

DHCP

ATELIER 1

SPINELLI Dylan
BTS SIO SISR | PARIS YNOV CAMPUS

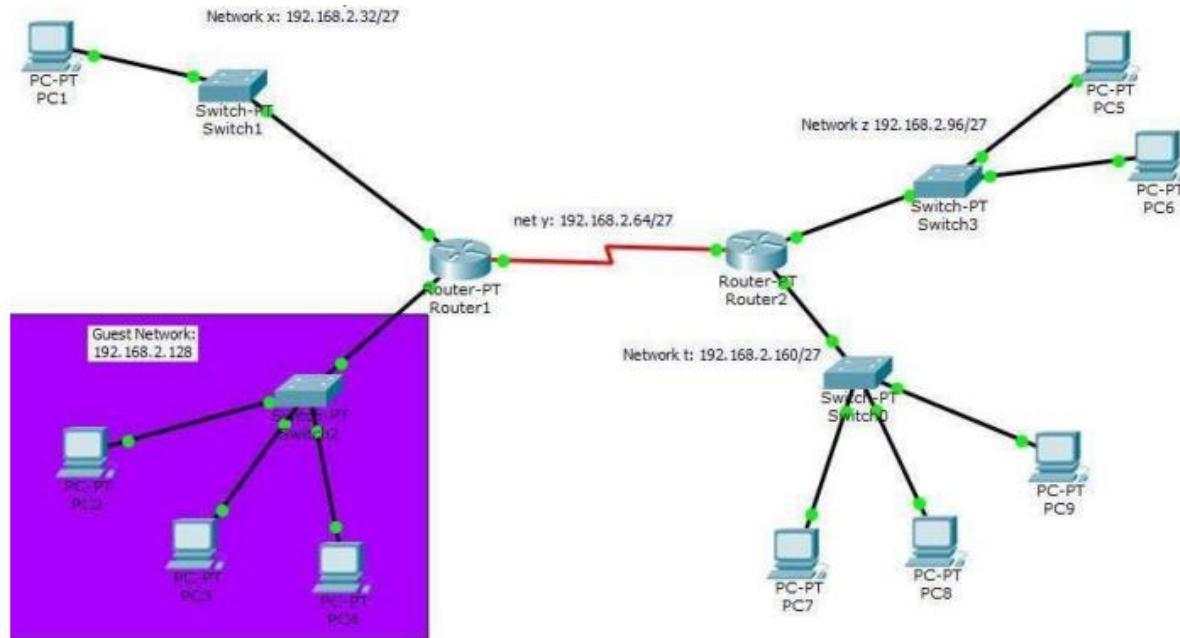
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1-Introduction

L'objectif de cet atelier est d'apprendre à configurer un serveur DHCP afin de distribuer automatiquement des adresses IP aux périphériques

Nous allons tout d'abord réaliser la maquette suivante sur Cisco Packet Tracer :



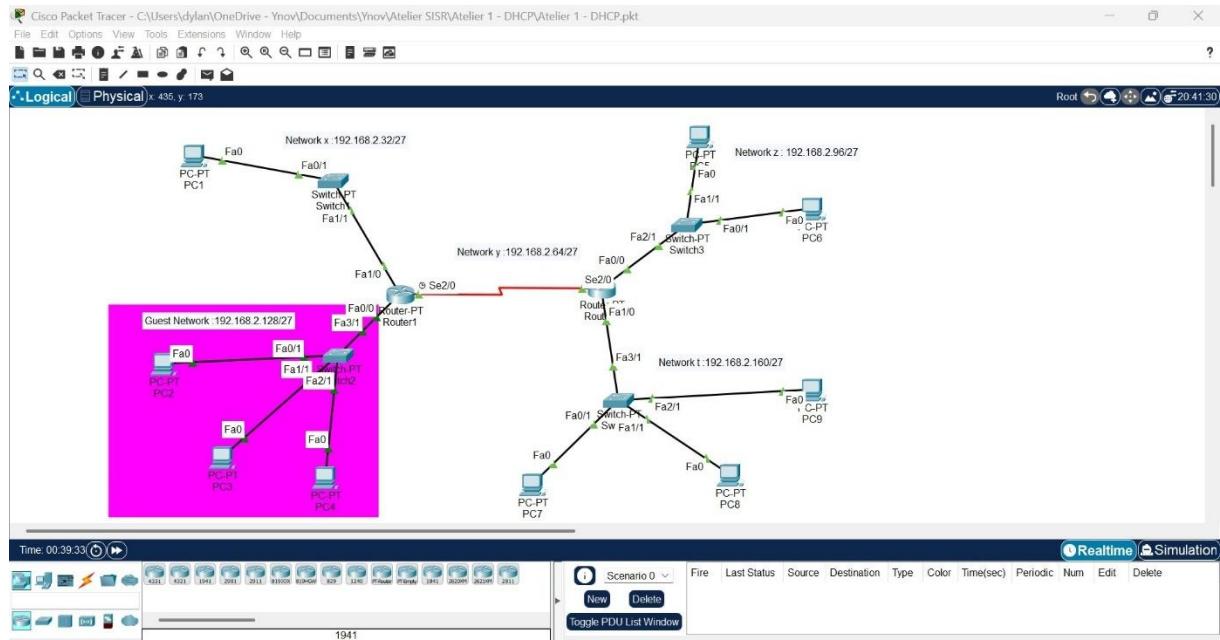
Nous ferons ensuite la configuration des différents équipements notamment l'attribution des adresses IP ainsi que les tables de routage.

Dans un second temps, nous intégrerons un serveur DHCP au réseau. Il faudra ensuite configurer ce serveur DHCP afin d'automatiser l'attribution des adresses IP.

Nous terminerons par une phase de tests afin de valider notre infrastructure.

2-Réalisation de la maquette dans Cisco Packet Tracer

Voici la maquette réalisée dans Cisco Packet Tracer :



Notre infrastructure est composée de 5 réseaux reliés entre eux par 2 routeurs.

La première adresse réseau pour chaque sous-réseau a été attribuée au routeur.

Si plusieurs routeurs sont connectés sur un sous-réseau, le routeur ayant l'identifiant le plus bas se voit attribuer la première adresse disponible.

Chaque fois qu'une adresse doit être attribuée, la première adresse disponible est utilisée

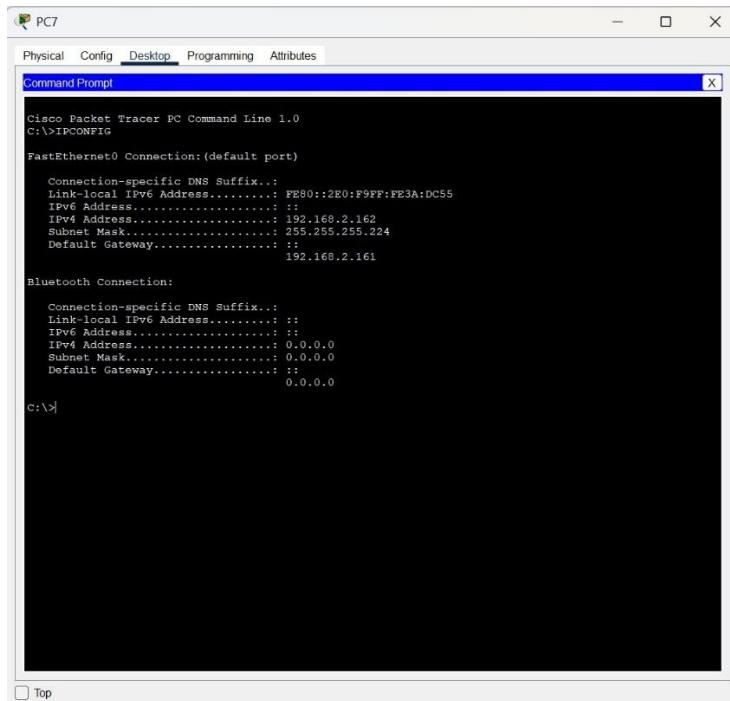
3-Configuration statique

Pour cette infrastructure, nous allons configurer un Sous-réseau FLSM /27

Voici le Masque de sous-réseau correspondant : 255.255.255.244

On configure les équipements en réservant la première adresse de chaque sous-réseau pour le routeur

Configuration du PC7 :



The screenshot shows a window titled "PC7" with a tab bar containing "Physical", "Config", "Desktop", "Programming", and "Attributes". The "Config" tab is selected. A sub-tab "Command Prompt" is open, displaying the output of the "IPCONFIG" command. The output shows the configuration for two network interfaces: "FastEthernet0 Connection:(default port)" and "Bluetooth Connection". For the FastEthernet interface, the IPv4 Address is 192.168.2.162, Subnet Mask is 255.255.255.224, and Default Gateway is 192.168.2.161. The Bluetooth connection has an IPv4 Address of 0.0.0.0 and a Subnet Mask of 0.0.0.0.

```
Cisco Packet Tracer PC Command Line 1.0
C:>IPCONFIG

FastEthernet0 Connection:(default port)
Connection-specific DNS Suffix...:
Link-local IPv6 Address.....: FE80::2E0:F9FF:FE3A:DC55
IPv6 Address.....: :::
IPv4 Address.....: 192.168.2.162
Subnet Mask.....: 255.255.255.224
Default Gateway.....: :::
                           192.168.2.161

Bluetooth Connection:
Connection-specific DNS Suffix...:
Link-local IPv6 Address.....: :::
IPv6 Address.....: :::
IPv4 Address.....: 0.0.0.0
Subnet Mask.....: 0.0.0.0
Default Gateway.....: :::
                           0.0.0.0

C:>|
```

Configuration du PC8 :

```
C:\>IPCONFIG

Cisco Packet Tracer PC Command Line 1.0

FastEthernet0 Connection:(default port)

Connection-specific DNS Suffix..:
Link-local IPv6 Address.....: FE80::20A:F3FF:FE66:699E
IPv6 Address.....: ::
IPv4 Address.....: 192.168.2.163
Subnet Mask.....: 255.255.255.224
Default Gateway.....: ::
                           192.168.2.161

Bluetooth Connection:

Connection-specific DNS Suffix..:
Link-local IPv6 Address.....: ::
IPv6 Address.....: ::
IPv4 Address.....: 0.0.0.0
Subnet Mask.....: 0.0.0.0
Default Gateway.....: ::
                           0.0.0.0

C:\>
```

Configuration du PC9 :

```
C:\>IPCONFIG

Cisco Packet Tracer PC Command Line 1.0

FastEthernet0 Connection:(default port)

Connection-specific DNS Suffix..:
Link-local IPv6 Address.....: FE80::20B:BEFF:FE58:2BEE
IPv6 Address.....: ::
IPv4 Address.....: 192.168.2.164
Subnet Mask.....: 255.255.255.224
Default Gateway.....: ::
                           192.168.2.161

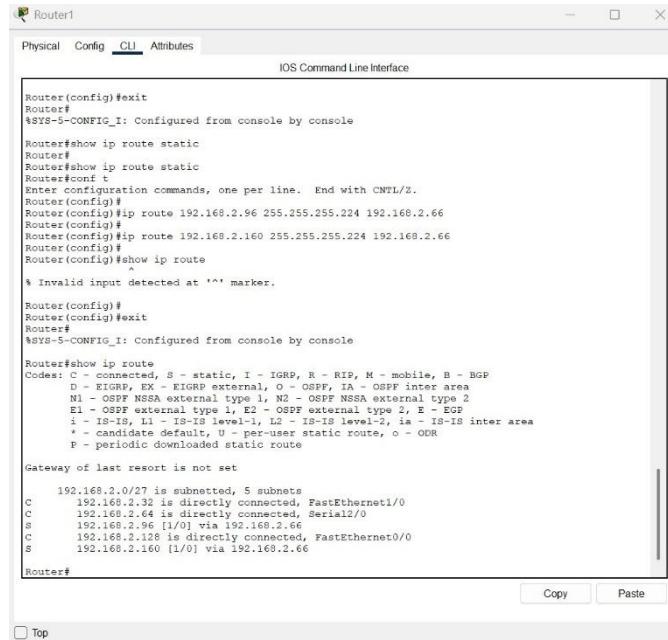
Bluetooth Connection:

Connection-specific DNS Suffix..:
Link-local IPv6 Address.....: ::
IPv6 Address.....: ::
IPv4 Address.....: 0.0.0.0
Subnet Mask.....: 0.0.0.0
Default Gateway.....: ::
                           0.0.0.0

C:\>
```

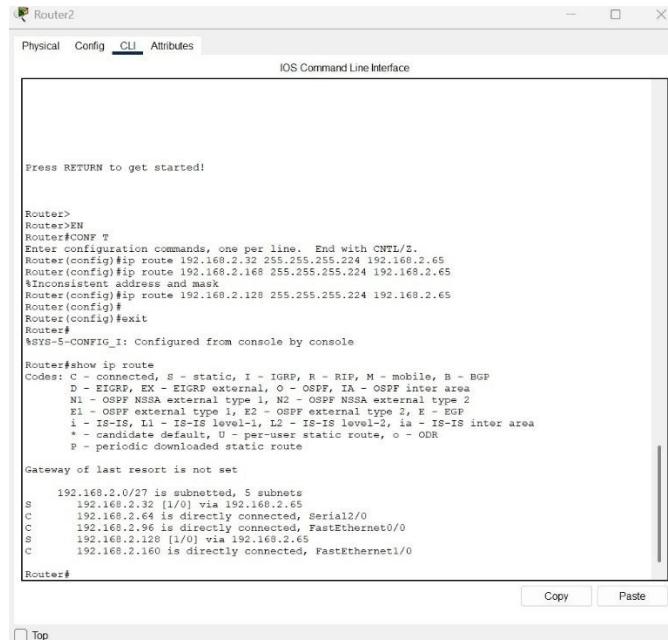
Nous allons ensuite configurer les tables de routages statiques :

Routeur 1 :



```
Router#exit
Router#SYS-5-CONFIG_I: Configured from console by console
Router#show ip route static
Router#show ip route static
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router#ip route 192.168.2.96 255.255.255.224 192.168.2.66
Router#ip route 192.168.2.160 255.255.255.224 192.168.2.66
Router#show ip route
% Invalid input detected at '^' marker.
Router#show ip route
Router#exit
Router#SYS-5-CONFIG_I: Configured from console by console
Router#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
  192.168.2.0/27 is subnetted, 5 subnets
C    192.168.2.32 is directly connected, FastEthernet1/0
C    192.168.2.64 is directly connected, Serial2/0
S    192.168.2.96 [1/0] via 192.168.2.66
C    192.168.2.128 is directly connected, FastEthernet0/0
S    192.168.2.160 [1/0] via 192.168.2.66
Router#
```

Routeur 2 :



```
Press RETURN to get started!
Router>
Router>EN
Router#CONF T
Enter configuration commands, one per line. End with CNTL/Z.
Router#ip route 192.168.2.32 255.255.255.224 192.168.2.65
Router#ip route 192.168.2.168 255.255.255.224 192.168.2.65
%Incomplete address and mask
Router#ip route 192.168.2.128 255.255.255.224 192.168.2.65
Router#exit
Router#SYS-5-CONFIG_I: Configured from console by console
Router#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
  192.168.2.0/27 is subnetted, 5 subnets
S    192.168.2.32 [1/0] via 192.168.2.65
C    192.168.2.64 is directly connected, Serial2/0
C    192.168.2.96 is directly connected, FastEthernet0/0
S    192.168.2.128 [1/0] via 192.168.2.65
C    192.168.2.160 is directly connected, FastEthernet1/0
Router#
```

Effectuons quelques tests de notre configuration

Test Ping de PC1 depuis PC8 :

The screenshot shows two windows from Cisco Packet Tracer:

PC1 IP Configuration Window:

Category	Setting	Value
IP4 Configuration	IP4 Address	192.168.2.34
IP4 Configuration	Subnet Mask	255.255.255.224
IP4 Configuration	Default Gateway	192.168.2.33
IP4 Configuration	DNS Server	0.0.0.0
IPv6 Configuration	IPv6 Address	FE80::209:7CFF:FE18:3DE1
802.1X	Authentication	MD5

PC8 Command Prompt Window:

```
C:\>IPCONFIG
FastEthernet0 Connection:(default port)
  Connection-specific DNS Suffix...: 
  Link-local IPv6 Address....: FE80::20A:F3FF:FE66:689E
  IPv6 Address.....: ::1
  IPv4 Address.....: 192.168.2.163
  Subnet Mask.....: 255.255.255.224
  Default Gateway.....: ::1
  192.168.2.161

Bluetooth Connection:
  Connection-specific DNS Suffix...: 
  Link-local IPv6 Address....: ::1
  IPv6 Address.....: ::1
  IPv4 Address.....: 0.0.0.0
  Subnet Mask.....: 0.0.0.0
  Default Gateway.....: ::1
  0.0.0.0

C:\>clear
Invalid Command.

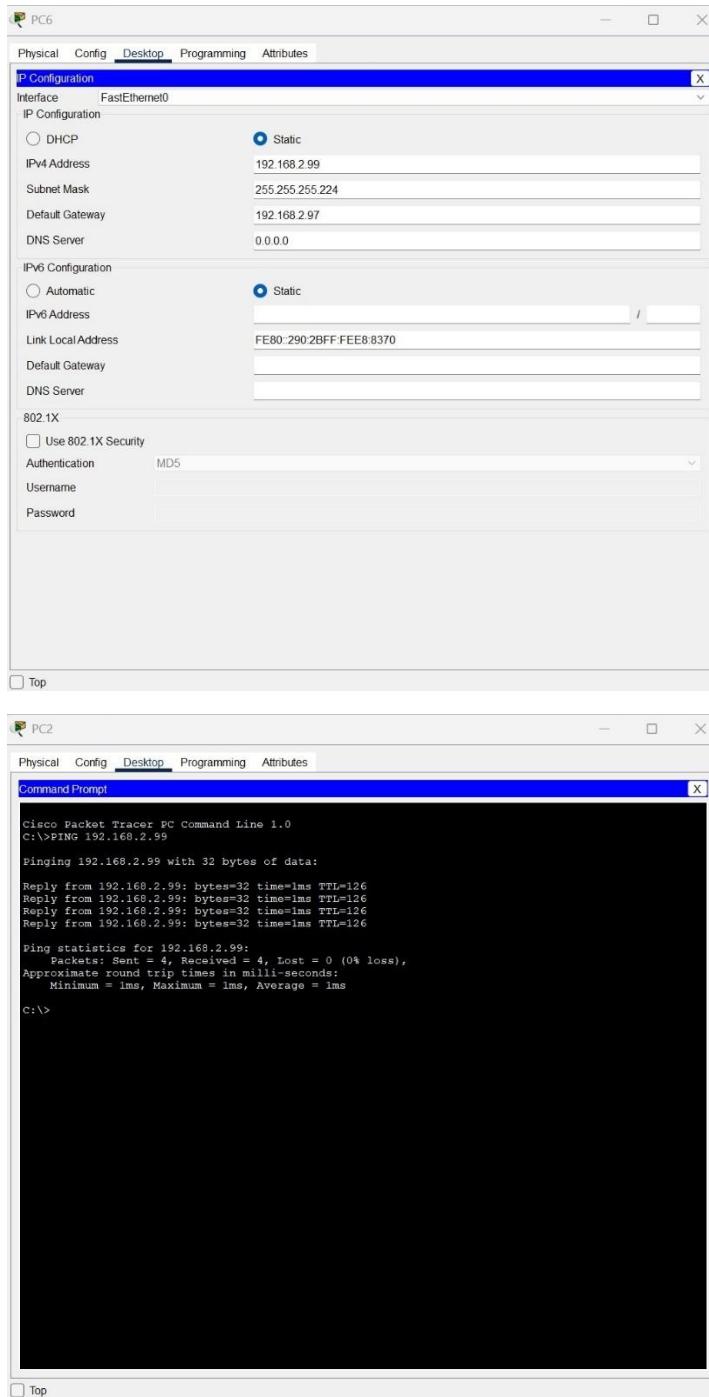
C:\>ping 192.168.2.34

Pinging 192.168.2.34 with 32 bytes of data:
Reply from 192.168.2.34: bytes=32 time=1ms TTL=126
Reply from 192.168.2.34: bytes=32 time=1ms TTL=126
Reply from 192.168.2.34: bytes=32 time=34ms TTL=126
Reply from 192.168.2.34: bytes=32 time=6ms TTL=126

Ping statistics for 192.168.2.34:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 34ms, Average = 10ms

C:\>
```

Test Ping de PC6 depuis PC2 :



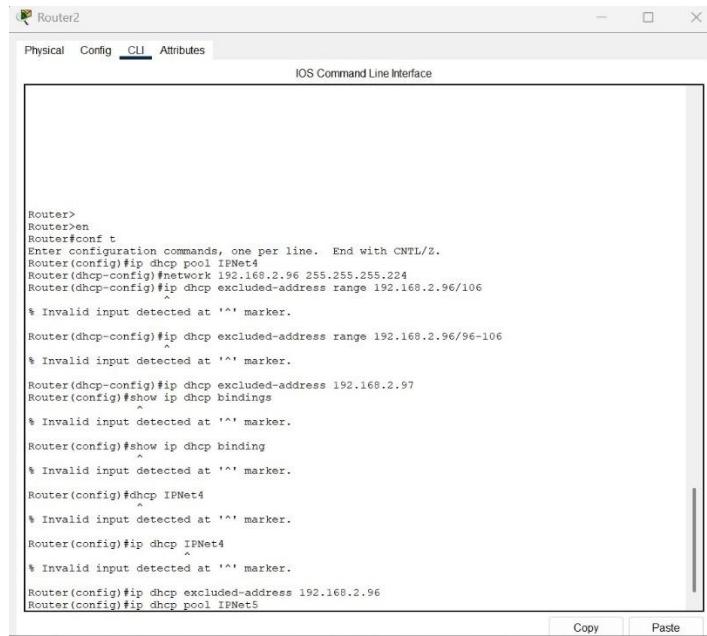
Les PC peuvent bien communiquer entre eux. Les routes ont bien été configurées

4-Configuration DHCP sur un routeur

Nous allons désormais configurer le DHCP sur le router 2

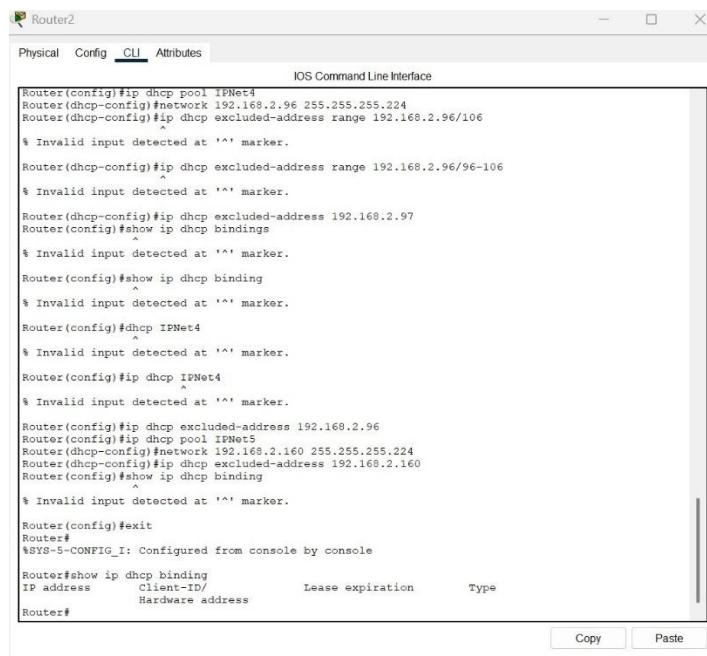
On configure deux pools d'adresses DHCP pour 2 réseaux :

IPNet4 : 192.168.2.96/27



```
Router>
Router#en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip dhcp pool IPNet4
Router(dhcp-config)#network 192.168.2.96 255.255.255.224
Router(dhcp-config)#ip dhcp excluded-address range 192.168.2.96/106
% Invalid input detected at '^' marker.
Router(dhcp-config)#ip dhcp excluded-address range 192.168.2.96/96-106
% Invalid input detected at '^' marker.
Router(dhcp-config)#ip dhcp excluded-address 192.168.2.97
Router(config)#show ip dhcp bindings
% Invalid input detected at '^' marker.
Router(config)#show ip dhcp binding
% Invalid input detected at '^' marker.
Router(config)#dhcp IPNet4
% Invalid input detected at '^' marker.
Router(config)#ip dhcp IPNet4
% Invalid input detected at '^' marker.
Router(config)#ip dhcp excluded-address 192.168.2.96
Router(config)#ip dhcp pool IPNet5
Router(dhcp-config)#network 192.168.2.160 255.255.255.224
Router(dhcp-config)#ip dhcp excluded-address 192.168.2.160
Router(config)#show ip dhcp binding
Copy Paste
```

IPNet5 : 192.168.2.160/27



```
Router(config)#ip dhcp pool IPNet4
Router(dhcp-config)#network 192.168.2.96 255.255.255.224
Router(dhcp-config)#ip dhcp excluded-address range 192.168.2.96/106
% Invalid input detected at '^' marker.
Router(dhcp-config)#ip dhcp excluded-address range 192.168.2.96/96-106
% Invalid input detected at '^' marker.
Router(dhcp-config)#ip dhcp excluded-address 192.168.2.97
Router(config)#show ip dhcp bindings
% Invalid input detected at '^' marker.
Router(config)#show ip dhcp binding
% Invalid input detected at '^' marker.
Router(config)#dhcp IPNet4
% Invalid input detected at '^' marker.
Router(config)#ip dhcp IPNet4
% Invalid input detected at '^' marker.
Router(config)#ip dhcp excluded-address 192.168.2.96
Router(config)#ip dhcp pool IPNet5
Router(dhcp-config)#network 192.168.2.160 255.255.255.224
Router(dhcp-config)#ip dhcp excluded-address 192.168.2.160
Router(config)#show ip dhcp binding
% Invalid input detected at '^' marker.
Router(config)#exit
Router#
#SYS-5-CONFIG_I: Configured from console by console
Router#show ip dhcp binding
IP address Client-ID/ Lease expiration Type
Hardware address
Router#
```

On décide d'exclure les 10 premières adresses du Pool d'adresses disponibles dans chaque DHCP

Router2

Physical Config **CLI** Attributes

IOS Command Line Interface

```

ip dhcp excluded-address 192.168.2.97
ip dhcp excluded-address 192.168.2.160
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#no ip excluded-address 192.168.2.97
^
% Invalid input detected at '^' marker.

Router(config)#no ip dhcp excluded-address 192.168.2.97
Router(config)#
Router(config)#exit
Router#
$SYS-5-CONFIG_I: Configured from console by console
show running-config | include excluded-address
ip dhcp excluded-address 192.168.2.160
Router#show running-config | include excluded-address
ip dhcp excluded-address 192.168.2.160
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#no ip dhcp excluded-address 192.168.2.160
Router(config)#
Router(config)%DHCPD-4-PING_CONFLICT: DHCP address conflict: server pinged 192.168.2.99.

Router(config)#
Router(config)#ip dhcp pool IPNet4
Router(dhcp-config)#
Router(dhcp-config)#default-router 192.168.2.97
Router(dhcp-config)#
Router(dhcp-config)%DHCPD-4-PING_CONFLICT: DHCP address conflict: server pinged 192.168.2.99.

Router(dhcp-config)#
Router(dhcp-config)#
Router(dhcp-config)#ip dhcp excluded-address 192.168.
% Unrecognized command
Router(dhcp-config)#ip dhcp excluded-address 192.16.2.98 192.168.2.108
Router(config)#
Router(config)#ip dhcp pool IPNet5
Router(dhcp-config)#
Router(dhcp-config)#ip dhcp excluded-address 192.16.2.162 192.168.2.172
Router(config)#
Router(config)#

```

Top

Router2

Physical Config **CLI** Attributes

IOS Command Line Interface

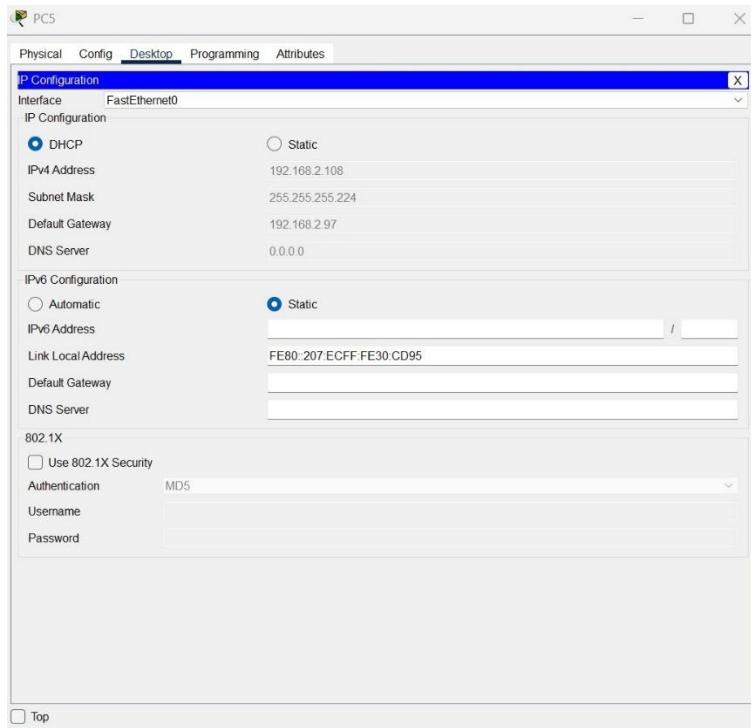
```

Router#
Router#sh run
Building configuration...

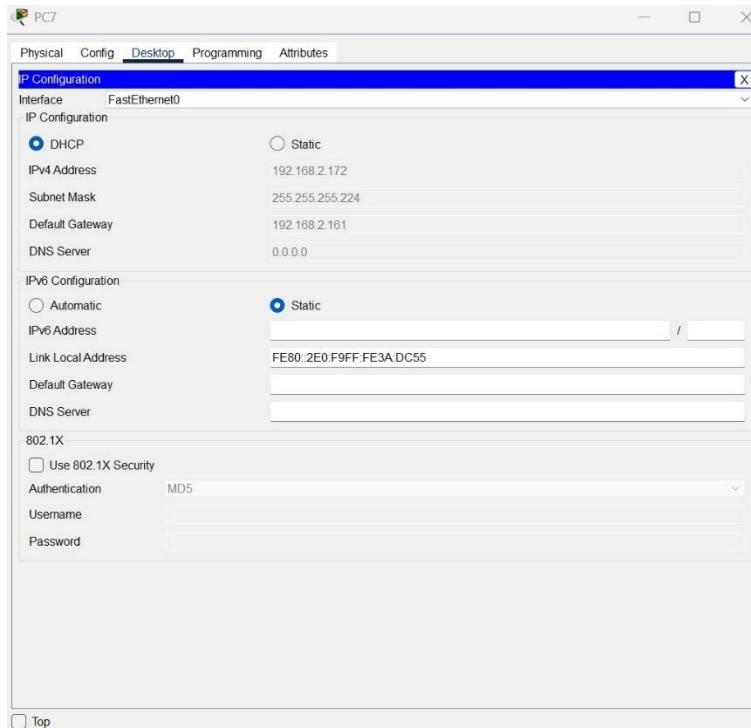
Current configuration : 1072 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router
!
!
!
ip dhcp excluded-address 192.168.2.97 192.168.2.107
ip dhcp excluded-address 192.168.2.161 192.168.2.171
!
ip dhcp pool IPNet4
  network 192.168.2.96 255.255.255.224
ip dhcp pool IPNet5
  network 192.168.2.160 255.255.255.224
!
!
ip cef
no ipv6 cef
!
!
```

On modifie l'attribution d'adresse IP du PC5 et PC7. Elle sera désormais attribuée automatiquement par le DHCP

Nouvelle adresse DHCP sur le PC5 :

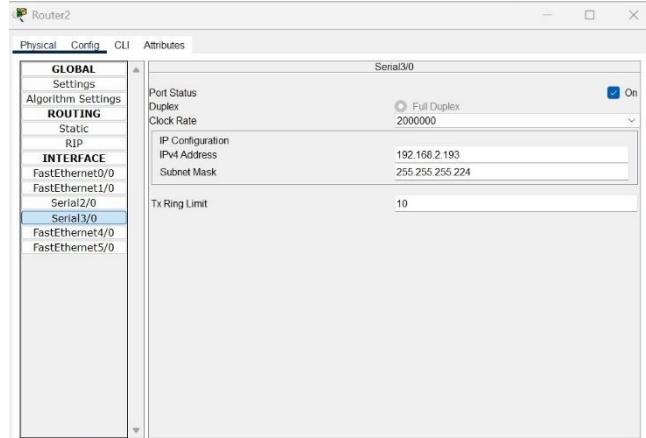


Nouvelle IP du PC7 :



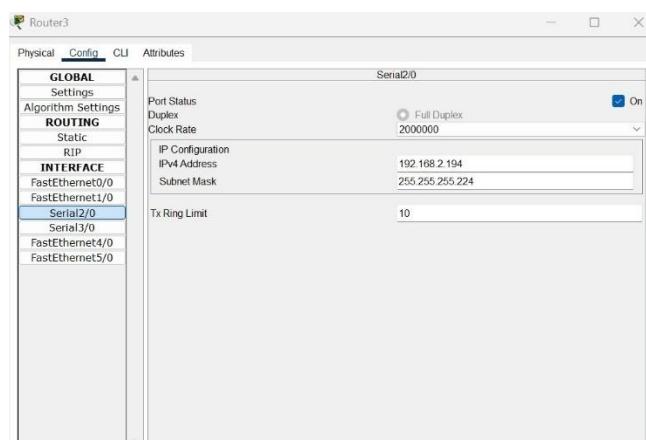
5-Configuration réseau avec serveur DHCP

On rajoute un nouveau routeur et on configure un nouveau réseau 192.168.2.192 :



Top

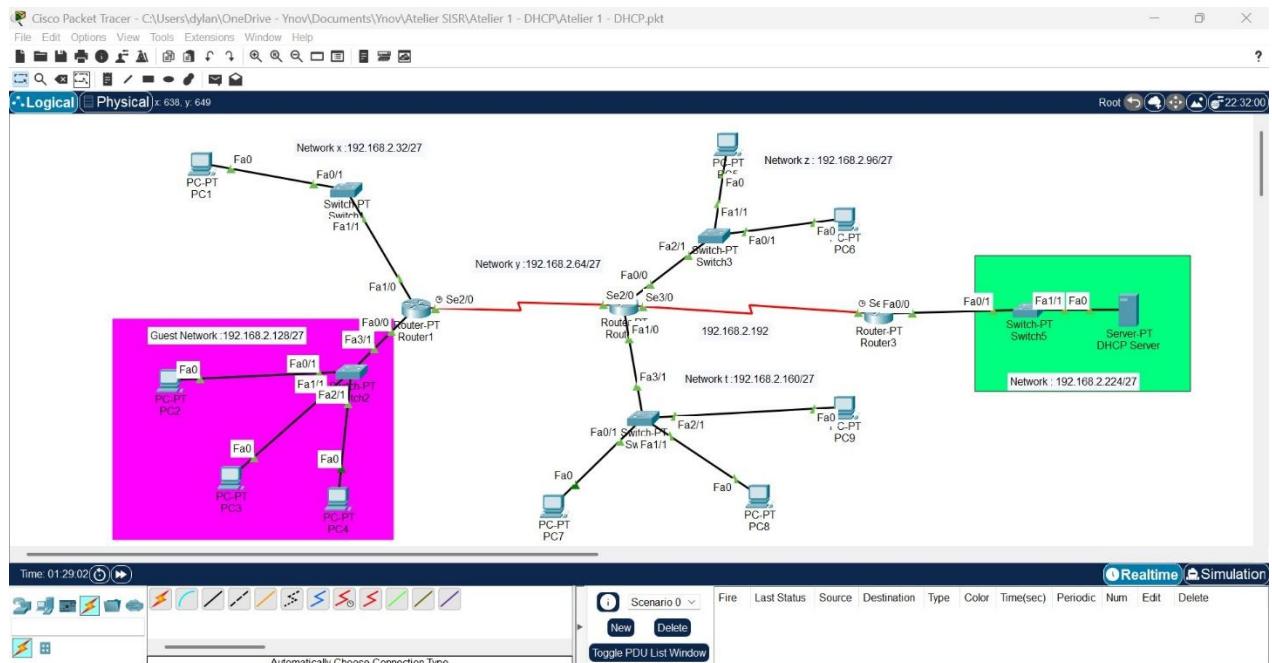
```
Equivalent IOS Commands
Router>enable
Router#configure terminal
Router(config)#interface serial3/0
Router(config-if)#ip address 192.168.2.193 255.255.255.224
Router(config-if)#exit
Router(config)#exit
Router#
```



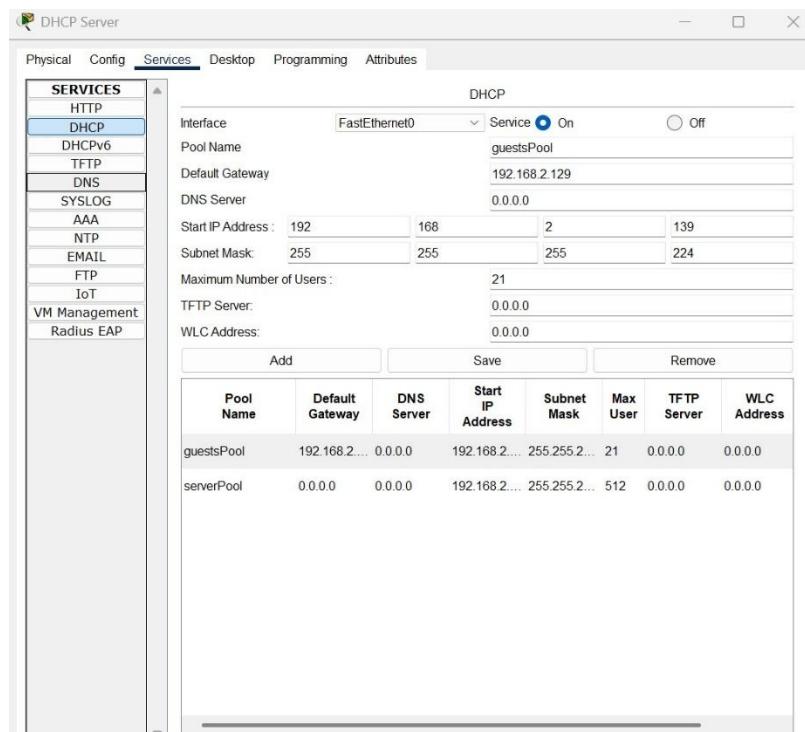
Top

```
Equivalent IOS Commands
Router>enable
Router#configure terminal
Router(config)#interface serial2/0
Router(config-if)#ip address 192.168.2.194 255.255.255.224
Router(config-if)#exit
Router(config)#exit
Router#
```

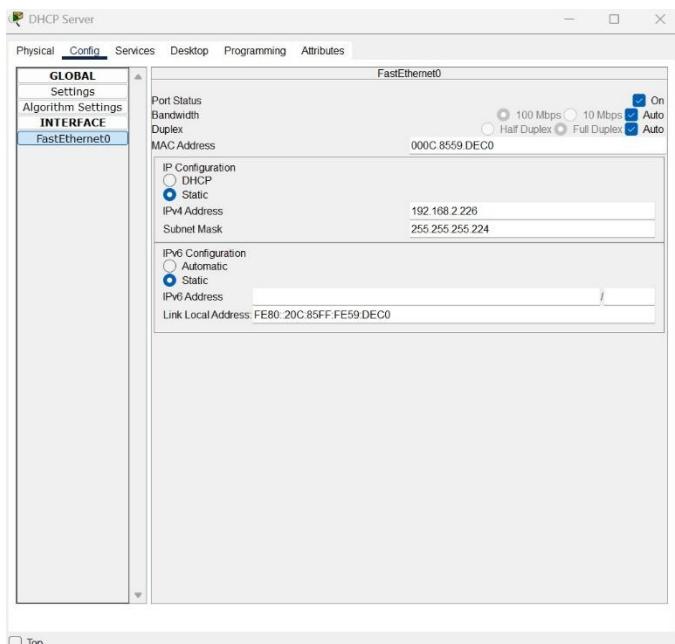
Puis on rajoute un switch et un serveur DHCP dans un nouveau réseau 192.168.2.224/27 :



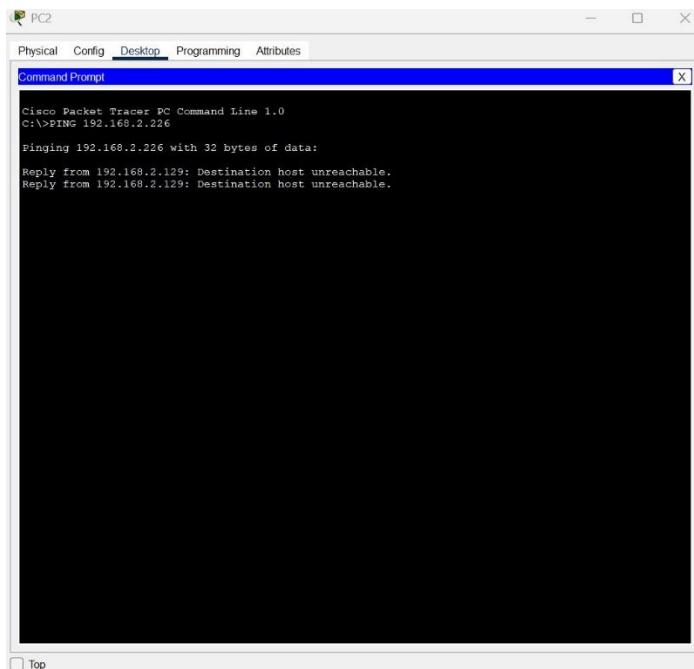
On configure une nouvelle Pool “GuestsPool” dans le serveur DHCP pour le réseau Guest (en violet sur la maquette) :



Voici l'adresse IP du serveur DHCP :

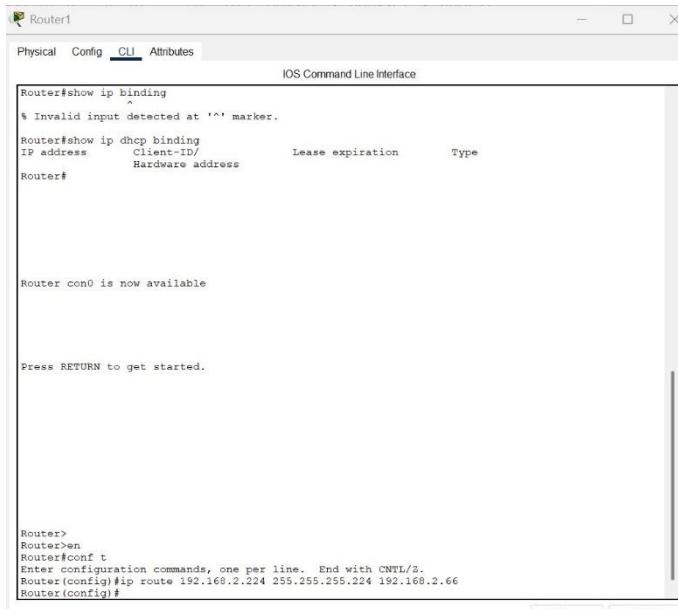


On fait un Test ping du serveur DHCP depuis PC2 :



Ping impossible car la route vers le réseau du serveur DHCP n'a pas été configurée

On configure les routes sur les routeurs :



```
Router#show ip binding
^
% Invalid input detected at '^' marker.

Router#show ip dhcp binding
IP address      Client-ID/          Lease expiration      Type
                  Hardware address

Router#

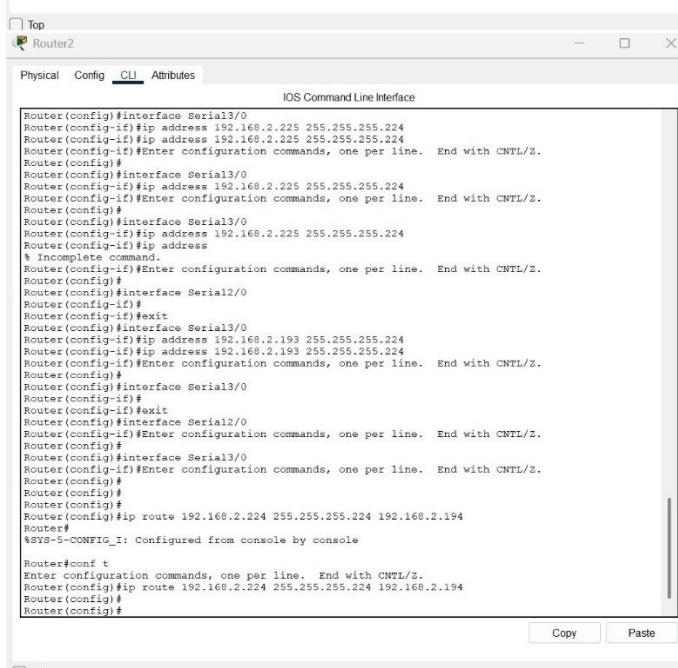

Router con0 is now available

Press RETURN to get started.

Router>
Router>conf t
Router(config)#ip route 192.168.2.224 255.255.255.224 192.168.2.66
Router(config)#

```

Copy Paste



```
Router(config)#interface Serial3/0
Router(config-if)#ip address 192.168.2.225 255.255.255.224
Router(config-if)#ip address 192.168.2.225 255.255.255.224
Router(config-if)#Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#interface Serial3/0
Router(config-if)#ip address 192.168.2.225 255.255.255.224
Router(config-if)#Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#interface Serial3/0
Router(config-if)#ip address 192.168.2.225 255.255.255.224
Router(config-if)#ip address
% Incomplete command.
Router(config-if)#Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#interface Serial2/0
Router(config-if)#Enter configuration commands, one per line. End with CNTL/Z.
Router(config-if)#exit
Router(config)#interface Serial3/0
Router(config-if)#ip address 192.168.2.193 255.255.255.224
Router(config-if)#ip address 192.168.2.193 255.255.255.224
Router(config-if)#Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#interface Serial3/0
Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#interface Serial3/0
Router(config-if)#Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#
Router(config)#ip route 192.168.2.224 255.255.255.224 192.168.2.194
Router#
%SYN-5-CONFIG_I: Configured from console by console

Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 192.168.2.224 255.255.255.224 192.168.2.194
Router(config)#
Router(config)#

```

Copy Paste

Router3

Physical Config **CLI** Attributes

IOS Command Line Interface

Press RETURN to get started!

```
Router>
Router>EN
Router>CONF T
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route
% Incomplete command.
Router(config)#
Router(config)#
Router(config)#
Router#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

192.168.2.0/27 is subnetted, 2 subnets
C     192.168.2.192 is directly connected, Serial2/0
C     192.168.2.224 is directly connected, FastEthernet0/0

Router#
Router#ip route 192.168.1.128 255.255.255.224 192.168.2.193
^
% Invalid input detected at '^' marker.

Router#
Router#CONF T
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#
Router#CONF T
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 192.168.1.128 255.255.255.224 192.168.2.193
Router(config)#
Router(config)#

```

Copy Paste

Router3

Physical Config **CLI** Attributes

IOS Command Line Interface

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

Router#
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.2.225 255.255.255.224
Router(config-if)#
Router(config-if)#
Router(config-if)no ip route 192.168.1.128 255.255.255.224 192.168.2.193
Router(config)#
Router(config)#ip route 192.168.2.128 255.255.255.224 192.168.2.193
Router(config)#
Router(config)#
Router(config)#
%SYS-5-CONFIG_I: Configured from console by console

Router#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

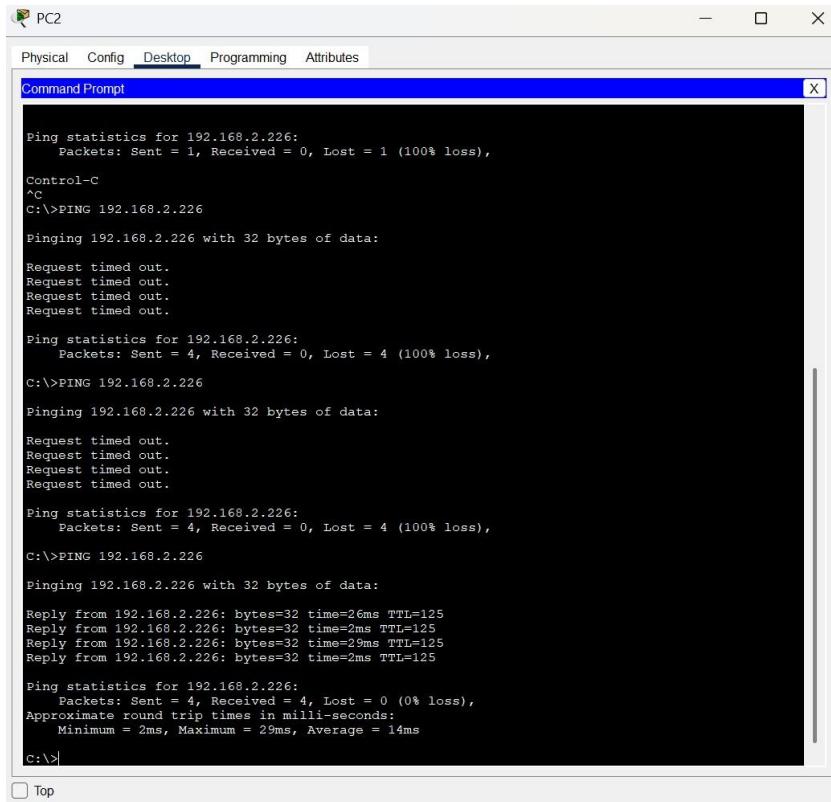
192.168.2.0/27 is subnetted, 6 subnets
S     192.168.2.32 [1/0] via 192.168.2.193
S     192.168.2.96 [1/0] via 192.168.2.193
S     192.168.2.128 [1/0] via 192.168.2.193
S     192.168.2.160 [1/0] via 192.168.2.193
C     192.168.2.192 is directly connected, Serial2/0
C     192.168.2.224 is directly connected, FastEthernet0/0

Router#

```

Copy Paste

On re teste le ping depuis PC2 vers le serveur DHCP :



```
Ping statistics for 192.168.2.226:
  Packets: Sent = 1, Received = 0, Lost = 1 (100% loss),
Control-C
^C
C:\>PING 192.168.2.226

Pinging 192.168.2.226 with 32 bytes of data:

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

Ping statistics for 192.168.2.226:
  Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>PING 192.168.2.226

Pinging 192.168.2.226 with 32 bytes of data:

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

Ping statistics for 192.168.2.226:
  Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>PING 192.168.2.226

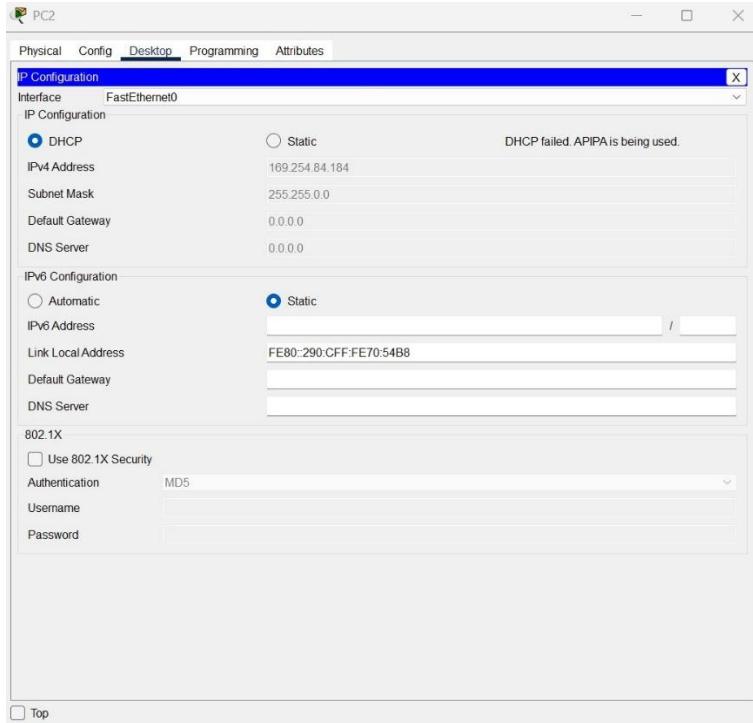
Pinging 192.168.2.226 with 32 bytes of data:

Reply from 192.168.2.226: bytes=32 time=26ms TTL=125
Reply from 192.168.2.226: bytes=32 time=2ms TTL=125
Reply from 192.168.2.226: bytes=32 time=29ms TTL=125
Reply from 192.168.2.226: bytes=32 time=2ms TTL=125

Ping statistics for 192.168.2.226:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
  Minimum = 2ms, Maximum = 29ms, Average = 14ms
C:\>
```

Le ping fonctionne correctement désormais, le PC2 peut communiquer avec le serveur DHCP

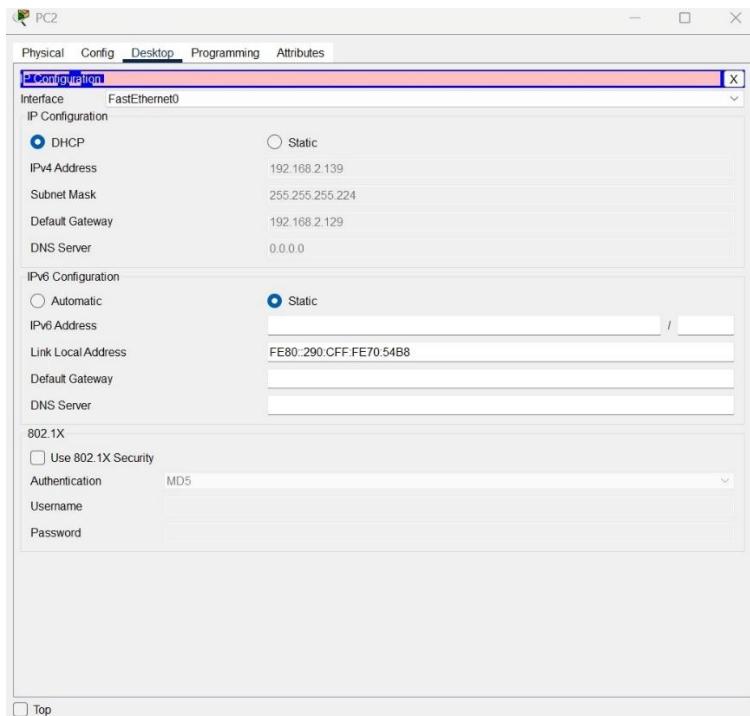
Test de l'attribution automatique d'une adresse IP sur le PC2 :



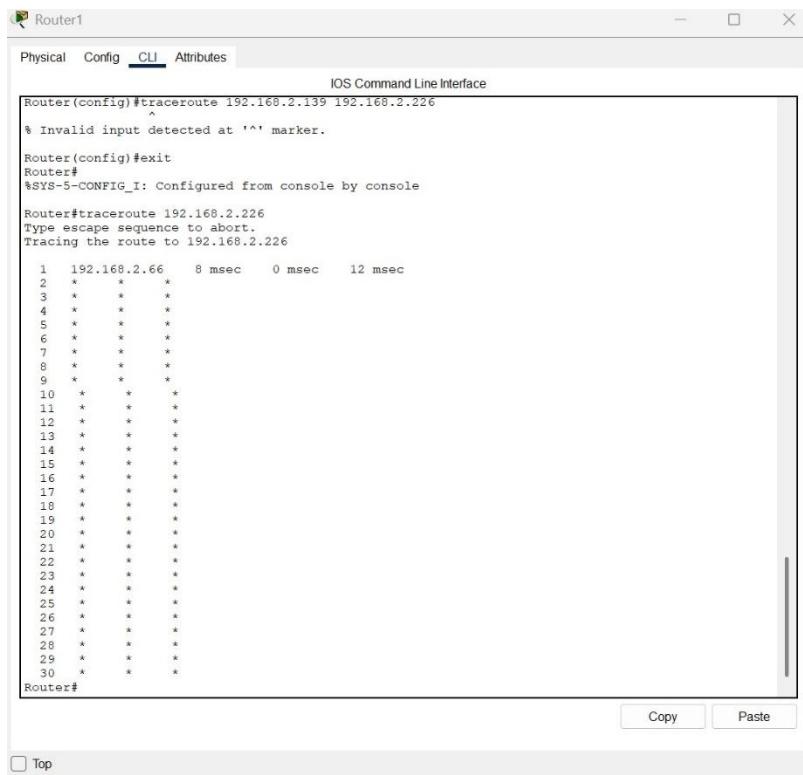
Le serveur DHCP n'a pas attribué une bonne adresse IP à PC2.

Il faut configurer le passage du DHCP sur les interfaces des 3 routeurs :

Désormais, le DHCP fonctionne correctement sur le PC2 :



Traceroute entre le routeur 1 et le serveur DHCP



The screenshot shows a Cisco IOS CLI interface titled "Router1". The window has tabs for "Physical", "Config", "CLI" (which is selected), and "Attributes". The main pane displays the output of a "traceroute" command:

```
Router(config)#traceroute 192.168.2.139 192.168.2.226
% Invalid input detected at ''' marker.

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

Router#traceroute 192.168.2.226
Type escape sequence to abort.
Tracing the route to 192.168.2.226

 1  192.168.2.66  8 msec    0 msec   12 msec
 2  *      *      *
 3  *      *      *
 4  *      *      *
 5  *      *      *
 6  *      *      *
 7  *      *      *
 8  *      *      *
 9  *      *      *
10  *      *      *
11  *      *      *
12  *      *      *
13  *      *      *
14  *      *      *
15  *      *      *
16  *      *      *
17  *      *      *
18  *      *      *
19  *      *      *
20  *      *      *
21  *      *      *
22  *      *      *
23  *      *      *
24  *      *      *
25  *      *      *
26  *      *      *
27  *      *      *
28  *      *      *
29  *      *      *
30  *      *      *

Router#
```

At the bottom of the window are "Copy" and "Paste" buttons. Below the window is a "Top" button.

6-Conclusion

Cet atelier nous a permis de mettre en œuvre et de comparer différentes méthodes d'adressage IP au sein d'une infrastructure réseau hiérarchisée sous Cisco Packet Tracer.

Nous avons débuté par une **configuration statique**, utile pour comprendre les bases du sous-réseau (subnetting) et du routage, mais fastidieuse à maintenir. Nous avons ensuite évolué vers une **automatisation avec le protocole DHCP**.

Les points clés de cet apprentissage sont :

- **Le DHCP sous IOS Cisco** : Nous avons appris à transformer un routeur en serveur DHCP, en gérant les pools d'adresses et, point crucial, en excluant les adresses statiques pour éviter les conflits IP.
- **Le Routage Statique** : L'interconnexion des différents réseaux a nécessité une configuration rigoureuse des tables de routage pour assurer la communication de bout en bout.
- **L'architecture Client/Serveur et Relais DHCP** : La dernière partie a mis en évidence une contrainte majeure des réseaux segmentés : les requêtes DHCP (Broadcast) ne traversent pas les routeurs. La mise en place de l'agent relais via la commande ip helper-address a été indispensable pour permettre aux clients du réseau "Guest" d'obtenir une configuration IP depuis un serveur dédié situé dans un autre réseau.

En conclusion, ce projet valide ma capacité à déployer une infrastructure réseau fonctionnelle, évolutive et automatisée, tout en résolvant les problématiques de routage et de distribution d'adresses.