

DHCP

ATELIER 1

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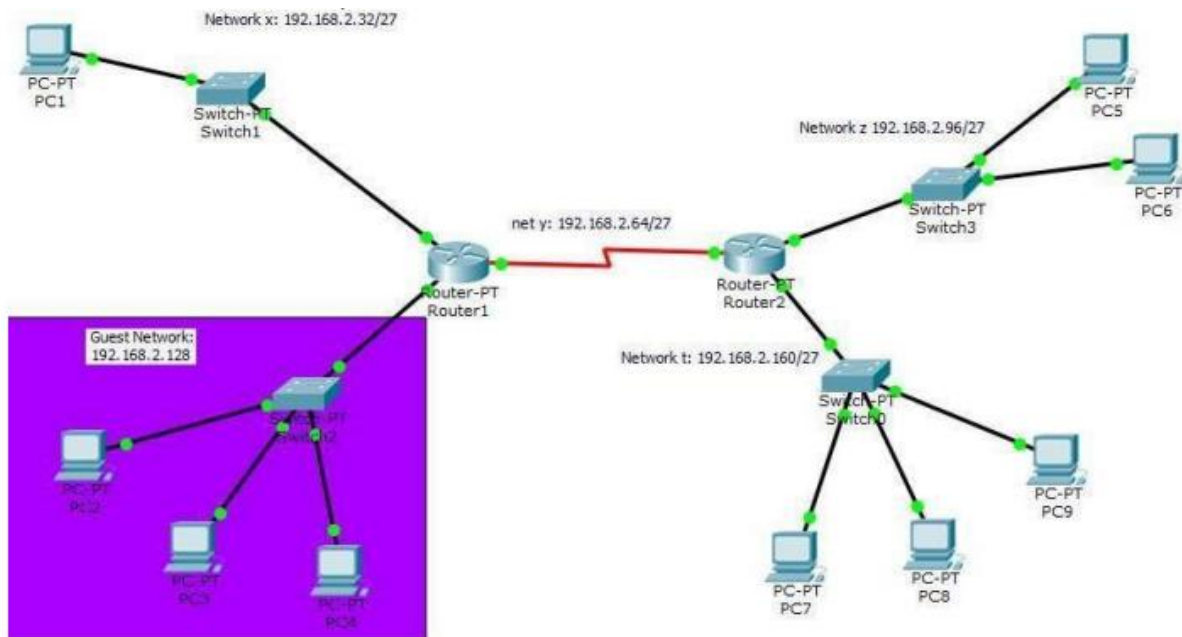
Table des matières

1-	Introduction	2
2-	Réalisation de la maquette dans Cisco Packet Tracer	3
3-	Configuration statique	4
4-	Configuration DHCP sur un routeur	9
5-	Configuration réseau avec serveur DHCP	12

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 :



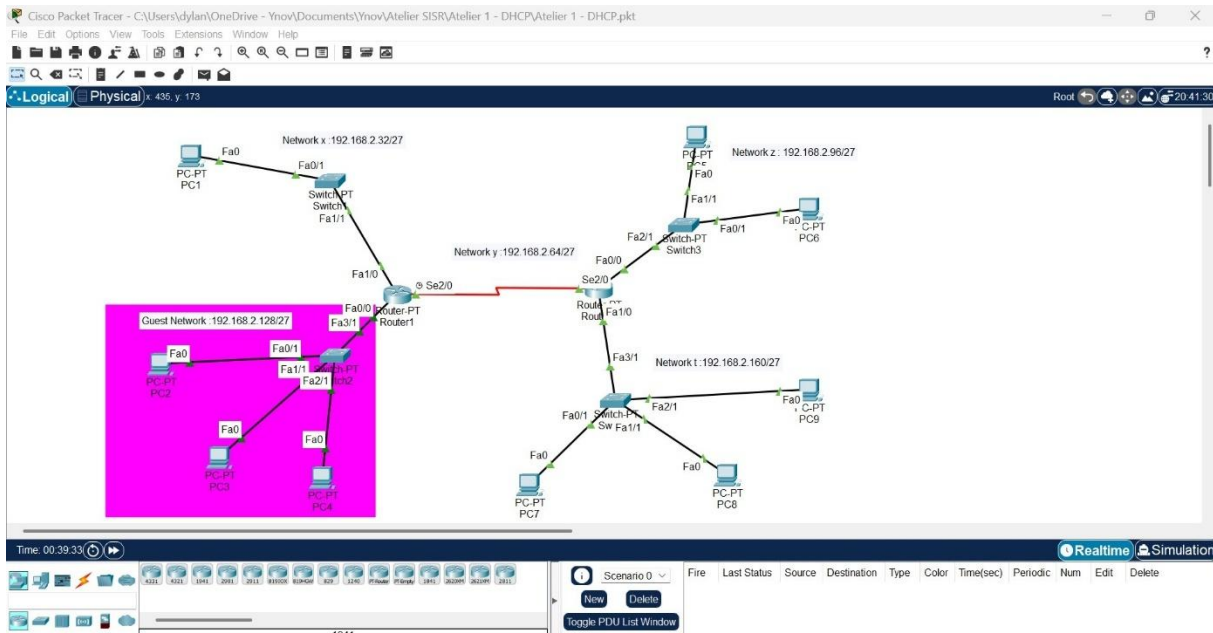
Nous ferons ensuite la configuration des différents équipements notamment l'attribution des adresses IP ainsi que les tables de routage.

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

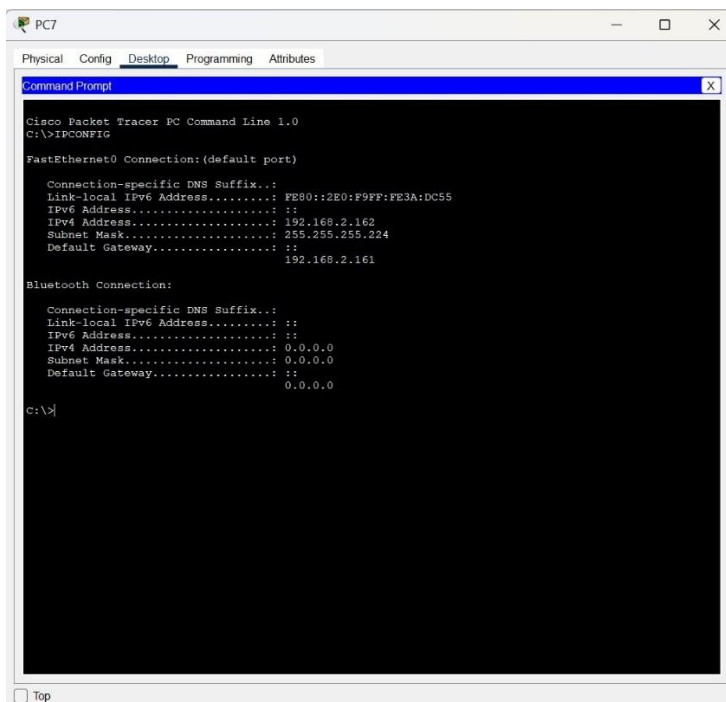
3-Configuration statique

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 :

A screenshot of a Cisco Packet Tracer window titled 'PC7'. The window has tabs for 'Physical', 'Config', 'Desktop', 'Programming', and 'Attributes', with 'Config' selected. Inside the 'Config' tab, there is a 'Command Prompt' window. The command prompt shows the following configuration for PC7:

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

FastEthernet0 Connection: (default port)

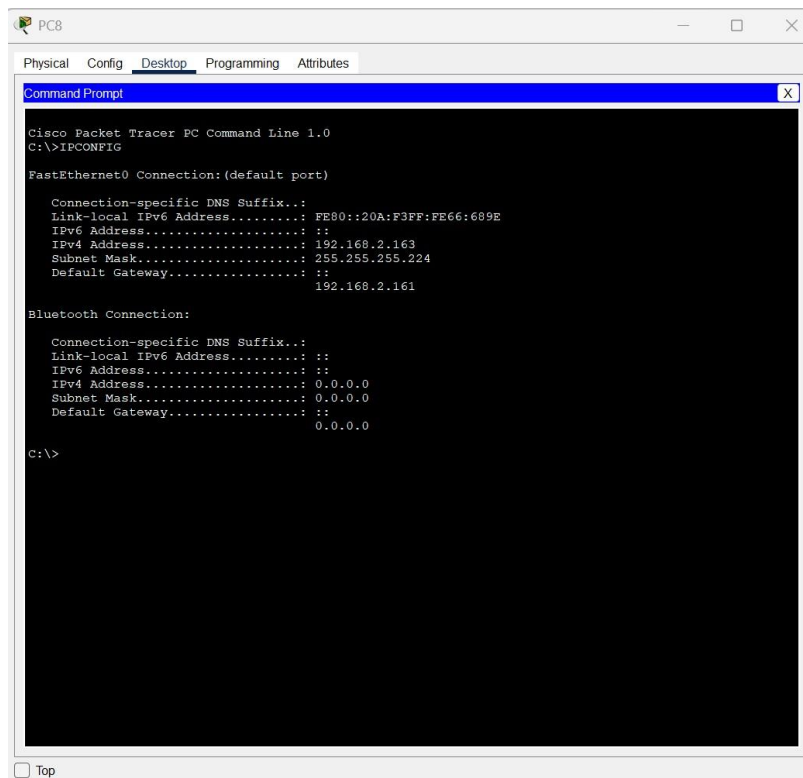
    Connection-specific DNS Suffix...:
    Link-local IPv6 Address . . . . .: FE80::2E0:F9FF:FE3A:DC55
    IPv6 Address . . . . .: ::
    IPv4 Address . . . . .: 192.168.2.162
    Subnet Mask . . . . .: 255.255.255.244
    Default Gateway . . . . .: ::
                                192.168.2.161

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 :



The screenshot shows the configuration window for PC8 in Cisco Packet Tracer. The window has tabs for Physical, Config, Desktop, Programming, and Attributes. The Desktop tab is active, showing a Command Prompt window. The Command Prompt displays the output of the 'show ipconfig' command, showing the configuration for the FastEthernet0 interface. The configuration includes a Link-local IPv6 Address, an IPv6 Address, an IPv4 Address, a Subnet Mask, and a Default Gateway. The Bluetooth connection is also shown with its own set of addresses and gateway.

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

FastEthernet0 Connection:(default port)

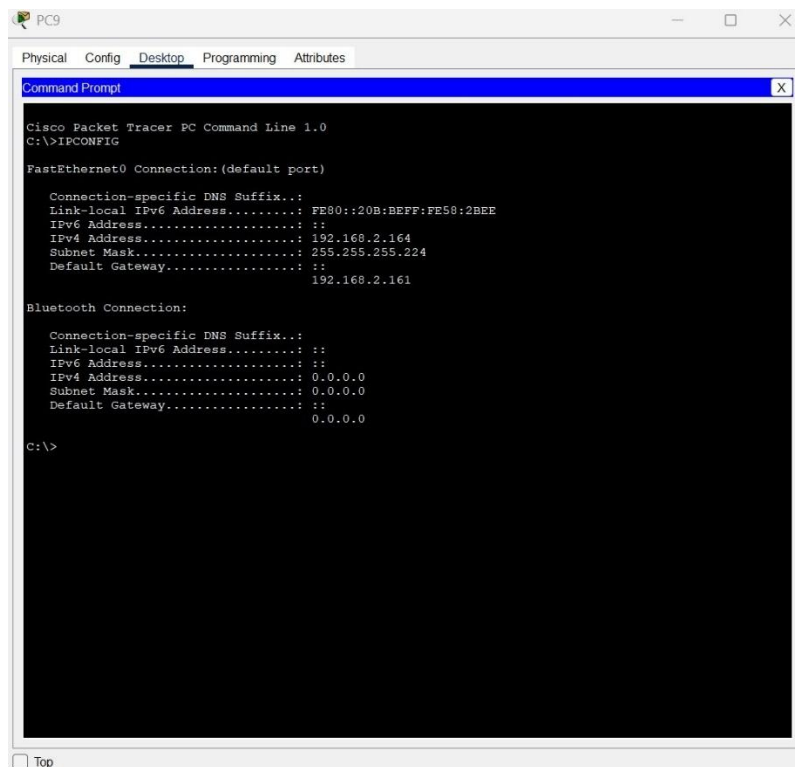
    Connection-specific DNS Suffix...:
    Link-local IPv6 Address . . . . .: FE80::20A:F3FF:FE66:689E
    IPv6 Address . . . . .: ::
    IPv4 Address . . . . .: 192.168.2.163
    Subnet Mask . . . . .: 255.255.255.224
    Default Gateway . . . . .: 192.168.2.161

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 :



The screenshot shows the configuration window for PC9 in Cisco Packet Tracer. The window has tabs for Physical, Config, Desktop, Programming, and Attributes. The Desktop tab is active, showing a Command Prompt window. The Command Prompt displays the output of the 'show ipconfig' command, showing the configuration for the FastEthernet0 interface. The configuration includes a Link-local IPv6 Address, an IPv6 Address, an IPv4 Address, a Subnet Mask, and a Default Gateway. The Bluetooth connection is also shown with its own set of addresses and gateway.

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

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

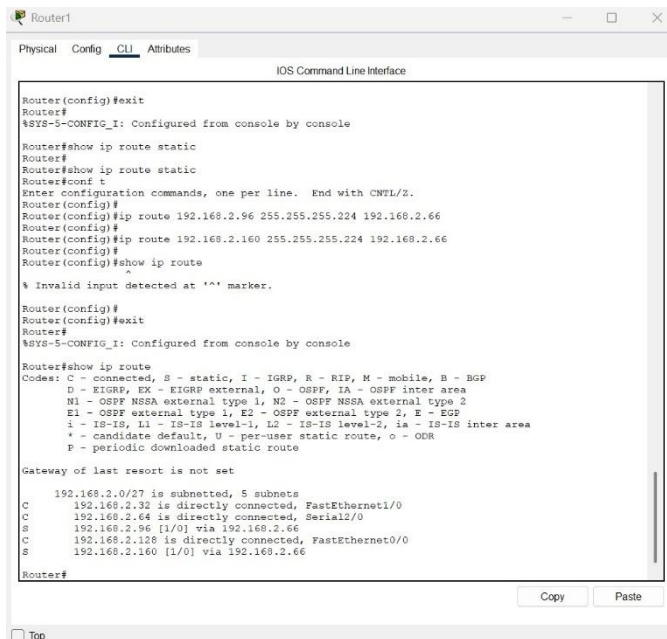
Bluetooth Connection:

    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 :



```
Router1
Physical Config CLI Attributes
IOS Command Line Interface

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

Router#show ip route static
Router#
Router#show ip route static
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#ip route 192.168.2.96 255.255.255.224 192.168.2.66
Router(config)#
Router(config)#ip route 192.168.2.160 255.255.255.224 192.168.2.66
Router(config)#
Router(config)#show ip route

% Invalid input detected at '^' marker.

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

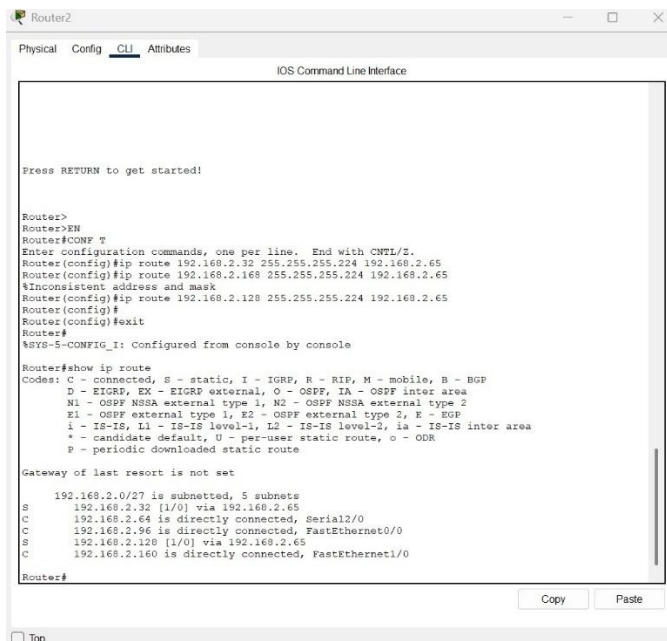
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2, E -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



```
Router2
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 192.168.2.32 255.255.255.224 192.168.2.65
Router(config)#ip route 192.168.2.168 255.255.255.224 192.168.2.65
%Inconsistent address and mask
Router(config)#ip route 192.168.2.128 255.255.255.224 192.168.2.65
Router(config)#
Router(config)#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

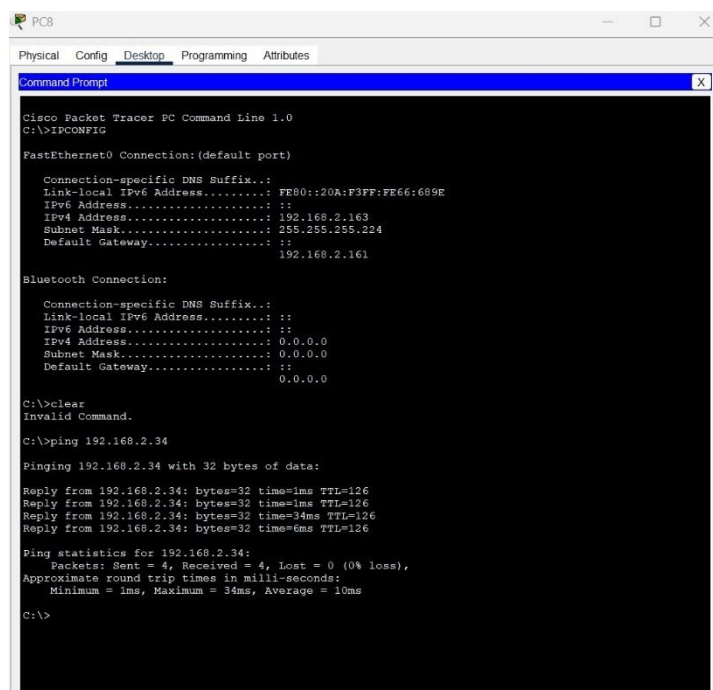
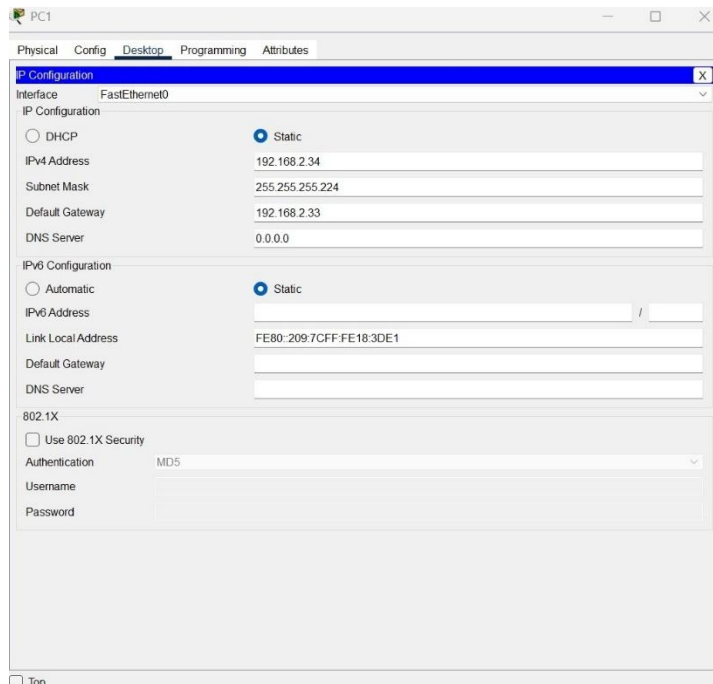
Gateway of last resort is not set

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

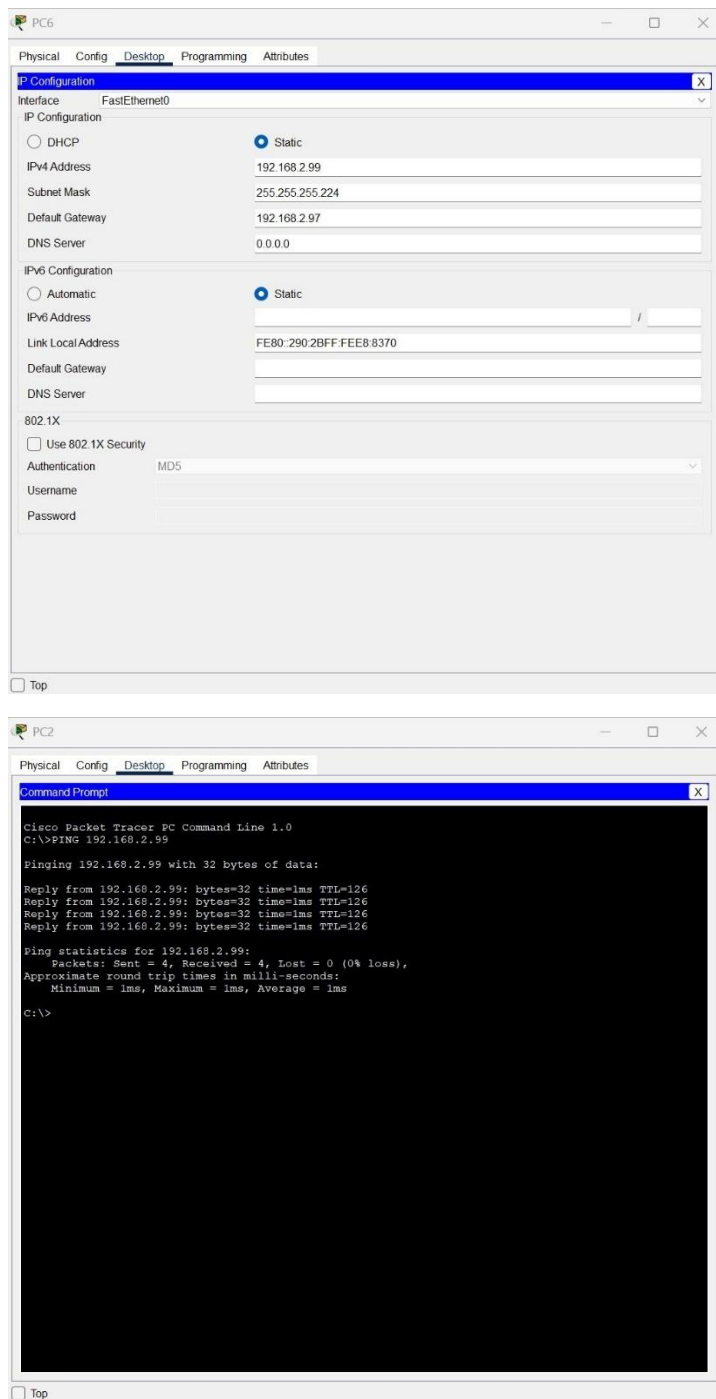
Router#
```

Effectuons quelques tests de notre configuration

Test Ping de PC1 depuis PC8 :



Test Ping de PC6 depuis PC2 :



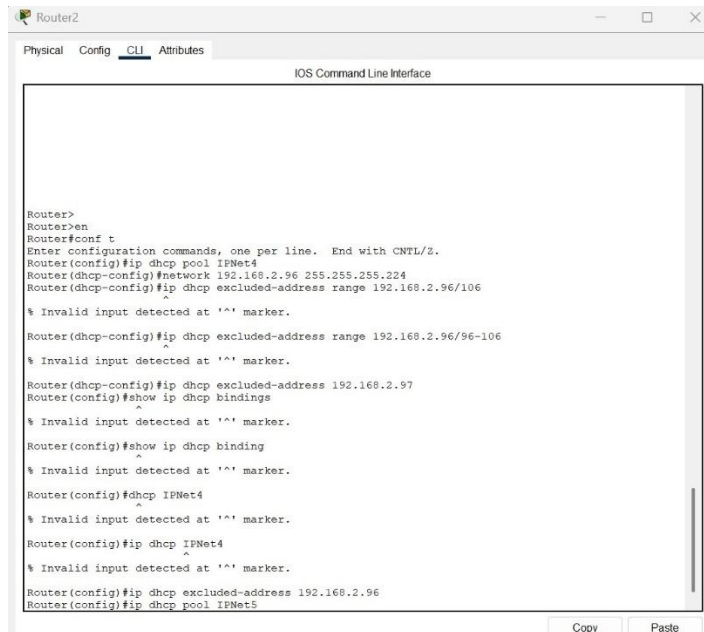
Les PC peuvent bien communiquer entre eux. Les routes ont bien été configurées

4-Configuration DHCP sur un routeur

Nous allons désormais configurer le DHCP sur le routeur 2

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

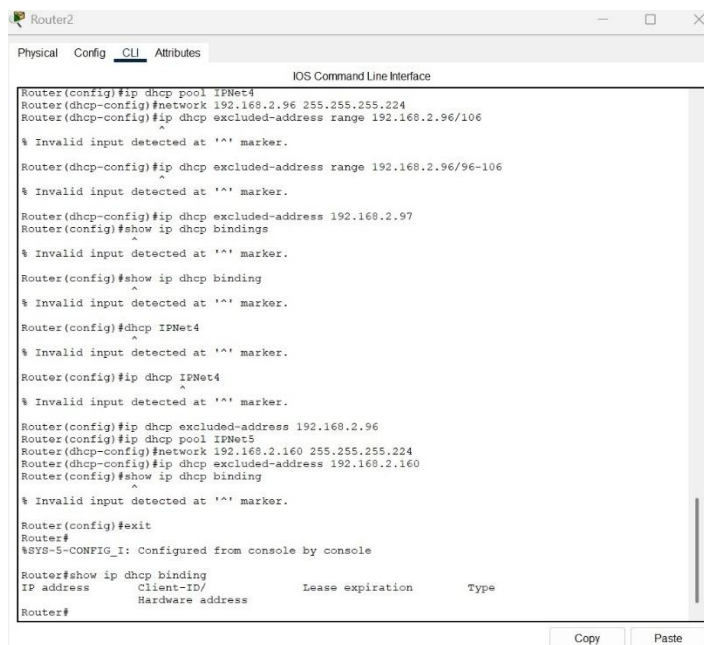
IPNet4 : 192.168.2.96/27



```
Router2
Physical Config CLI Attributes
IOS Command Line Interface

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
```

IPNet5 : 192.168.2.160/27

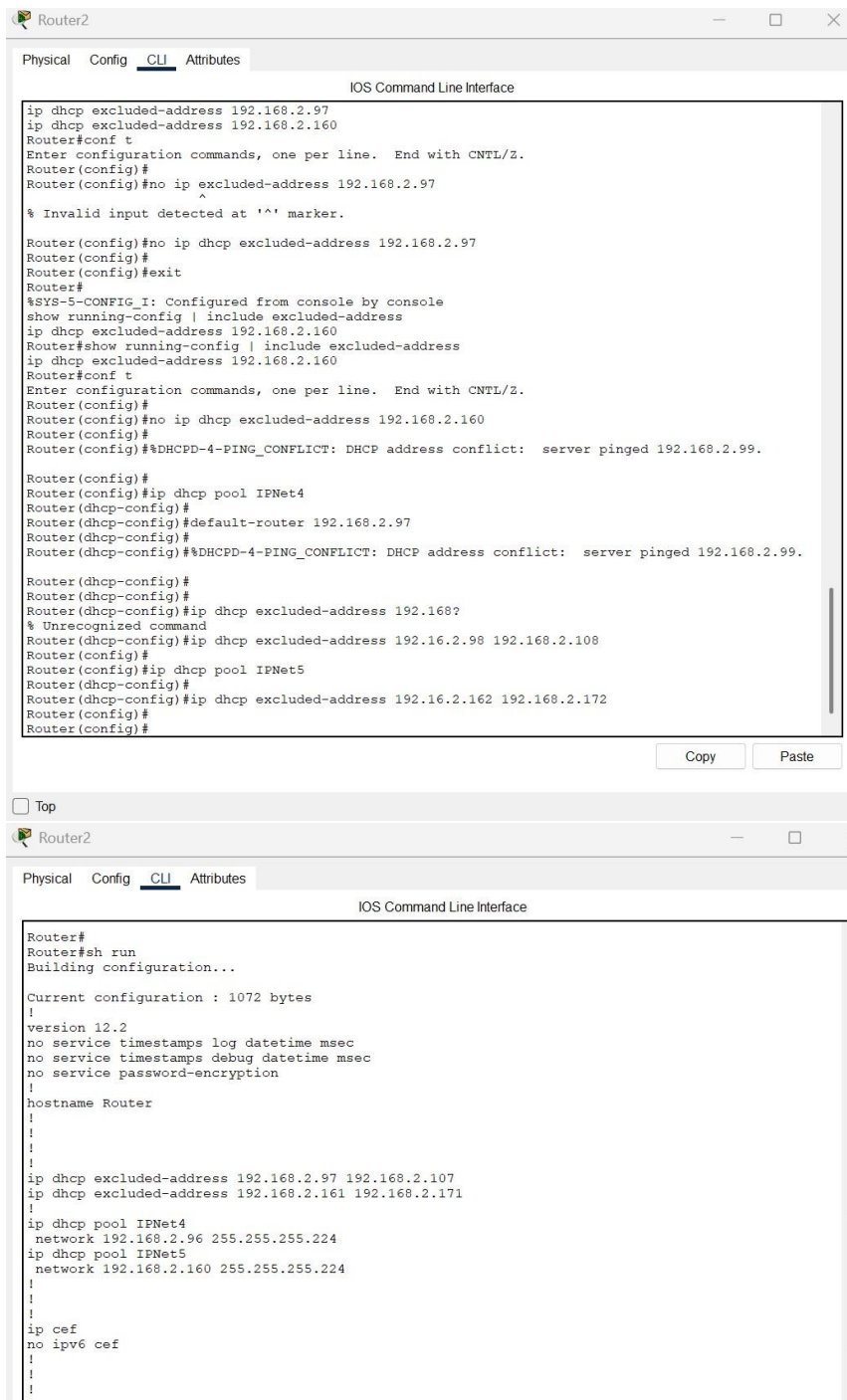


```
Router2
Physical Config CLI Attributes
IOS Command Line Interface

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



The image consists of two screenshots of a Cisco Router2 CLI interface. The top screenshot shows the configuration of DHCP pools and excluded addresses. The bottom screenshot shows the final configuration after saving and running the commands.

```
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 192.168.2.97
% Unrecognized command
Router(dhcp-config)#ip dhcp excluded-address 192.168.2.98 192.168.2.108
Router(config)#
Router(config)#ip dhcp pool IPNet5
Router(dhcp-config)#
Router(dhcp-config)#ip dhcp excluded-address 192.168.2.162 192.168.2.172
Router(config)#
Router(config)#

Copy Paste

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 :

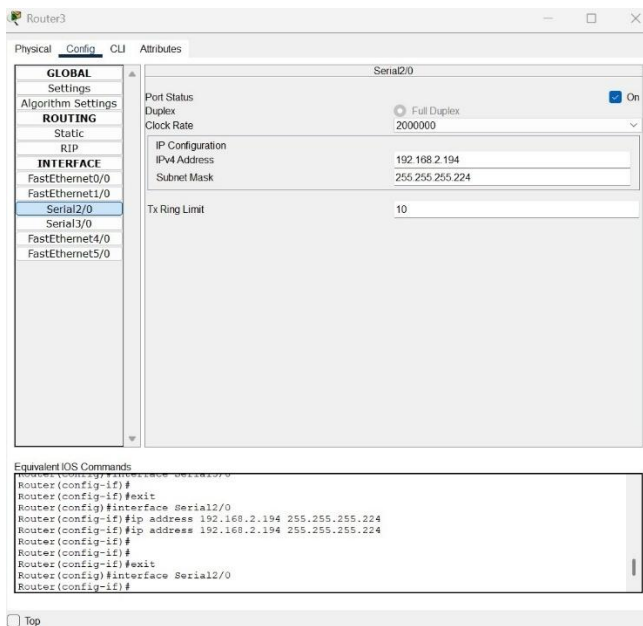
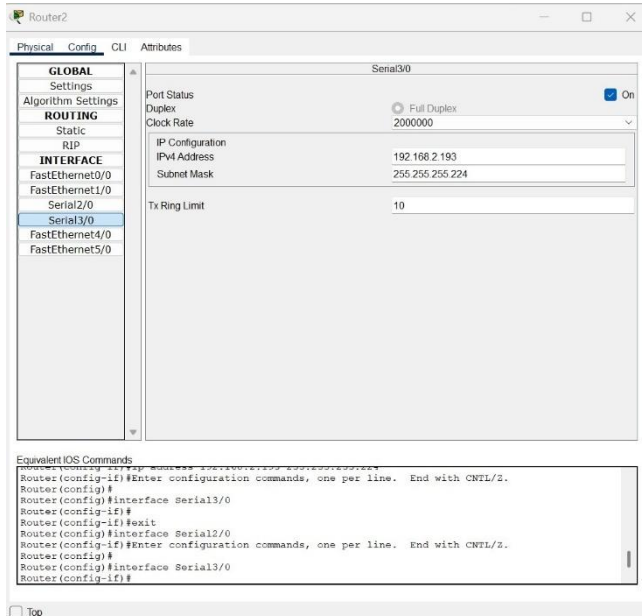
The screenshot shows the configuration window for PC5. The 'Desktop' tab is selected. Under 'IP Configuration', the 'Interface' is 'FastEthernet0'. The 'IP Configuration' section has 'DHCP' selected. The 'IPv4 Address' is '192.168.2.108', 'Subnet Mask' is '255.255.255.224', 'Default Gateway' is '192.168.2.97', and 'DNS Server' is '0.0.0.0'. The 'IPv6 Configuration' section has 'Static' selected. The 'IPv6 Address' is empty, 'Link Local Address' is 'FE80::207:ECFF:FE30:CD95', 'Default Gateway' is empty, and 'DNS Server' is empty. The '802.1X' section has 'Use 802.1X Security' unchecked, 'Authentication' set to 'MD5', 'Username' is empty, and 'Password' is empty. A 'Top' button is at the bottom left.

Nouvelle IP du PC7 :

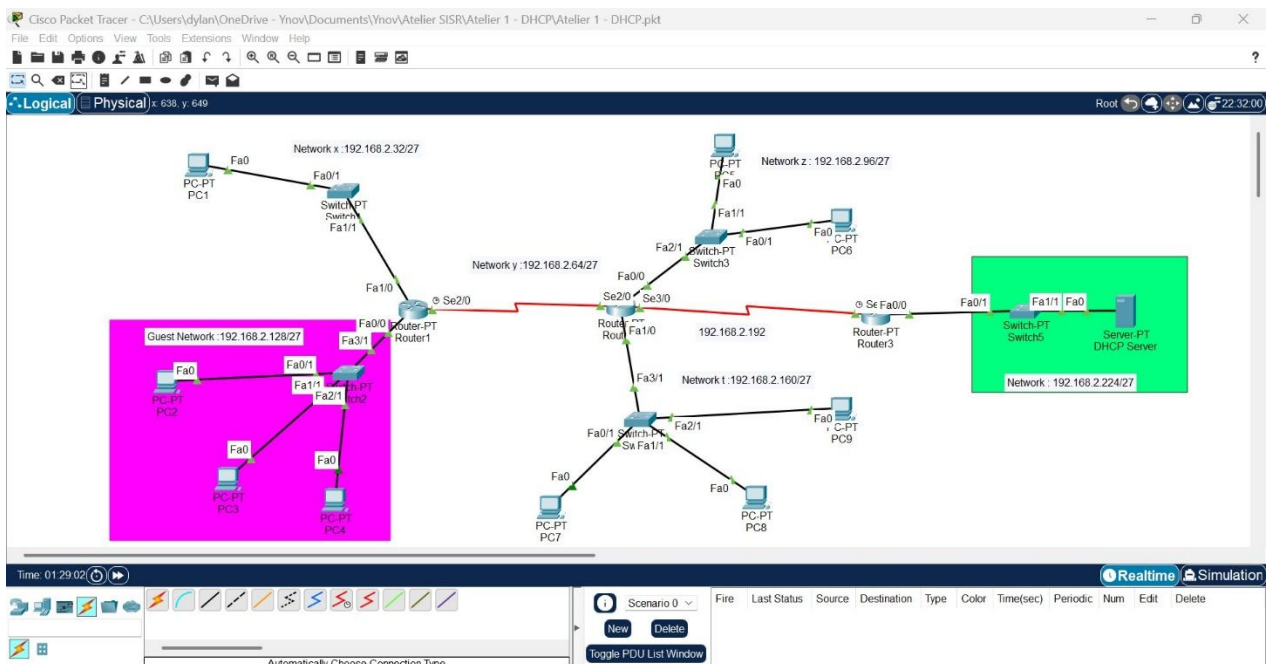
The screenshot shows the configuration window for PC7. The 'Desktop' tab is selected. Under 'IP Configuration', the 'Interface' is 'FastEthernet0'. The 'IP Configuration' section has 'DHCP' selected. The 'IPv4 Address' is '192.168.2.172', 'Subnet Mask' is '255.255.255.224', 'Default Gateway' is '192.168.2.161', and 'DNS Server' is '0.0.0.0'. The 'IPv6 Configuration' section has 'Static' selected. The 'IPv6 Address' is empty, 'Link Local Address' is 'FE80::2E0:F9FF:FE3A:DC55', 'Default Gateway' is empty, and 'DNS Server' is empty. The '802.1X' section has 'Use 802.1X Security' unchecked, 'Authentication' set to 'MD5', 'Username' is empty, and 'Password' is empty. A 'Top' button is at the bottom left.

5-Configuration réseau avec serveur DHCP

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



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) :

DHCP Server Configuration Window - Services Tab

SERVICES

- HTTP
- DHCP**
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

DHCP Configuration:

Interface: FastEthernet0 | Service: ☒ On ☐ Off

Pool Name: guestsPool

Default Gateway: 192.168.2.129

DNS Server: 0.0.0.0

Start IP Address: 192 | 168 | 2 | 139

Subnet Mask: 255 | 255 | 255 | 224

Maximum Number of Users: 21

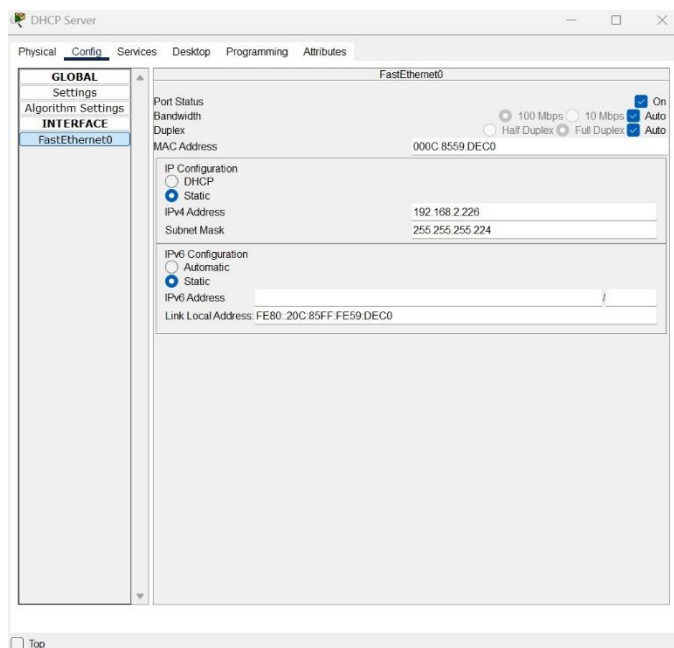
TFTP Server: 0.0.0.0

WLC Address: 0.0.0.0

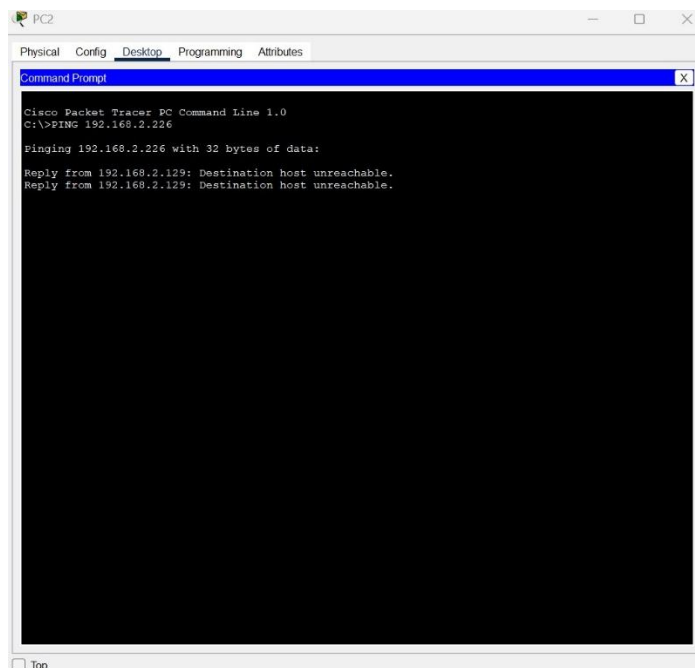
Buttons: Add, Save, Remove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
guestsPool	192.168.2...	0.0.0.0	192.168.2...	255.255.2...	21	0.0.0.0	0.0.0.0
serverPool	0.0.0.0	0.0.0.0	192.168.2...	255.255.2...	512	0.0.0.0	0.0.0.0

Voici l'adresse IP du serveur DHCP :

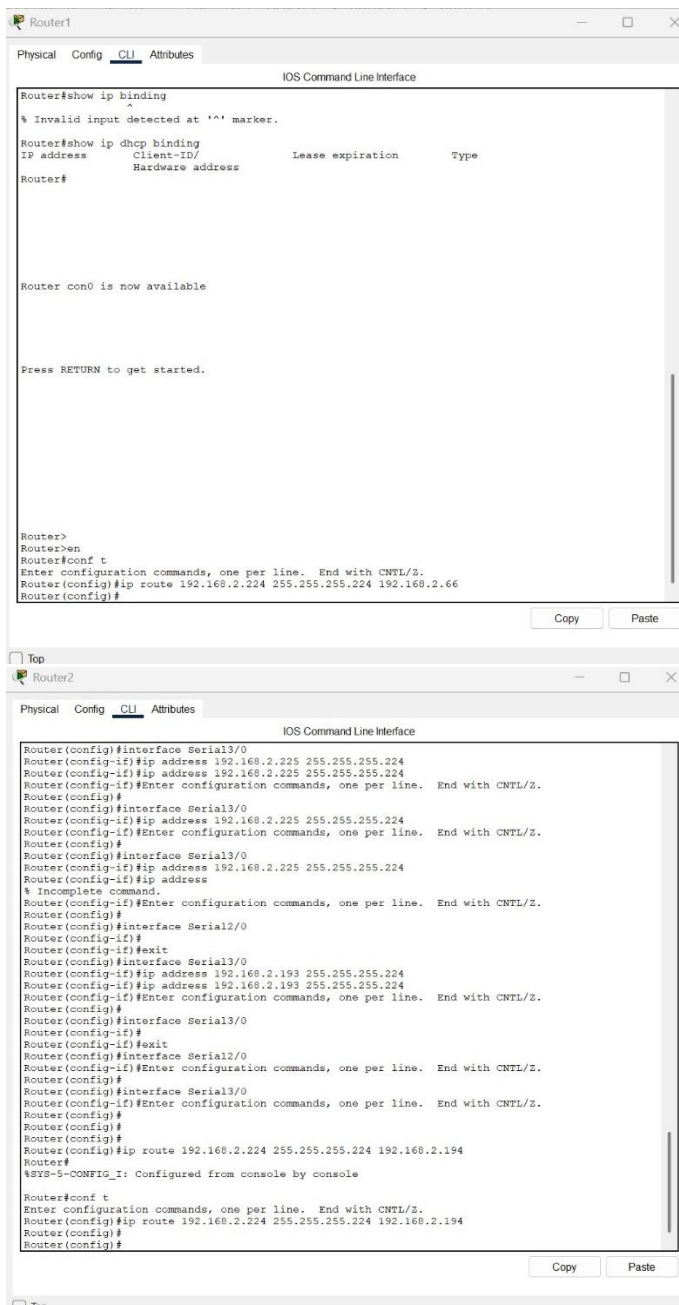


On fait un Test ping du serveur DHCP depuis PC2 :



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

On configure les routes sur les routeurs :



The image displays two screenshots of the Cisco IOS Command Line Interface (CLI) for two routers, Router1 and Router2.

Router1 Screenshot:

- The CLI shows the prompt `Router#`.
- The user enters `show ip binding`, which results in an error: `% Invalid input detected at '^' marker.`
- The user enters `show ip dhcp binding`, which displays a table with columns: IP address, Client-ID/ Hardware address, Lease expiration, and Type.
- The user enters `Router#`.
- The CLI shows the prompt `Router>`.
- The user enters `en` to enter configuration mode.
- The user enters `conf t` to enter global configuration mode.
- The CLI shows the prompt `Router(config)#`.
- The user enters `ip route 192.168.2.224 255.255.255.224 192.168.2.66`.
- The CLI shows the prompt `Router(config)#`.

Router2 Screenshot:

- The CLI shows the prompt `Router(config)#`.
- The user enters `interface Serial3/0`.
- The CLI shows the prompt `Router(config-if)#`.
- The user enters `ip address 192.168.2.225 255.255.255.224`.
- The CLI shows the prompt `Router(config-if)#`.
- The user enters `ip address 192.168.2.225 255.255.255.224`.
- The CLI shows the prompt `Router(config-if)#`.
- The user enters `Enter configuration commands, one per line. End with CNTL/Z.`.
- The CLI shows the prompt `Router(config)#`.
- The user enters `interface Serial3/0`.
- The CLI shows the prompt `Router(config-if)#`.
- The user enters `ip address 192.168.2.225 255.255.255.224`.
- The CLI shows the prompt `Router(config-if)#`.
- The user enters `ip address`.
- The CLI shows the prompt `Router(config-if)#`.
- The user enters `Enter configuration commands, one per line. End with CNTL/Z.`.
- The CLI shows the prompt `Router(config)#`.
- The user enters `interface Serial2/0`.
- The CLI shows the prompt `Router(config-if)#`.
- The user enters `exit`.
- The CLI shows the prompt `Router(config)#`.
- The user enters `interface Serial3/0`.
- The CLI shows the prompt `Router(config-if)#`.
- The user enters `ip address 192.168.2.193 255.255.255.224`.
- The CLI shows the prompt `Router(config-if)#`.
- The user enters `ip address 192.168.2.193 255.255.255.224`.
- The CLI shows the prompt `Router(config-if)#`.
- The user enters `Enter configuration commands, one per line. End with CNTL/Z.`.
- The CLI shows the prompt `Router(config)#`.
- The user enters `interface Serial3/0`.
- The CLI shows the prompt `Router(config-if)#`.
- The user enters `Enter configuration commands, one per line. End with CNTL/Z.`.
- The CLI shows the prompt `Router(config)#`.
- The user enters `ip route 192.168.2.224 255.255.255.224 192.168.2.194`.
- The CLI shows the prompt `Router#`.
- The CLI shows the message: `%SYS-5-CONFIG_I: Configured from console by console`.
- The user enters `conf t`.
- The CLI shows the prompt `Router(config)#`.
- The user enters `Enter configuration commands, one per line. End with CNTL/Z.`.
- The CLI shows the prompt `Router(config)#`.
- The user enters `ip route 192.168.2.224 255.255.255.224 192.168.2.194`.
- The CLI shows the prompt `Router(config)#`.
- The user enters `Router(config)#`.


```
Router3
Physical Config CLI Attributes
IOS Command Line Interface

Press RETURN to get started!

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

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

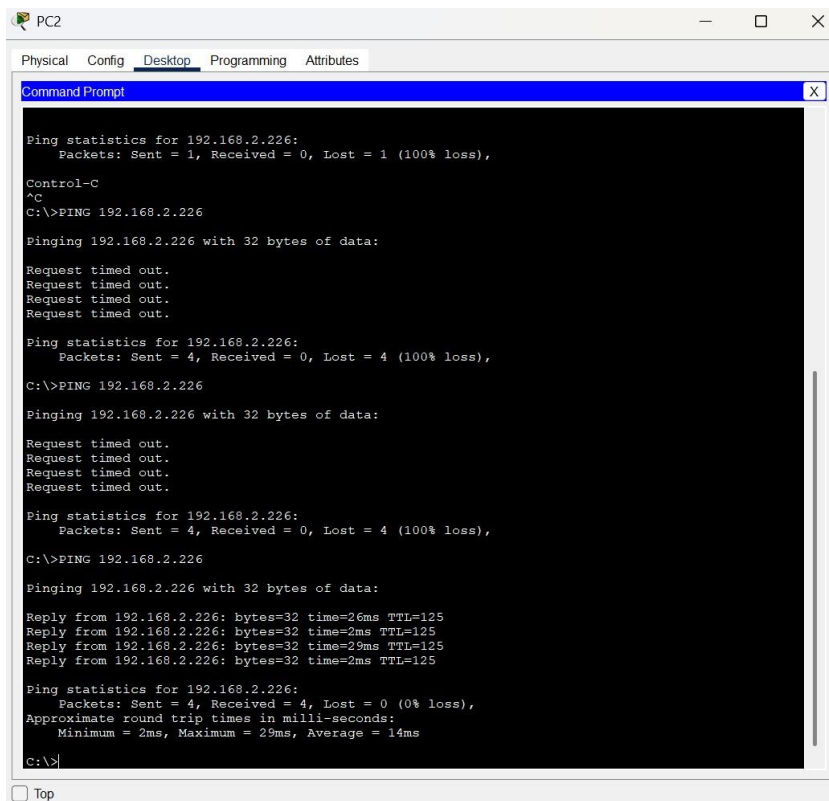
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2, E -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

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



```
PC2
Physical Config Desktop Programming Attributes
Command Prompt

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

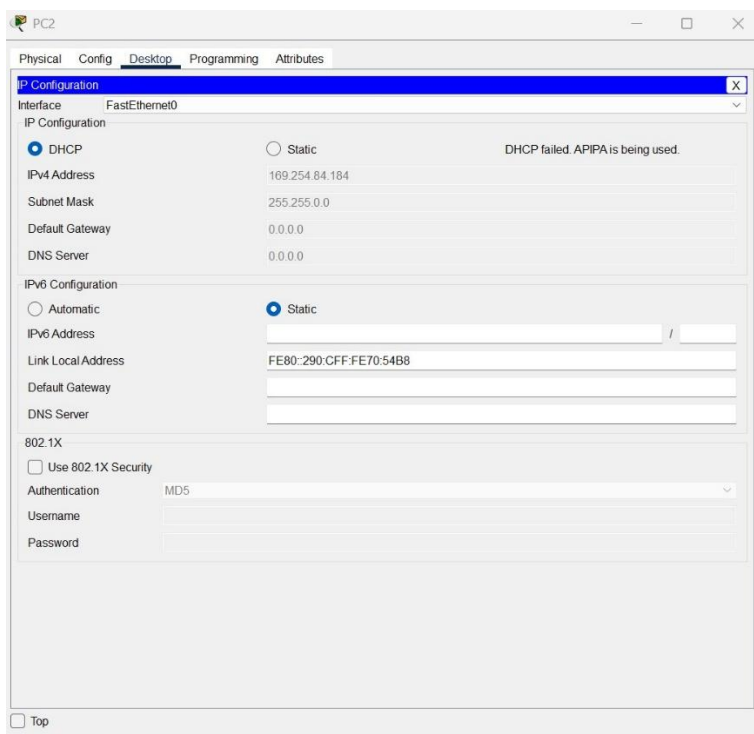
Pinging 192.168.2.226 with 32 bytes of data:
Reply from 192.168.2.226: bytes=32 time=26ms TTL=125
Reply from 192.168.2.226: bytes=32 time=2ms TTL=125
Reply from 192.168.2.226: bytes=32 time=29ms TTL=125
Reply from 192.168.2.226: bytes=32 time=2ms TTL=125

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:\>
```

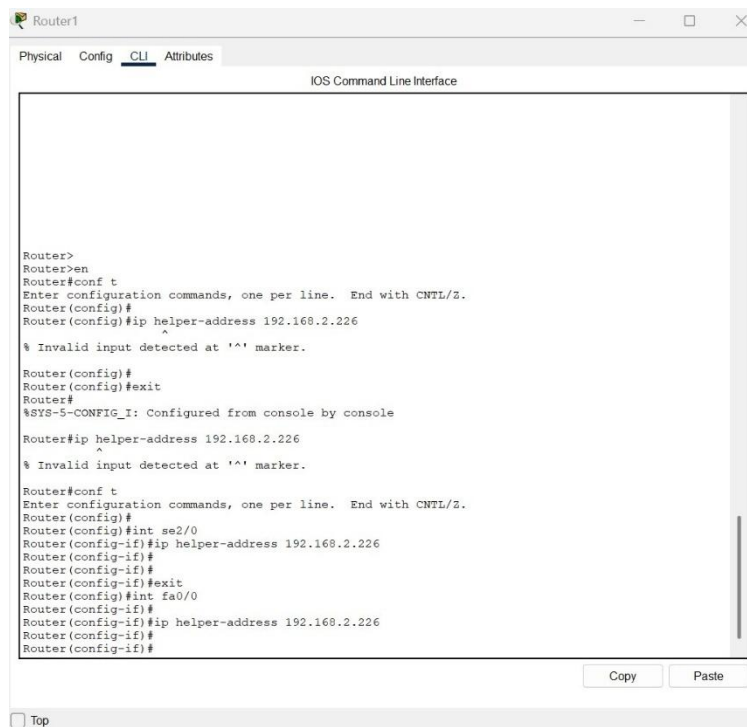
Le ping fonctionne correctement désormais, le PC2 peut communiquer avec le serveur DHCP

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



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

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

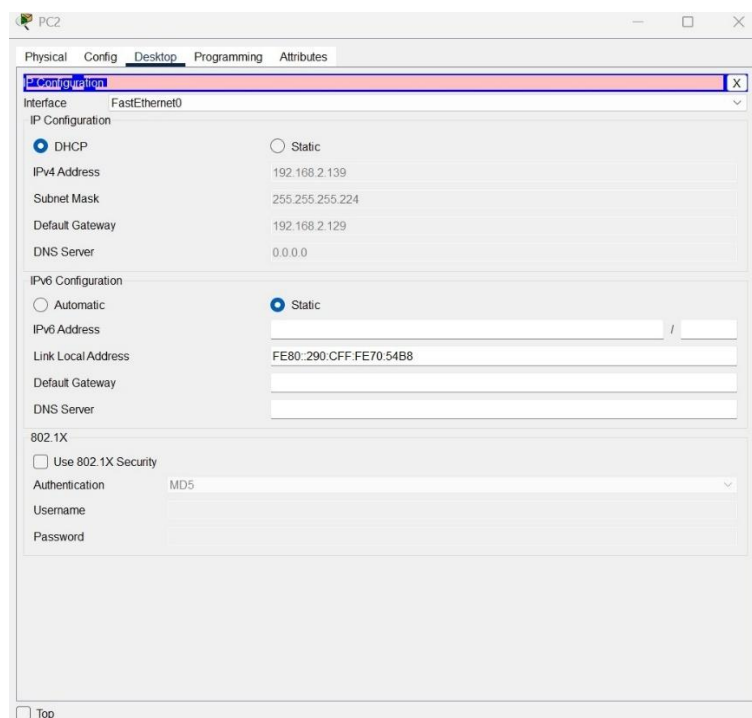


The screenshot shows the CLI of Router1. The user has entered the following commands:

```
Router>
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#ip helper-address 192.168.2.226
Router#
% Invalid input detected at '^' marker.
Router(config)#
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#ip helper-address 192.168.2.226
Router#
% Invalid input detected at '^' marker.
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#int s2/0
Router(config-if)#ip helper-address 192.168.2.226
Router(config-if)#
Router(config-if)#exit
Router(config)#int fa0/0
Router(config-if)#
Router(config-if)#ip helper-address 192.168.2.226
Router(config-if)#
Router(config-if)#
```

Buttons for Copy and Paste are visible at the bottom right of the terminal window.

Désormais, le DHCP fonctionne correctement sur le PC2 :



The screenshot shows the configuration window for PC2. The 'Desktop' tab is selected. The 'Interface' dropdown is set to 'FastEthernet0'. The 'IP Configuration' section shows 'DHCP' selected. The 'IPv6 Configuration' section shows 'Static' selected. The '802.1X' section is expanded, showing 'Use 802.1X Security' as a checkbox, 'Authentication' as 'MD5', and 'Username' and 'Password' fields.

IP Configuration	
<input checked="" type="radio"/> DHCP	<input type="radio"/> Static
IPv4 Address	192.168.2.139
Subnet Mask	255.255.255.224
Default Gateway	192.168.2.129
DNS Server	0.0.0.0

IPv6 Configuration	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	
Link Local Address	FE80::290:CFF:FE70:54B8
Default Gateway	
DNS Server	

802.1X

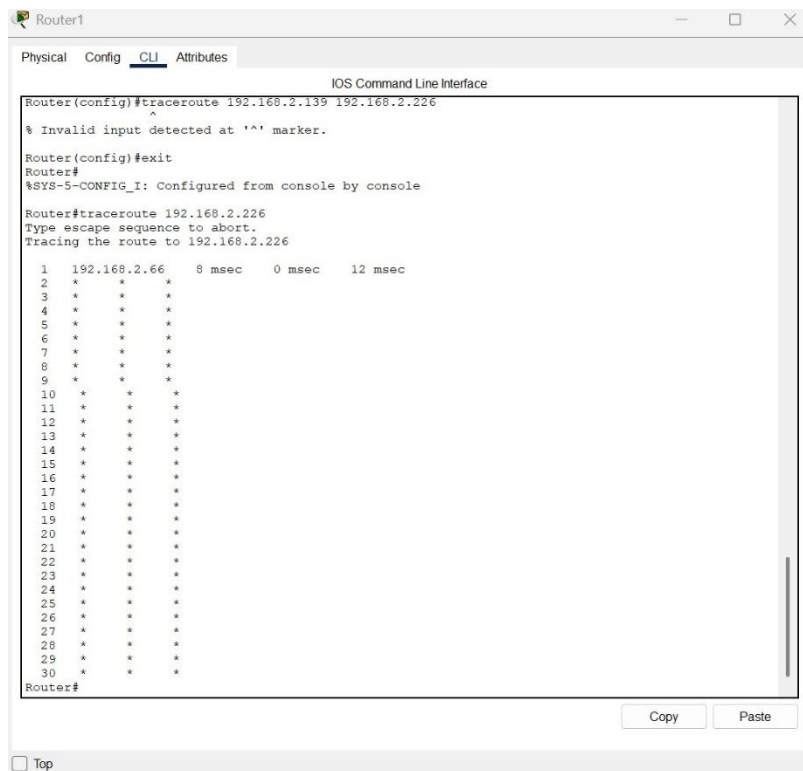
☐ Use 802.1X Security

Authentication: MD5

Username:

Password:

Traceroute entre le routeur 1 et le serveur DHCP



The screenshot shows a terminal window titled "Router1" with tabs for "Physical", "Config", "CLI", and "Attributes". The "CLI" tab is active, displaying the "IOS Command Line Interface". The user has entered the command `Router(config)#traceroute 192.168.2.139 192.168.2.226`, which resulted in an error: `% Invalid input detected at '^' marker.`. The user then exited the configuration mode with `Router(config)#exit` and returned to the user prompt `Router#`. A system message `%SYS-5-CONFIG_I: Configured from console by console` is displayed. The user then enters the command `Router#traceroute 192.168.2.226`. The output shows the route to 192.168.2.226, starting from the router itself (192.168.2.66) with a delay of 8 msec, 0 msec, and 12 msec. The route is traced through 30 hops, each marked with an asterisk (*).

```
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

 0  192.168.2.66      8 msec    0 msec    12 msec
 1  * * *
 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#

Copy Paste

☐ Top

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.