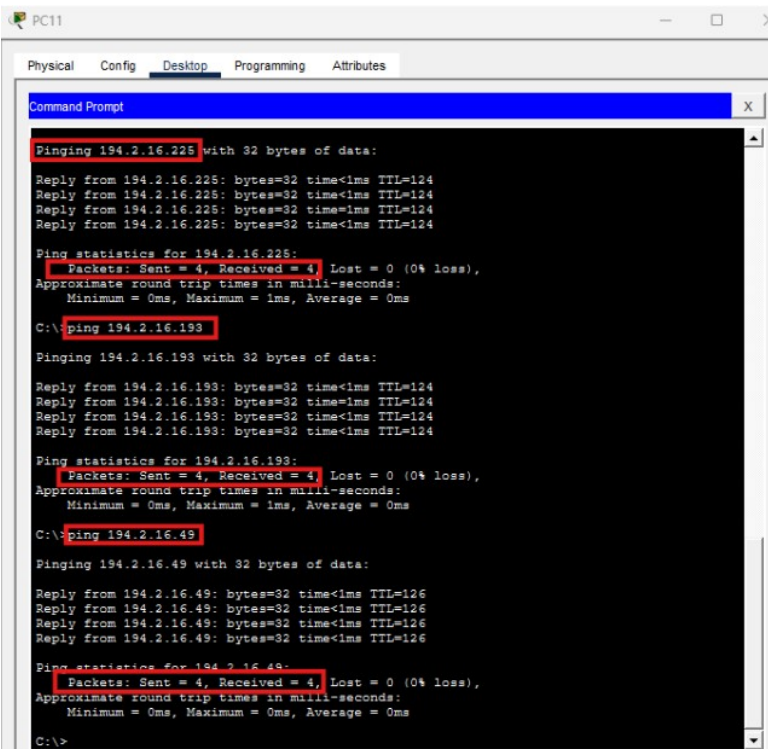
```
R1>en
R1#sh ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - 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

    194.2.16.0/28 is subnetted, 10 subnets
D       194.2.16.16 [90/2174976] via 194.2.16.97, 00:23:16, Serial0/0/0
D       194.2.16.32 [90/2172416] via 194.2.16.97, 00:23:40, Serial0/0/0
D       194.2.16.48 [90/2174976] via 194.2.16.97, 00:23:16, Serial0/0/0
C       194.2.16.96 is directly connected, Serial0/0/0
D       194.2.16.112 [90/2172416] via 194.2.16.146, 00:23:43, Serial0/0/1
        [90/2172416] via 194.2.16.97, 00:23:40, Serial0/0/0
D       194.2.16.128 [90/2681856] via 194.2.16.146, 00:23:42, Serial0/0/1
        [90/2681856] via 194.2.16.97, 00:23:40, Serial0/0/0
C       194.2.16.144 is directly connected, Serial0/0/1
D       194.2.16.192 [90/2174976] via 194.2.16.146, 00:23:17, Serial0/0/1
D       194.2.16.208 [90/2172416] via 194.2.16.146, 00:23:43, Serial0/0/1
D       194.2.16.224 [90/2174976] via 194.2.16.146, 00:23:17, Serial0/0/1

R1#
```

Je vérifie la connectivité de chacun des 4 PC à l'aide de la commande **ping**
PC 11 arrive à joindre les 3 PC correctement



```
PC11
Physical Config Desktop Programming Attributes
Command Prompt
Pinging 194.2.16.225 with 32 bytes of data:
Reply from 194.2.16.225: bytes=32 time<1ms TTL=124
Reply from 194.2.16.225: bytes=32 time<1ms TTL=124
Reply from 194.2.16.225: bytes=32 time<1ms TTL=124
Reply from 194.2.16.225: bytes=32 time<1ms TTL=124
Ping statistics for 194.2.16.225:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>ping 194.2.16.193
Pinging 194.2.16.193 with 32 bytes of data:
Reply from 194.2.16.193: bytes=32 time<1ms TTL=124
Reply from 194.2.16.193: bytes=32 time<1ms TTL=124
Reply from 194.2.16.193: bytes=32 time<1ms TTL=124
Reply from 194.2.16.193: bytes=32 time<1ms TTL=124
Ping statistics for 194.2.16.193:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>ping 194.2.16.49
Pinging 194.2.16.49 with 32 bytes of data:
Reply from 194.2.16.49: bytes=32 time<1ms TTL=126
Reply from 194.2.16.49: bytes=32 time<1ms TTL=126
Reply from 194.2.16.49: bytes=32 time<1ms TTL=126
Reply from 194.2.16.49: bytes=32 time<1ms TTL=126
Ping statistics for 194.2.16.49:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>
```

2. Ajout du routeur R0 et de l'ordinateur PC0

J'ajoute le routeur 1841 et je lui ajoute le **module WIC-2T**

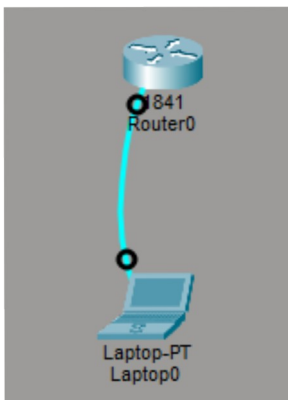
J'éteins d'abord le routeur



Puis j'ajoute le module et j'allume le routeur



J'ajoute ensuite un PC Laptop puis je vais sur l'émulateur de terminal pour pouvoir configurer



2.3. Configuration de base du routeur : utilisation du mode « setup »

```
Terminal X
Would you like to enter the initial configuration dialog? [yes/no]: yes
At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '['.

Basic management setup configures only enough connectivity
for management of the system, extended setup will ask you
to configure each interface on the system

Would you like to enter basic management setup? [yes/no]: yes
Configuring global parameters:

Enter host name [Router]: R0

The enable secret is a password used to protect access to
privileged EXEC and configuration modes. This password, after
entered, becomes encrypted in the configuration.
Enter enable secret: mdp1

The enable password is used when you do not specify an
enable secret password, with some older software versions, and
some boot images
Enter enable password: mdp2

The virtual terminal password is used to protect
access to the router over a network interface.
Enter virtual terminal password: mdp3
Configure SNMP Network Management? (no):no

Current interface summary

Interface      IP-Address      OK? Method Status          Protocol
FastEthernet0/0 unassigned      YES manual administratively down down
FastEthernet0/1 unassigned      YES manual administratively down down
Vlan1          unassigned      YES manual administratively down down
```

```
Configuring interface FastEthernet0/0:
Configure IP on this interface? (yes): yes
IP address for this interface: 192.168.2.1
Subnet mask for this interface [255.255.255.0] :

The following configuration command script was created:

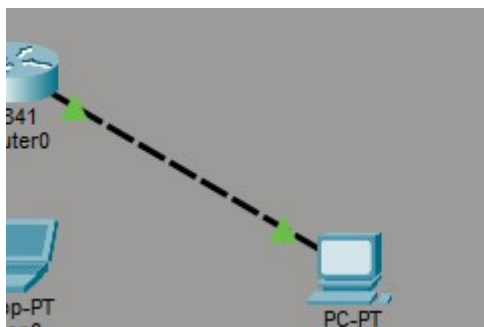
!
hostname R0
enable secret 5 $1$mERr$QnY/64E5ClF2j8H8iL28G0
enable password mdp2
line vty 0 4
password mdp3
!
interface Vlan1
shutdown
no ip address
!
interface FastEthernet0/0
no shutdown
ip address 192.168.2.1 255.255.255.0
!
interface FastEthernet0/1
shutdown
no ip address
!
end

[0] Go to the IOS command prompt without saving this config.
[1] Return back to the setup without saving this config.
[2] Save this configuration to nvram and exit.

Enter your selection [2]: 2
Building configuration...
[OK]
```

2.4. Configuration de l'ordinateur et connexion au routeur

Je connecte l'ordinateur au routeur avec un câble croisé



2.5. Observez le fonctionnement ARP et vérifiez la connectivité entre PC0 et R0

Depuis l'invite commande sur PC0 j'entre la commande **arp -a** puis j'entre la commande **show arp** sur le routeur **R0** depuis l'émulateur de terminal portable

```
Cisco Packet Tracer PC Command Line 1.0
C:\>arp -a
No ARP Entries Found
C:\>
```

```
R0:show arp
Protocol Address Age (min) Hardware Addr Type Interface
Internet 192.168.2.1 - 0060.2FE8.4901 ARPA FastEthernet0/0
R0>
```

Depuis le PC0 je **ping 192.168.2.1**

```
C:\>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

Reply from 192.168.2.1: bytes=32 time<1ms TTL=255
Reply from 192.168.2.1: bytes=32 time<1ms TTL=255
Reply from 192.168.2.1: bytes=32 time<1ms TTL=255
Reply from 192.168.2.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Depuis le PC 0 j'exécute la commande **sh arp**

```
C:\>arp -a
Internet Address Physical Address Type
192.168.2.1 0060.2fe8.4901 dynamic
```

Depuis le PC 0 j'exécute la commande **sh arp** pour voir si l'adresse ip de PC0 est bien dans la table de routage du routeur R0

```
R0 #sh arp
Protocol Address Age (min) Hardware Addr Type Interface
Internet 192.168.2.1 - 0060.2FE8.4901 ARPA FastEthernet0/0
Internet 192.168.2.2 0 0001.C767.816B ARPA FastEthernet0/0
```

Je supprime le laptop ainsi que le câble console

2.7. Connexion du routeur R0 au routeur R1

```
R1 #sh ip interface brief
Interface IP-Address OK? Method Status Protocol
FastEthernet0/0 unassigned YES unset administratively down down
FastEthernet0/1 unassigned YES unset administratively down down
Serial0/0/0 194.2.16.98 YES manual up up
Serial0/0/1 194.2.16.145 YES manual up up
Serial0/1/0 192.168.1.1 YES manual down down
Serial0/1/1 unassigned YES unset administratively down down
```

Depuis le routeur R1 je visualise les interfaces de série à l'aide de la commande **sh ip interface brief**

2.8. Configuration de l'interface série du routeur R0

```
R0(config-if) #ip address 192.168.1.2 255.255.255.0
R0(config-if)#
```

Depuis le routeur **R0** je me mets en mode **privilegié** et j'exécute la commande **conf t** pour pouvoir configurer le router et ensuite j'entre la commande **ip address 192.168.1.2 255.255.255 .0**

A l'aide de la commande **clock rate 6400** je configure la synchronisation

```
R0(config-if) #clock rate 64000
R0(config-if)#
```

J'active le mode interface à l'aide de la commande **no shutdown** et ensuite pour quitter le mode de configuration j'appuie sur les touches **CTRL + Z** et pour finir j'enregistre la configuration avec la commande **copy run start**

Puis je vérifie la configuration IP avec la commande **show ip interface brief**

3. Ajout de routes

```
R0#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

C     192.168.1.0/24 is directly connected, Serial0/0/0
C     192.168.2.0/24 is directly connected, FastEthernet0/0
```

Depuis le routeur R0 j'entre la commande **sh ip route** pour voir la table de routage

Je fais la même chose pour le routeur R1

```
R1#en
R1#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

C    192.168.1.0/24 is directly connected, Serial10/1/0
S    192.168.2.0/24 [1/0] via 192.168.1.2
     194.2.16.0/28 is subnetted, 10 subnets
D       194.2.16.16 [90/2174976] via 194.2.16.97, 00:27:11, Serial10/0/0
D       194.2.16.32 [90/2172416] via 194.2.16.97, 00:27:35, Serial10/0/0
D       194.2.16.48 [90/2174976] via 194.2.16.97, 00:27:11, Serial10/0/0
C       194.2.16.96 is directly connected, Serial10/0/0
D       194.2.16.112 [90/2172416] via 194.2.16.146, 00:27:36, Serial10/0/1
        [90/2172416] via 194.2.16.97, 00:27:35, Serial10/0/0
D       194.2.16.128 [90/2681856] via 194.2.16.146, 00:27:36, Serial10/0/1
        [90/2681856] via 194.2.16.97, 00:27:35, Serial10/0/0
C       194.2.16.144 is directly connected, Serial10/0/1
```

Il y a 3 possibilités :

- définir une route par défaut
- définir manuellement toutes les routes d'accès
- définir une route agrégée

Sur le routeur R1 j'ajoute la route manquante

```
Gateway of last resort is not set

C    192.168.1.0/24 is directly connected, Serial10/1/0
S    192.168.2.0/24 [1/0] via 192.168.1.2
     194.2.16.0/28 is subnetted, 10 subnets
D       194.2.16.16 [90/2174976] via 194.2.16.97, 00:50:17, Serial10/0/0
D       194.2.16.32 [90/2172416] via 194.2.16.97, 00:50:41, Serial10/0/0
D       194.2.16.48 [90/2174976] via 194.2.16.97, 00:50:17, Serial10/0/0
C       194.2.16.96 is directly connected, Serial10/0/0
D       194.2.16.112 [90/2172416] via 194.2.16.146, 00:50:42, Serial10/0/1
        [90/2172416] via 194.2.16.97, 00:50:41, Serial10/0/0
D       194.2.16.128 [90/2681856] via 194.2.16.146, 00:50:42, Serial10/0/1
        [90/2681856] via 194.2.16.97, 00:50:41, Serial10/0/0
C       194.2.16.144 is directly connected, Serial10/0/1
```

Je le fais également pour le routeur R0

Router ID route

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, E
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter s
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external typ
E1 - OSPF external type 1, E2 - OSPF external type 2, E - E
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is 192.168.1.1 to network 0.0.0.0

```
C 192.168.1.0/24 is directly connected, Serial0/0/0
C 192.168.2.0/24 is directly connected, FastEthernet0/0
S* 0.0.0.0/0 [1/0] via 192.168.1.1
```

Depuis PC 0 je ping toutes les autres machines à l'aide de la commande **ping**

```
C:\>ping 194.2.16.16
Pinging 194.2.16.16 with 32 bytes of data:

Reply from 194.2.16.33: bytes=32 time=18ms TTL=252
Reply from 194.2.16.33: bytes=32 time=2ms TTL=252
Reply from 194.2.16.33: bytes=32 time=3ms TTL=252
Reply from 194.2.16.33: bytes=32 time=17ms TTL=252

Ping statistics for 194.2.16.16:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 18ms, Average = 10ms

C:\>ping 194.2.16.48
Pinging 194.2.16.48 with 32 bytes of data:

Reply from 194.2.16.34: bytes=32 time=21ms TTL=252
Reply from 194.2.16.34: bytes=32 time=3ms TTL=252
Reply from 194.2.16.34: bytes=32 time=2ms TTL=252
Reply from 194.2.16.34: bytes=32 time=2ms TTL=252

Ping statistics for 194.2.16.48:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 21ms, Average = 7ms

C:\>ping 194.2.16.192
Pinging 194.2.16.192 with 32 bytes of data:

Reply from 194.2.16.209: bytes=32 time=2ms TTL=252
Reply from 194.2.16.209: bytes=32 time=27ms TTL=252
Reply from 194.2.16.209: bytes=32 time=18ms TTL=252
Reply from 194.2.16.209: bytes=32 time=2ms TTL=252

Ping statistics for 194.2.16.192:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 27ms, Average = 12ms

C:\>ping 194.2.16.224
Pinging 194.2.16.224 with 32 bytes of data:

Reply from 194.2.16.210: bytes=32 time=19ms TTL=252
Reply from 194.2.16.210: bytes=32 time=9ms TTL=252
Reply from 194.2.16.210: bytes=32 time=20ms TTL=252
Reply from 194.2.16.210: bytes=32 time=3ms TTL=252

Ping statistics for 194.2.16.224:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 3ms, Maximum = 20ms, Average = 12ms
```