

Reproduction de la topologie en implémentant le Protocole de Routage OSPF dans un Réseau

Introduction

Ce rapport documente la configuration et l'implémentation du protocole de routage **OSPF** dans un réseau, illustrée par une série de captures d'écran. L'objectif est de montrer les différentes étapes de mise en place des éléments réseaux et leur interaction.

1. Architecture du réseau

Voici la topologie du réseau utilisée pour l'implémentation du protocole **OSPF** :

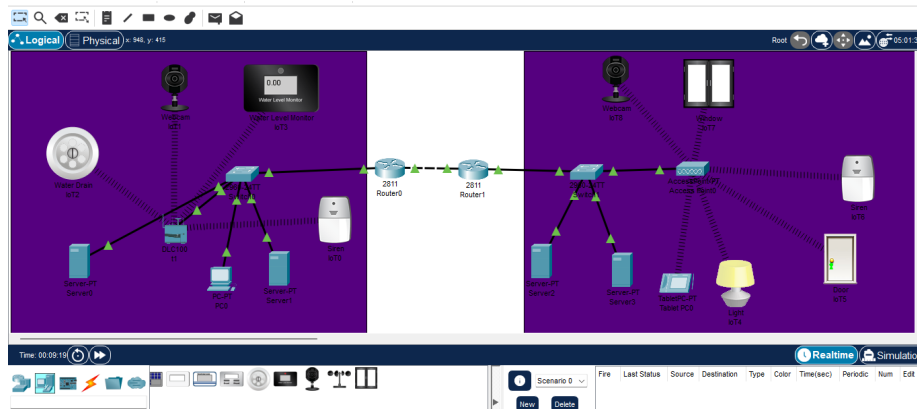


Figure 1: image 1

2. Configuration des réseaux sans fil

La configuration des points d'accès sans fil et des paramètres SSID est représentée ci-dessous :

3. Paramétrage du DHCP

Le serveur DHCP est configuré pour l'attribution dynamique des adresses IP aux périphériques IoT et autres équipements réseau :

4. Configuration des appareils IoT

Chaque appareil IoT est intégré au réseau via des paramètres spécifiques, incluant les configurations sans fil et d'adressage :

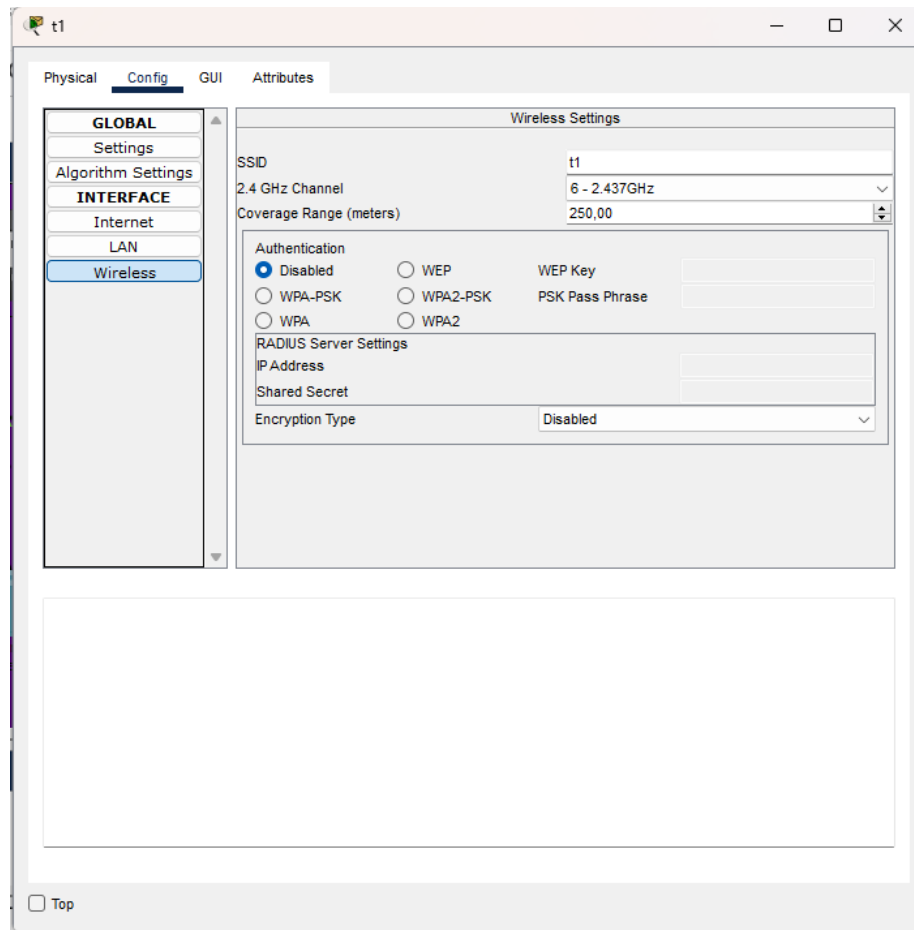


Figure 2: image 2

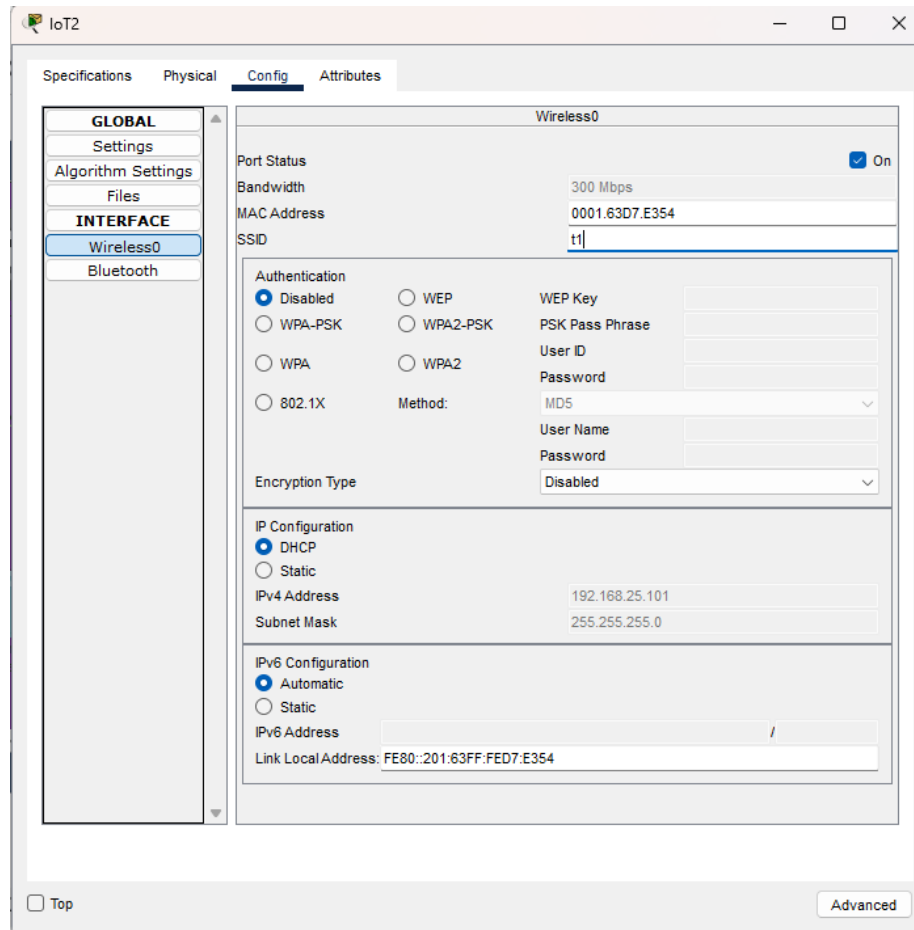


Figure 3: image 3

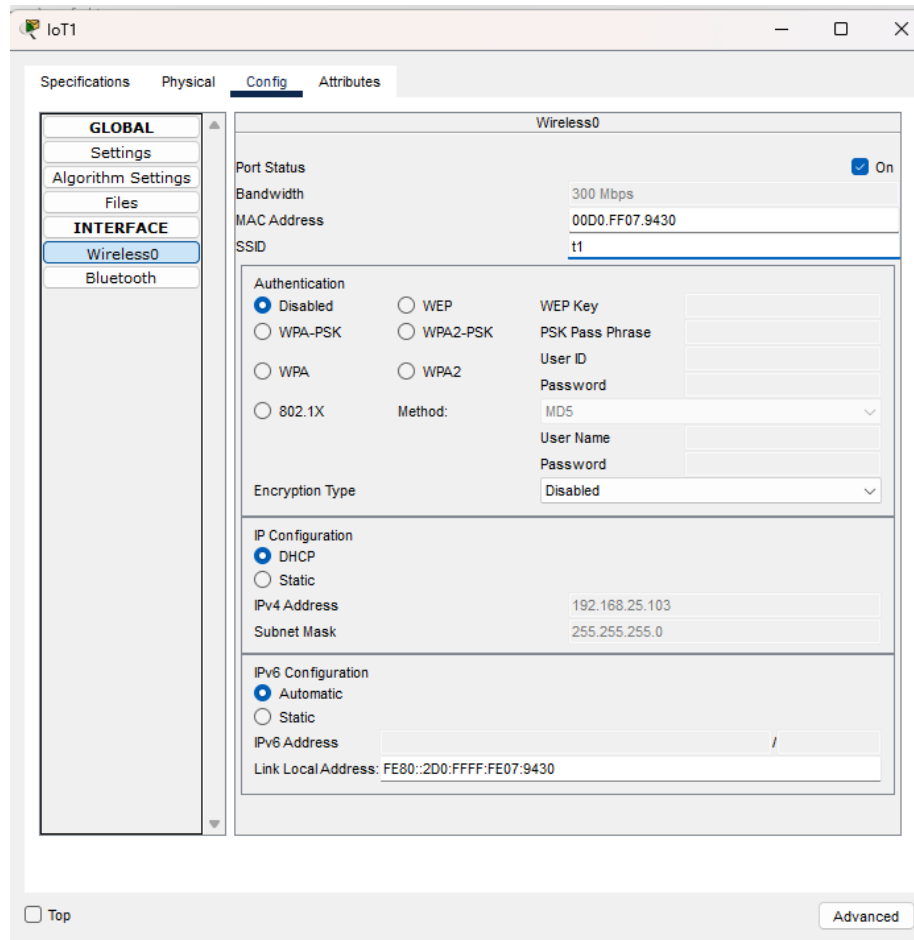


Figure 4: image 4

4.1 IoT1

4.2 IoT8

Access Point0

Physical **Config** Attributes

GLOBAL

Settings

INTERFACE

Port 0

Port 1

Port 1

Port Status ☒ On

SSID admin

2.4 GHz Channel 6

Coverage Range (meters) 140,00

Authentication

☒ Disabled ☐ WEP ☐ WPA-PSK ☐ WPA2-PSK

WEP Key

PSK Pass Phrase

User ID

Password

Encryption Type Disabled

Top

IoT8

Specifications Physical **Config** Attributes

GLOBAL

Settings

Algorithm Settings

Files

INTERFACE

Wireless0

Bluetooth

Wireless0

Port Status ☒ On

Bandwidth 300 Mbps

MAC Address 0001.64B2.D2ED

SSID admin

Authentication

☒ Disabled ☐ WEP ☐ WPA-PSK ☐ WPA2-PSK ☐ WPA ☐ WPA2 ☐ 802.1X

Method: MD5

WEP Key

PSK Pass Phrase

User ID

Password

User Name

Password

Encryption Type Disabled

IP Configuration

☒ DHCP ☐ Static

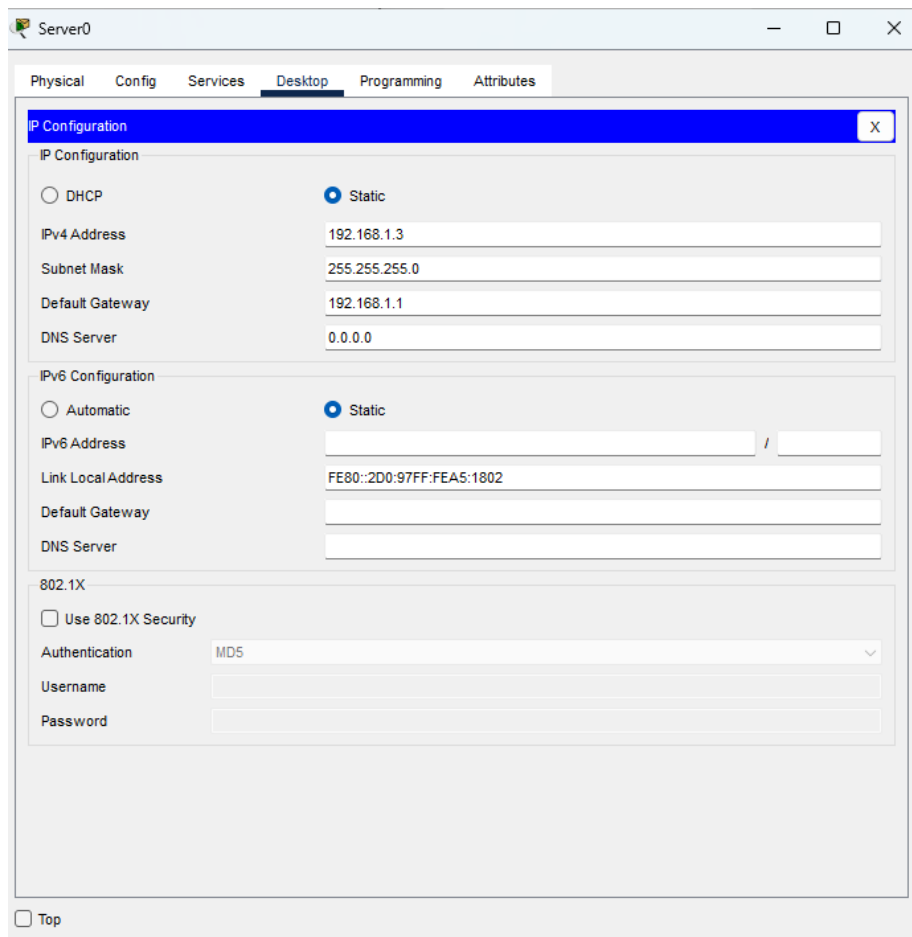
IPv4 Address 192.168.25.108

Subnet Mask 255.255.255.0

IPv6 Configuration

☒ Automatic ☐ Static

IPv6 Address



5. Paramétrage des serveurs

Les serveurs du réseau sont configurés avec des adresses statiques et intégrés au protocole OSPF pour assurer la redondance et l'interconnexion :

5.1 ServerIoT – Adressage et authentification

5.2 Configuration DHCP du serveur

5.3 Statique IPv4 et IPv6 sur ServerIoT

6. Sécurité et optimisation

L'authentification et le chiffrement sont des éléments essentiels à la sécurisation du réseau. Voici les configurations de **IoT8** montrant les paramètres de sécurité actuels et les éventuelles améliorations :

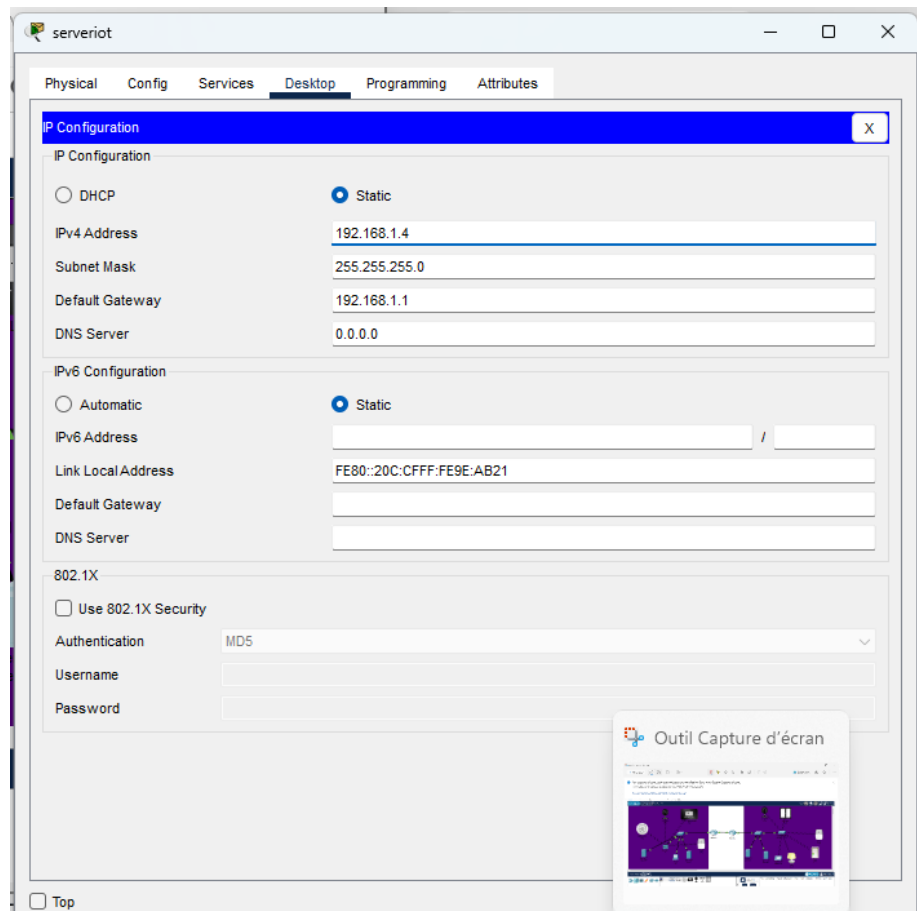


Figure 5: image 8

serverdhcp1

Physical Config **Services** Desktop Programming Attributes

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

DHCP

Interface: FastEthernet0 Service: ☒ On ☐ Off

Pool Name: serverPool

Default Gateway: 192.168.1.1

DNS Server: 0.0.0.0

Start IP Address: 192 168 1 5

Subnet Mask: 255 255 255 0

Maximum Number of Users: 512

TFTP Server: 0.0.0.0

WLC Address: 0.0.0.0

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
serverPool	0.0.0.0	0.0.0.0	192.168....	255.255....	512	0.0.0.0	0.0.0.0

☐ Top

Figure 6: image 9

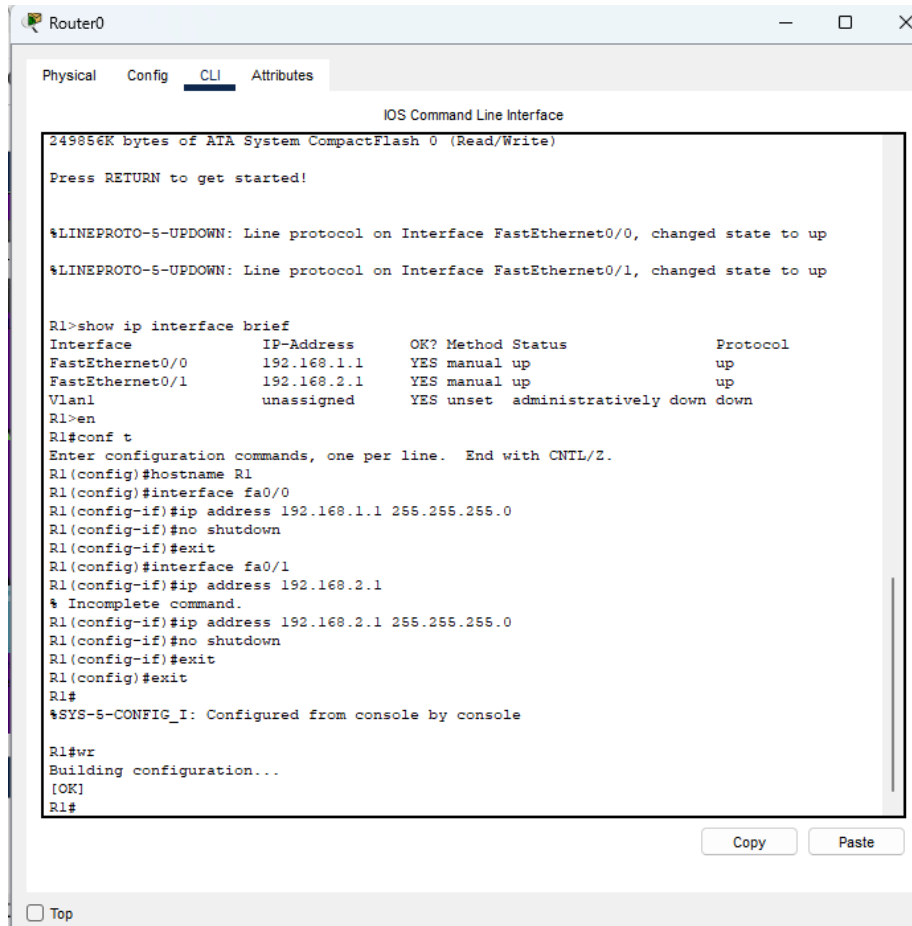


Figure 7: image 10

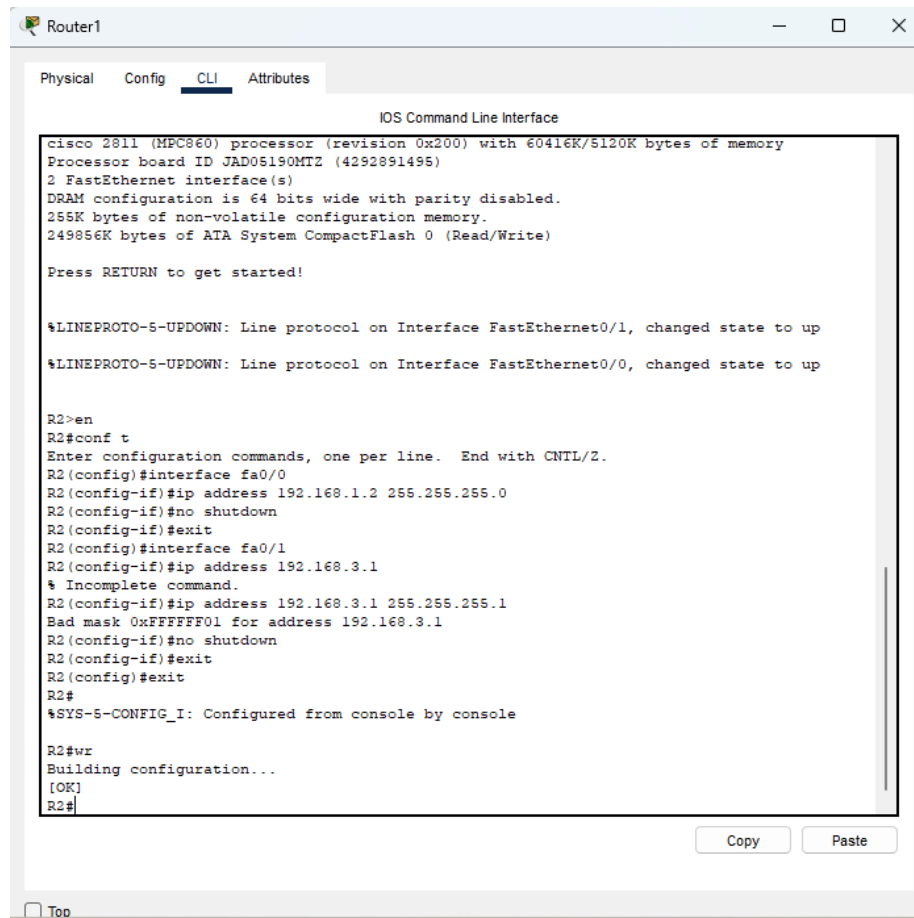
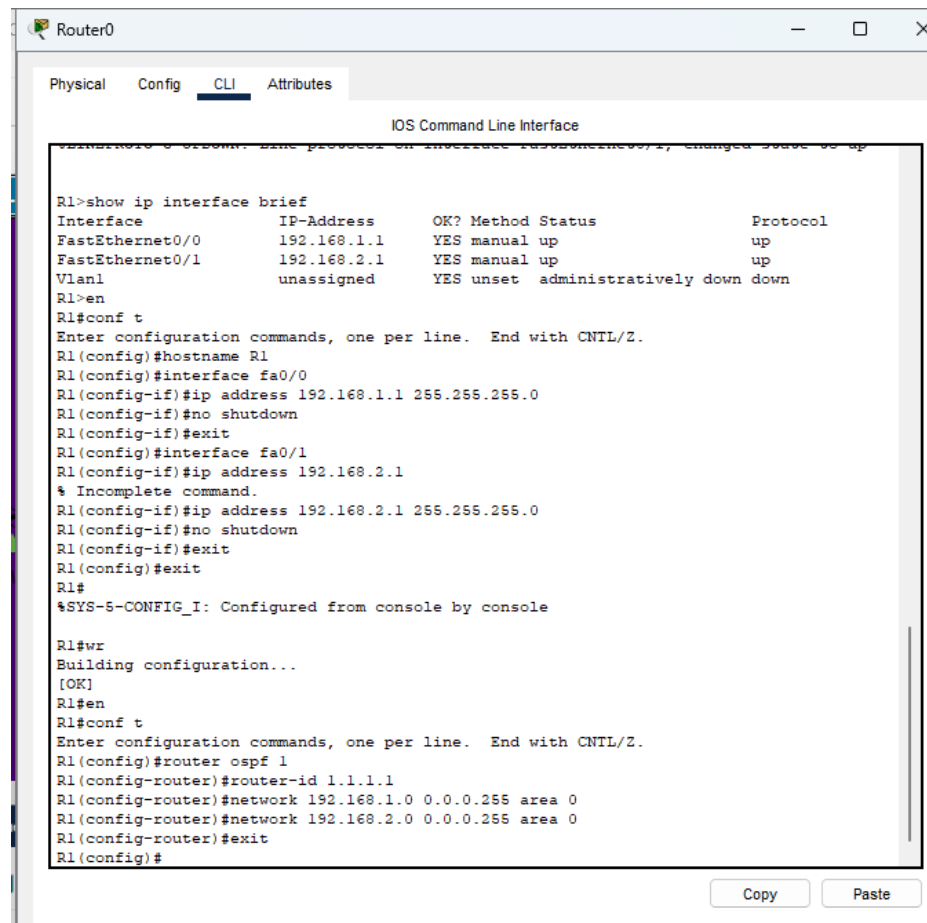


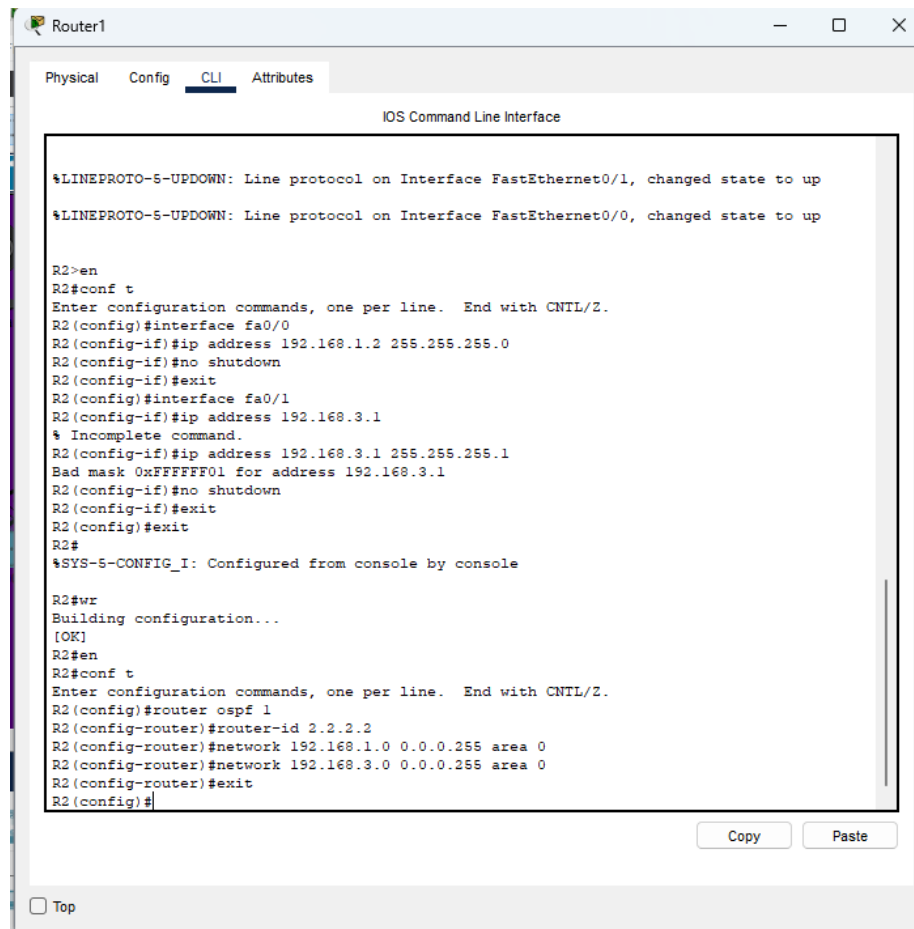
Figure 8: image 11

7. Analyse et amélioration

L'implémentation actuelle de **OSPF** garantit une connectivité robuste et évolutive. Des améliorations peuvent être apportées en intégrant un mécanisme de **segmentation VLAN** et en optimisant les méthodes de routage pour améliorer l'efficacité du réseau.



```
Router0
Physical Config CLI Attributes
IOS Command Line Interface
R1>show ip interface brief
Interface      IP-Address      OK? Method Status      Protocol
FastEthernet0/0 192.168.1.1     YES manual up          up
FastEthernet0/1 192.168.2.1     YES manual up          up
Vlan1          unassigned      YES unset  administratively down down
R1>en
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#hostname R1
R1(config)#interface fa0/0
R1(config-if)#ip address 192.168.1.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#interface fa0/1
R1(config-if)#ip address 192.168.2.1
% Incomplete command.
R1(config-if)#ip address 192.168.2.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#exit
R1#
%SYS-5-CONFIG_I: Configured from console by console
R1#wr
Building configuration...
[OK]
R1#en
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router ospf 1
R1(config-router)#router-id 1.1.1.1
R1(config-router)#network 192.168.1.0 0.0.0.255 area 0
R1(config-router)#network 192.168.2.0 0.0.0.255 area 0
R1(config-router)#exit
R1(config)#
```



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

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

R2>en
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#interface fa0/0
R2(config-if)#ip address 192.168.1.2 255.255.255.0
R2(config-if)#no shutdown
R2(config-if)#exit
R2(config)#interface fa0/1
R2(config-if)#ip address 192.168.3.1
% Incomplete command.
R2(config-if)#ip address 192.168.3.1 255.255.255.1
Bad mask 0xFFFFF01 for address 192.168.3.1
R2(config-if)#no shutdown
R2(config-if)#exit
R2(config)#exit
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#wr
Building configuration...
[OK]
R2#en
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router ospf 1
R2(config-router)#router-id 2.2.2.2
R2(config-router)#network 192.168.1.0 0.0.0.255 area 0
R2(config-router)#network 192.168.3.0 0.0.0.255 area 0
R2(config-router)#exit
R2(config)#
```

Conclusion

L'implémentation du **protocole OSPF** dans un réseau permet d'assurer une **gestion dynamique des routes**, améliorant ainsi la redondance et la performance globale. Une sécurisation renforcée via **WPA2-PSK** et des **authentifications plus robustes** serait un axe d'amélioration majeur, en particulier dans un environnement intégrant des **appareils IoT**.

Configuration d'un réseau IoT dans Cisco Packet Tracer

Introduction

Ce rapport décrit la mise en place et la configuration d'un réseau **IoT** dans **Cisco Packet Tracer**, incluant l'architecture réseau, les paramètres des appareils, la gestion DHCP, et l'intégration du routage dynamique. Chaque section est accompagnée des **captures d'écran** illustrant les étapes clés.

1. Topologie du réseau

La configuration générale du réseau est illustrée ci-dessous :

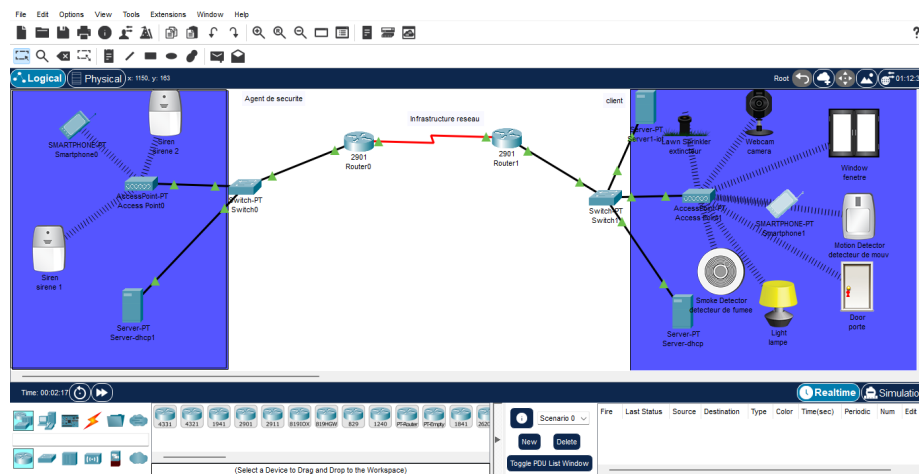


Figure 9: image 14

2. Configuration des points d'accès

Les **points d'accès Wi-Fi** sont configurés pour permettre aux **périphériques IoT** de se connecter :

3. Paramétrage des serveurs DHCP

Les **serveurs DHCP** sont mis en place pour distribuer les adresses IP aux différents équipements du réseau :

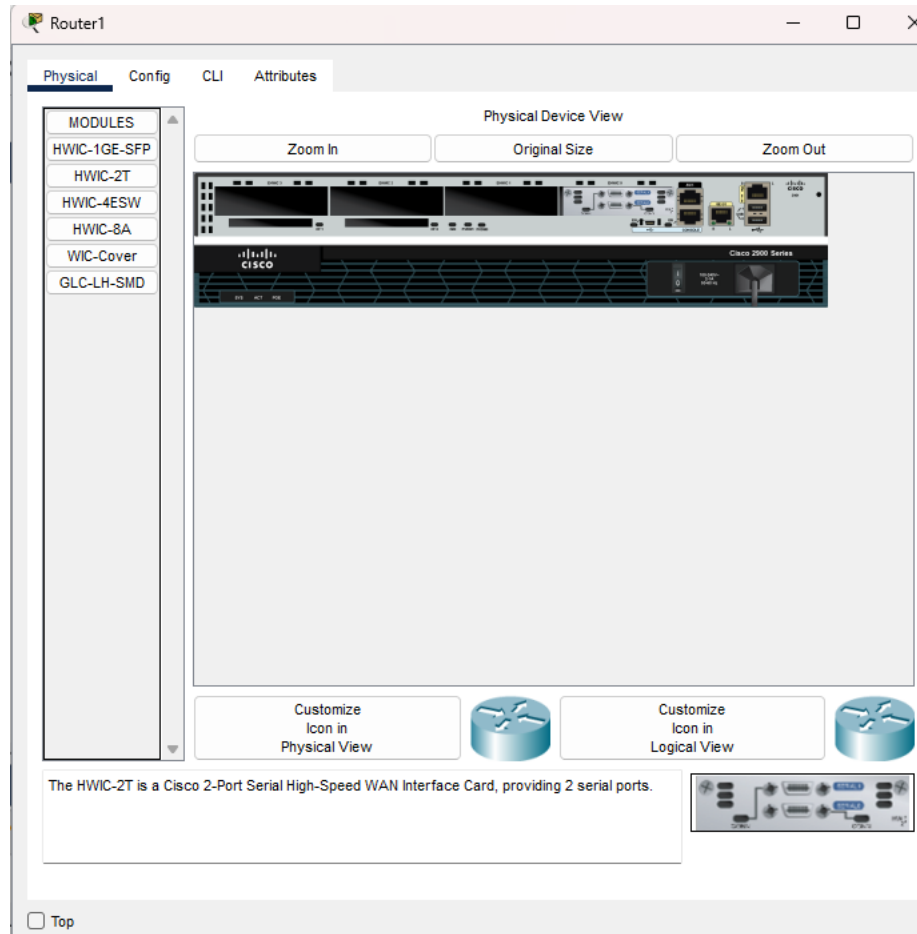


Figure 10: image 15

Server-dhcp

PhysicalConfigServicesDesktopProgrammingAttributes

IP Configuration

IP Configuration

☐ DHCP

☒ Static

IPv4 Address

192.168.1.13

Subnet Mask

255.255.255.0

Default Gateway

192.168.1.1

DNS Server

0.0.0.0

IPv6 Configuration

☐ Automatic

☒ Static

IPv6 Address

/

Link Local Address

FE80::20C:85FF:FECE:7C90

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication

MDS

Username

Password

☐ Top

Server-dhcp

Physical Config **Services** Desktop Programming Attributes

SERVICES

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

DHCP

Interface: FastEthernet0 Service: ☒ On ☐ Off

Pool Name: serverPool

Default Gateway: 192.168.1.1

DNS Server: 0.0.0.0

Start IP Address: 192 168 1 14

Subnet Mask: 255 255 255 0

Maximum Number of Users: 512

TFTP Server: 0.0.0.0

WLC Address: 0.0.0.0

Add Save Remove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
serverPool	0.0.0.0	0.0.0.0	192.168.1.14	255.255.255.0	512	0.0.0.0	0.0.0.0

☐ Top

4. Configuration des appareils IoT

Les **périphériques IoT** sont configurés avec leurs paramètres réseau et authentification.

4.1 IoT0

4.2 IoT3

4.3 IoT8

5. Sécurisation des accès et authentification

Les paramètres de sécurité et d'authentification des **appareils IoT et points d'accès** sont examinés :

Server-dhcp1

Physical Config Services **Desktop** Programming Attributes

IP Configuration [X]

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.2.13

Subnet Mask 255.255.255.0

Default Gateway 192.168.2.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::20C:85FF:FEE2:AB8

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Password

☐ Top

Figure 11: image 18

Server-dhcp1

Physical
Config
Services
Desktop
Programming
Attributes

SERVICES

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

DHCP

Interface
FastEthernet0
Service
On
Off

Pool Name
serverPool

Default Gateway
192.168.2.1

DNS Server
0.0.0.0

Start IP Address :
192
168
2
14

Subnet Mask:
255
255
255
0

Maximum Number of Users :
242

TFTP Server:
0.0.0.0

WLC Address:
0.0.0.0

Add
Save
Remove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
serverPool	192.168....	0.0.0.0	192.168....	255.255....	242	0.0.0.0	0.0.0.0

Top

Figure 12: image 19

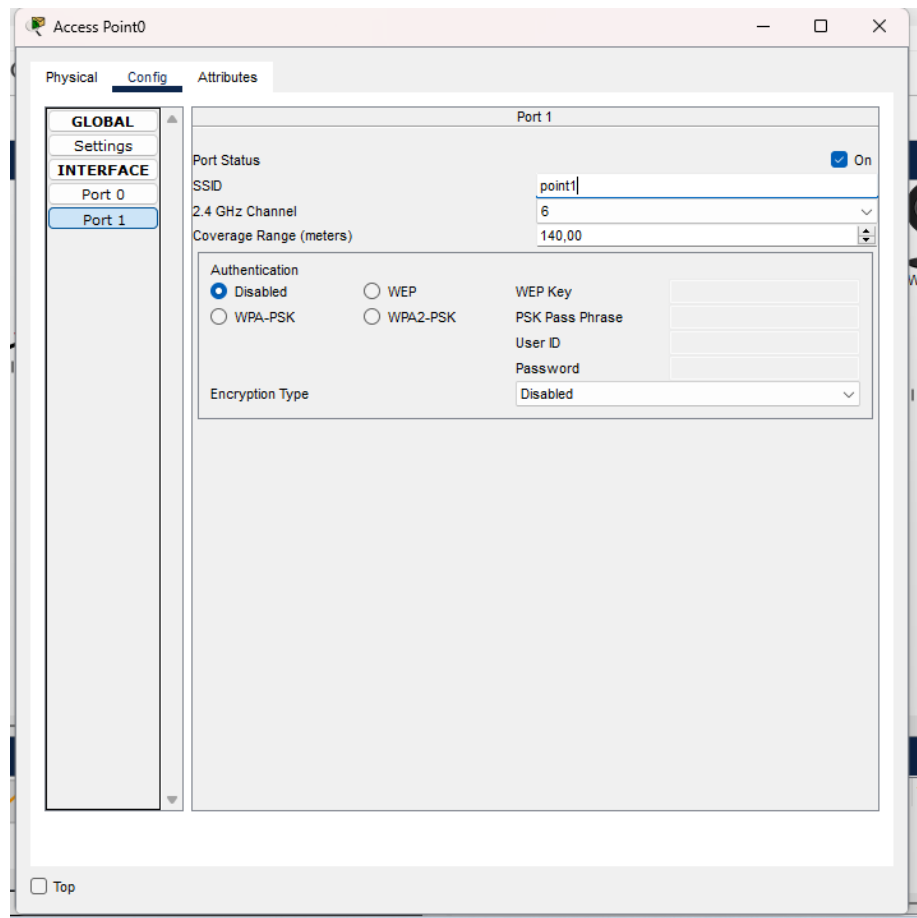


Figure 13: image 20

Access Point1

Physical

Config

Attributes

GLOBAL

Settings

INTERFACE

Port 0

Port 1

Port 1

Port Status

On

SSID

point2

2.4 GHz Channel

6

Coverage Range (meters)

140,00

Authentication

Disabled

WPA-PSK

WEP

WPA2-PSK

WEP Key

PSK Pass Phrase

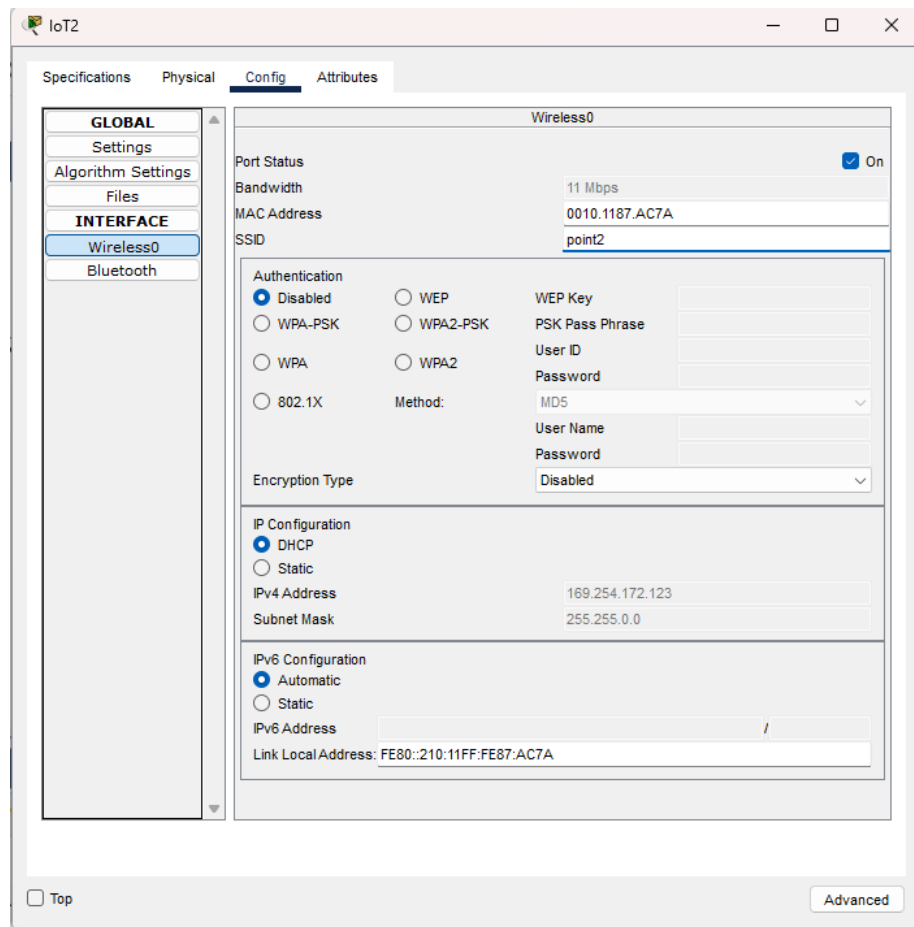
User ID

Password

Encryption Type

Disabled

Top



6. Configuration OSPF sur les routeurs

Les **routeurs** sont configurés avec le **protocole de routage OSPF**, assurant une **connectivité dynamique** et une **résilience du réseau**.

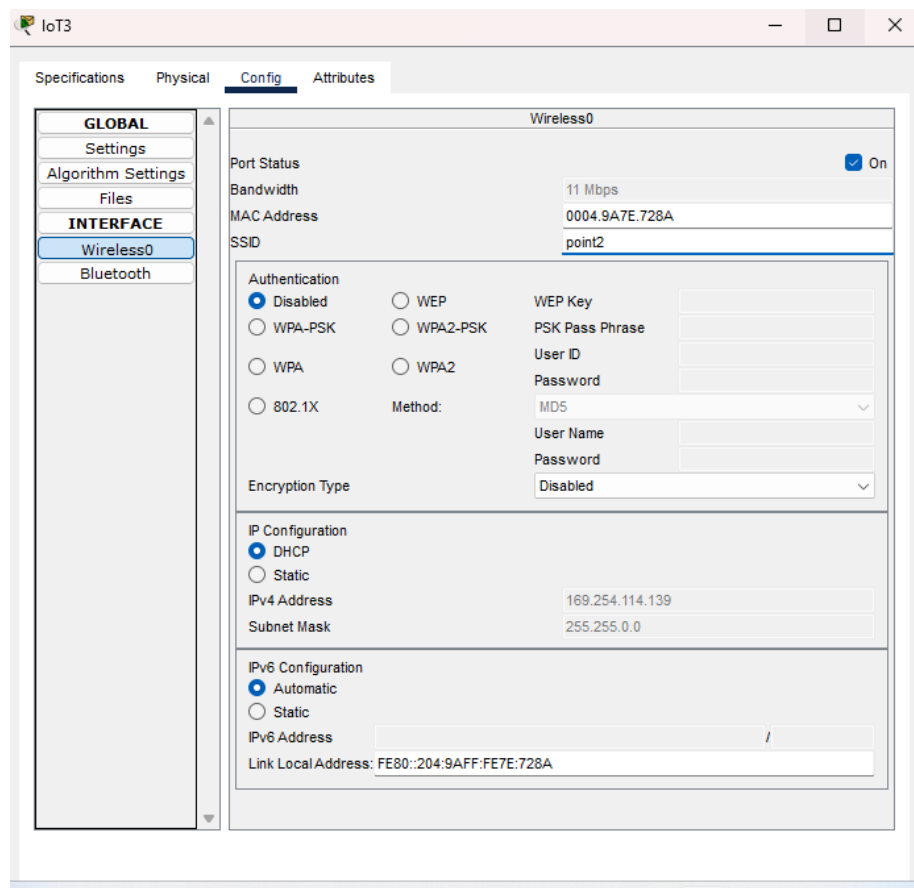


Figure 14: image 23

6.1 Routeur R1 - Configuration OSPF

6.2 Routeur R2 - Vérification des routes

Smartphone1

Physical **Config** Desktop Programming Attributes

GLOBAL

Settings

Algorithm Settings

INTERFACE

Wireless0

3G/4G Cell1

Bluetooth

Wireless0

Port Status ☒ On

Bandwidth 54 Mbps

MAC Address 00E0.F78D.0085

SSID point2

Authentication

☒ Disabled ☐ WEP ☐ WPA-PSK ☐ WPA2-PSK ☐ WPA ☐ WPA2 ☐ 802.1X

WEP Key

PSK Pass Phrase

User ID

Password

Method: MD5

User Name

Password

Encryption Type Disabled

IP Configuration

☒ DHCP ☐ Static

IPv4 Address 169.254.0.134

Subnet Mask 255.255.0.0

IPv6 Configuration

☒ Automatic ☐ Static

IPv6 Address /

Link Local Address: FE80::2E0:F7FF:FE8D:85

☐ Top

IoT1

Specifications Physical **Config** Attributes

GLOBAL

Settings

Algorithm Settings

Files

INTERFACE

Wireless0

Bluetooth

Wireless0

Port Status ☒ On

Bandwidth 11 Mbps

MAC Address 0010.11C2.9AD1

SSID point2

Authentication

☒ Disabled ☐ WEP ☐ WPA-PSK ☐ WPA2-PSK ☐ WPA ☐ WPA2 ☐ 802.1X

WEP Key

PSK Pass Phrase

User ID

Password

Method: MD5

User Name

Password

Encryption Type Disabled

IP Configuration

☒ DHCP ☐ Static

IPv4 Address 169.254.154.210

Subnet Mask 255.255.0.0

IPv6 Configuration

☒ Automatic ☐ Static

IPv6 Address /

Link Local Address: FE80::210:11FF:FEC2:9AD1

23

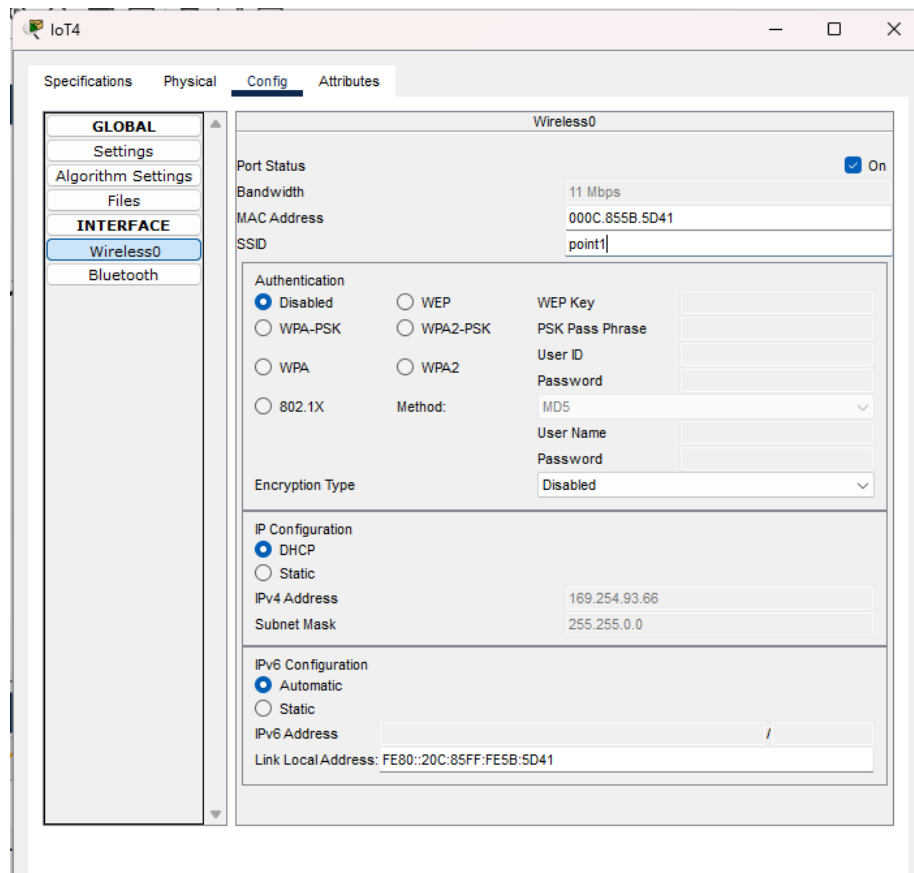
7. Tests de connectivité

Les **tests ping et traceroute** confirment la stabilité et la bonne communication entre les appareils :

The screenshot shows the 'IoT0' configuration window with the 'Config' tab selected. The left sidebar has a tree view with 'GLOBAL' (Settings, Algorithm Settings, Files) and 'INTERFACE' (Wireless0, Bluetooth). The 'Wireless0' interface is selected, showing the following settings:

- Port Status:** On (checked)
- Bandwidth:** 11 Mbps
- MAC Address:** 0090.2B08.5054
- SSID:** point2
- Authentication:** Disabled (selected), WEP, WPA-PSK, WPA2-PSK, WPA, WPA2, 802.1X. The 'Method' field is empty.
- Encryption Type:** Disabled
- IP Configuration:** DHCP (selected), Static. IPv4 Address: 169.254.80.85, Subnet Mask: 255.255.0.0.
- IPv6 Configuration:** Automatic (selected), Static. IPv6 Address: /, Link Local Address: FE80::290:2BFF:FE08:5054.

At the bottom, there is a 'Top' button and an 'Advanced' button.



8. Interface web du serveur IoT

Le **serveur IoT** est accessible via une interface web, permettant de gérer les **appareils connectés** et définir des **règles d'automatisation**.

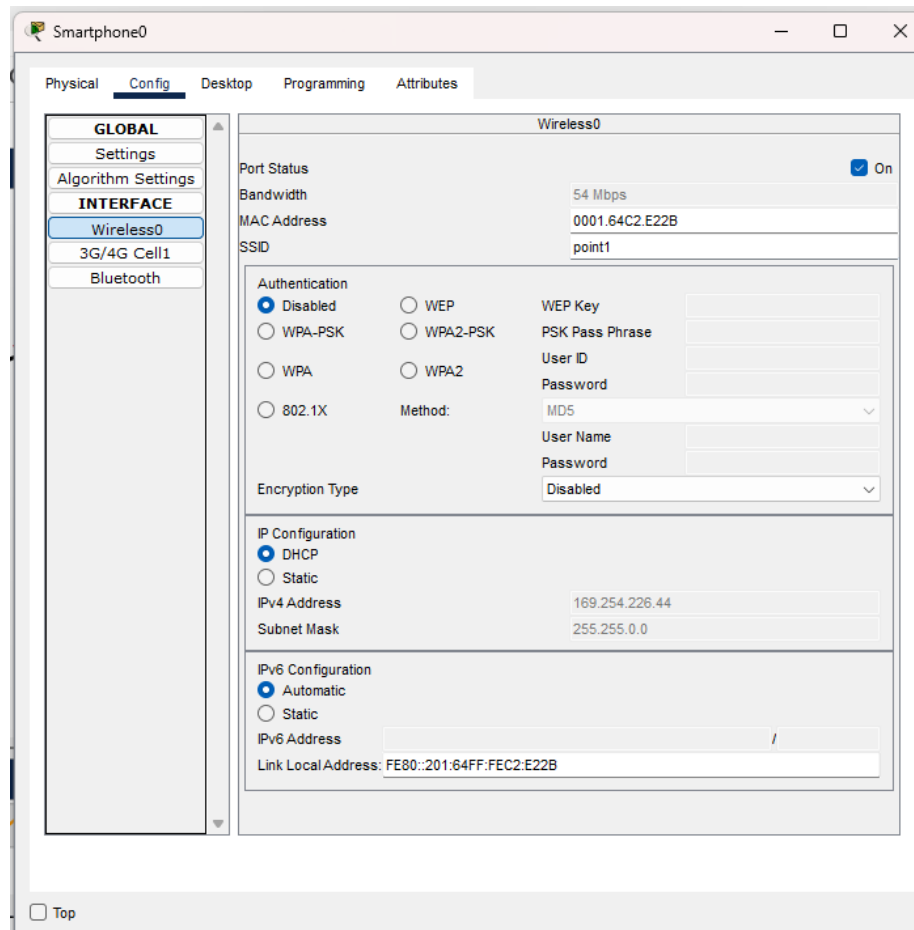


Figure 15: image 28

8.1 Accès au serveur

8.2 Gestion des appareils

Smartphone1

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface: Wireless0

IP Configuration

☒ DHCP ☐ Static

IPv4 Address: 192.168.1.17

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.1.1

DNS Server: 0.0.0.0

IPv6 Configuration

☒ Automatic ☐ Static

IPv6 Address: /

Link Local Address: FE80::2E0:F7FF:FE8D:85

Default Gateway:

DNS Server:

☐ Top

Smartphone0

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface: Wireless0

IP Configuration

☒ DHCP ☐ Static DHCP request successful.

IPv4 Address: 192.168.2.17

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.2.1

DNS Server: 0.0.0.0

IPv6 Configuration

☒ Automatic ☐ Static ipv6 request failed.

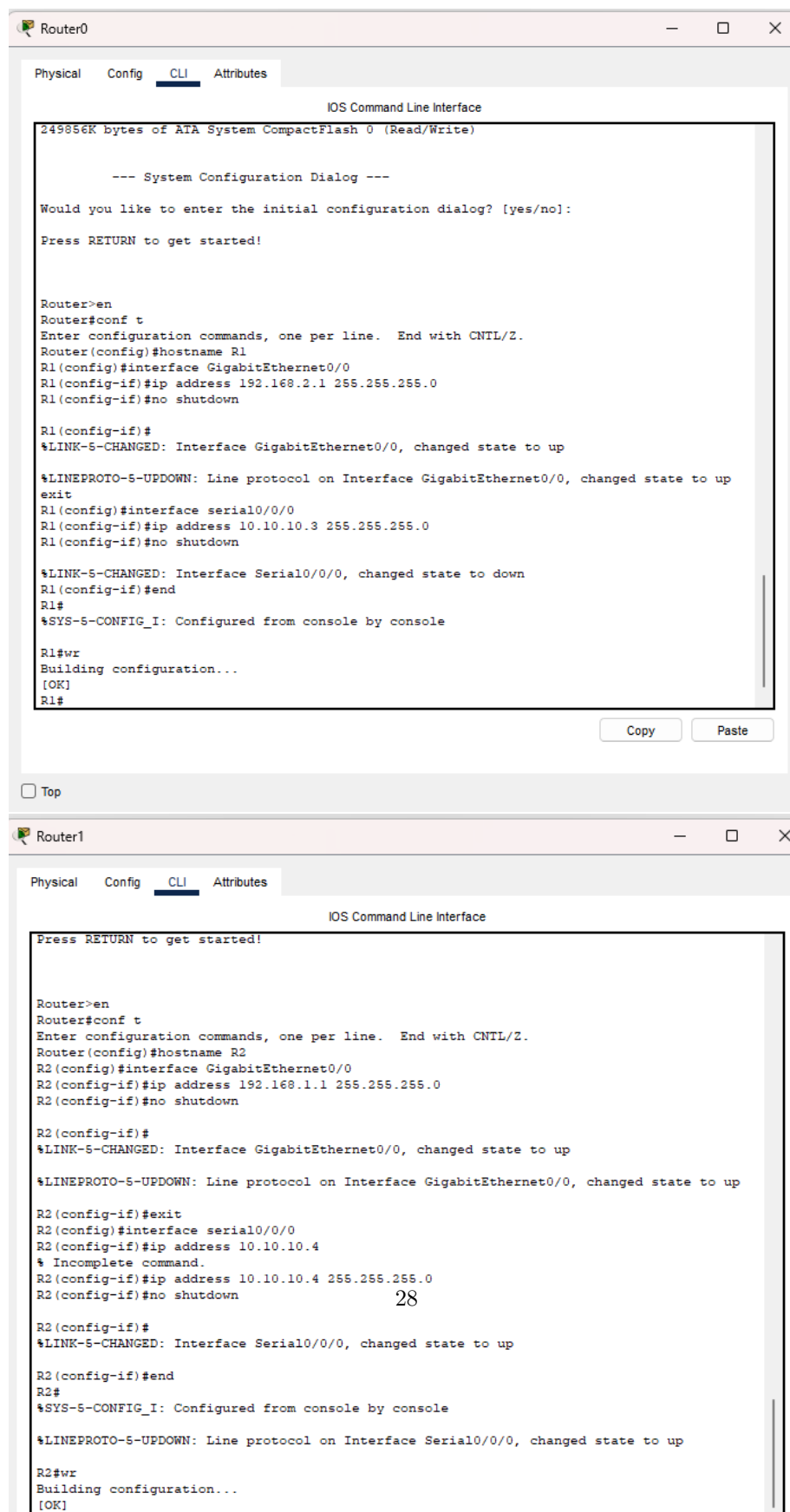
IPv6 Address: /

Link Local Address: FE80::201:64FF:FEC2:E22B

Default Gateway:

DNS Server:

8.3 Paramètres de contrôle et automatisation



The image shows two windows from the Cisco Packet Tracer application, each displaying the CLI of a different router.

Router0 Window:

- Tab: CLI
- Title: Router0
- Content:

```
IOS Command Line Interface
249856K bytes of ATA System CompactFlash 0 (Read/Write)

--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]:

Press RETURN to get started!

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#interface GigabitEthernet0/0
R1(config-if)#ip address 192.168.2.1 255.255.255.0
R1(config-if)#no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
exit
R1(config)#interface serial0/0/0
R1(config-if)#ip address 10.10.10.3 255.255.255.0
R1(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R1(config-if)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#wr
Building configuration...
[OK]
R1#
```

Router1 Window:

- Tab: CLI
- Title: Router1
- Content:

```
IOS Command Line Interface

Press RETURN to get started!

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R2(config)#interface GigabitEthernet0/0
R2(config-if)#ip address 192.168.1.1 255.255.255.0
R2(config-if)#no shutdown

R2(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

R2(config-if)#exit
R2(config)#interface serial0/0/0
R2(config-if)#ip address 10.10.10.4
% Incomplete command.
R2(config-if)#ip address 10.10.10.4 255.255.255.0
R2(config-if)#no shutdown
28
R2(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

R2(config-if)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

R2#wr
Building configuration...
[OK]
```

9. Configuration avancée des périphériques IoT

Cette section intègre les paramètres détaillés des périphériques IoT.

9.1 IoT4

The image shows two Cisco Packet Tracer routers, Router0 and Router1, with their CLI configurations displayed. Router0 is at the top and Router1 is at the bottom. Both routers have tabs for Physical, Config, CLI, and Attributes, with the CLI tab selected. The CLI window title is 'IOS Command Line Interface'.

Router0 CLI Configuration:

```
R1(config-if)#no shutdown
R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
exit
R1(config)#interface serial0/0/0
R1(config-if)#ip address 10.10.10.3 255.255.255.0
R1(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial10/0/0, changed state to down
R1(config-if)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#wr
Building configuration...
[OK]
R1#
%LINK-5-CHANGED: Interface Serial10/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial10/0/0, changed state to up

R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router ospf 1
R1(config-router)#network 192.168.0.0 0.0.255.255 area 0
R1(config-router)#network 10.10.10.0 0.0.0.255 area 0
R1(config-router)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#wr
Building configuration...
[OK]
R1#
```

Router1 CLI Configuration:

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

R2(config-if)#exit
R2(config)#interface serial0/0/0
R2(config-if)#ip address 10.10.10.4
% Incomplete command.
R2(config-if)#ip address 10.10.10.4 255.255.255.0
R2(config-if)#no shutdown

R2(config-if)#
%LINK-5-CHANGED: Interface Serial10/0/0, changed state to up

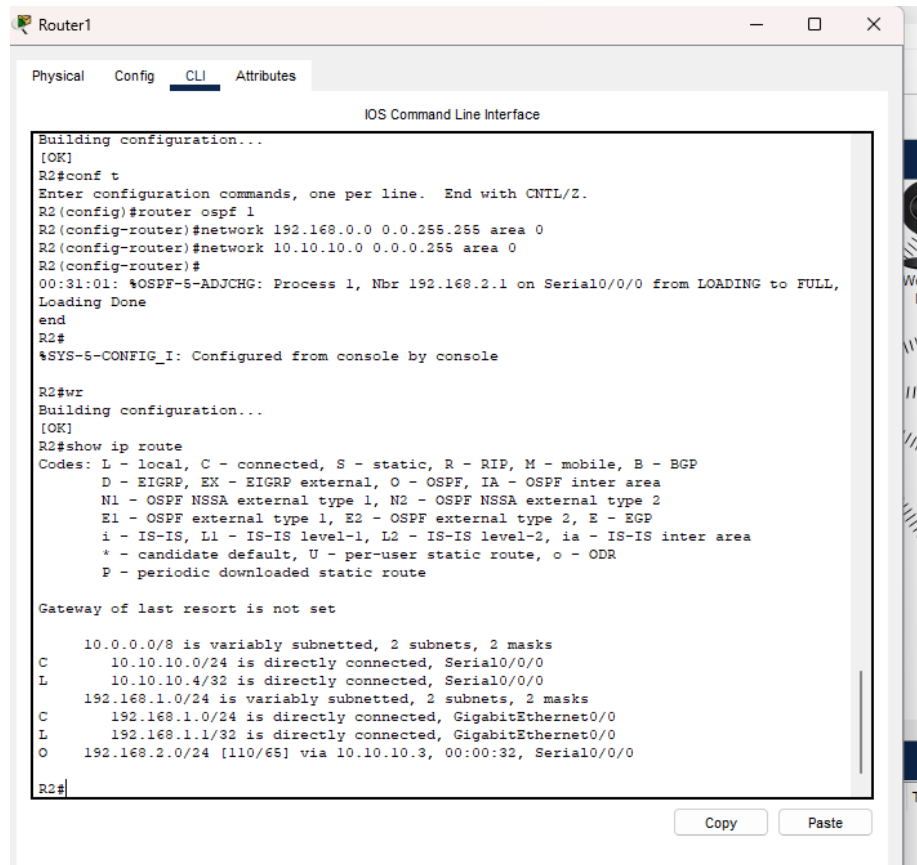
R2(config-if)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial10/0/0, changed state to up

R2#wr
Building configuration...
[OK]
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router ospf 1
R2(config-router)#network 192.168.0.0 0.0.255.255 area 0
R2(config-router)#network 10.10.10.0 0.0.0.255 area 0
R2(config-router)#
00:31:01: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.2.1 on Serial0/0/0 from LOADING to FULL,
Loading Done
end
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#wr
Building configuration...
[OK]
R2#
```

9.2 IoT5



Router1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Building configuration...
[OK]
R2#conf t
Enter configuration commands, one per line. End with CNIL/Z.
R2(config)#router ospf 1
R2(config-router)#network 192.168.0.0 0.0.255.255 area 0
R2(config-router)#network 10.10.10.0 0.0.0.255 area 0
R2(config-router)#
00:31:01: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.2.1 on Serial0/0/0 from LOADING to FULL, Loading Done
end
R2#
%SYS-5-CONFIG_I: Configured from console by console

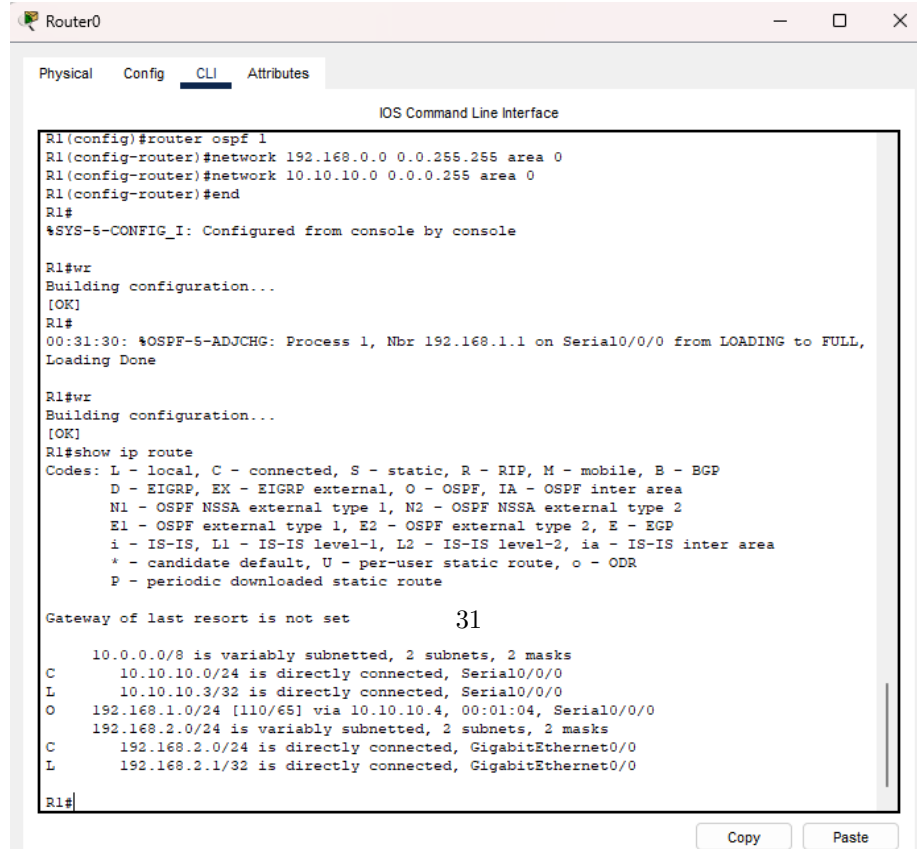
R2#wr
Building configuration...
[OK]
R2#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 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

    10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       10.10.10.0/24 is directly connected, Serial0/0/0
L       10.10.10.4/32 is directly connected, Serial0/0/0
C       192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.1.0/24 is directly connected, GigabitEthernet0/0
L       192.168.1.1/32 is directly connected, GigabitEthernet0/0
O       192.168.2.0/24 [110/65] via 10.10.10.3, 00:00:32, Serial0/0/0

R2#
```

Copy Paste



Router0

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R1(config)#router ospf 1
R1(config-router)#network 192.168.0.0 0.0.255.255 area 0
R1(config-router)#network 10.10.10.0 0.0.0.255 area 0
R1(config-router)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#wr
Building configuration...
[OK]
R1#
00:31:30: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.1.1 on Serial0/0/0 from LOADING to FULL, Loading Done

R1#wr
Building configuration...
[OK]
R1#show ip route
Codes: L - local, C - connected, S - static, 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

    10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       10.10.10.0/24 is directly connected, Serial0/0/0
L       10.10.10.3/32 is directly connected, Serial0/0/0
O       192.168.1.0/24 [110/65] via 10.10.10.4, 00:01:04, Serial0/0/0
C       192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.2.0/24 is directly connected, GigabitEthernet0/0
L       192.168.2.1/32 is directly connected, GigabitEthernet0/0

R1#
```

Copy Paste

9.3 IoT6

The image shows two windows from the Cisco Packet Tracer application. The top window, titled 'Smartphone0', 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 a ping command to 192.168.1.1, showing successful results with 0% loss and round trip times between 25ms and 46ms. The bottom window, titled 'Server1-iot', also has tabs for Physical, Config, Services, Desktop, Programming, and Attributes. The 'Desktop' tab is active, showing the 'IP Configuration' window. This window is divided into IPv4 and IPv6 configuration sections. The IPv4 section is set to 'Static' with an IP address of 192.168.1.5, subnet mask of 255.255.255.0, and default gateway of 192.168.1.1. The IPv6 section is also set to 'Static' with a link local address of FE80::2D0:FFFF:FE33:3E11. Below these sections, the '802.1X' section is visible, showing a checkbox for 'Use 802.1X Security' which is unchecked, and a dropdown menu for 'Authentication' set to 'MD5'. The number '32' is displayed in the center of the 802.1X section.

Smartphone0

Physical Config Desktop Programming Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time=46ms TTL=254
Reply from 192.168.1.1: bytes=32 time=25ms TTL=254
Reply from 192.168.1.1: bytes=32 time=34ms TTL=254
Reply from 192.168.1.1: bytes=32 time=34ms TTL=254

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 25ms, Maximum = 46ms, Average = 34ms

C:\>
```

Server1-iot

Physical Config Services Desktop Programming Attributes

IP Configuration

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.1.5

Subnet Mask 255.255.255.0

Default Gateway 192.168.1.1

DNS Server 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::2D0:FFFF:FE33:3E11

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security 32

Authentication MD5

Username

Password

9.4 IoT7

The image displays two windows from a virtual environment. The top window, titled "Server1-iot", shows the "Services" configuration page. On the left, a list of services includes HTTP, DHCP, DHCPv6, TFTP, DNS, SYSLOG, AAA, NTP, EMAIL, FTP, IoT (highlighted), VM Management, and Radius EAP. The main area is titled "Registration Server" and contains the text "This service runs on top of the HTTP or HTTPS service." Below this, the "Service" is set to "On" with a radio button. A "Delete" button is visible at the bottom right of the main area. The bottom window, titled "Smartphone1", shows a "Web Browser" with the URL "http://192.168.1.5". The browser displays the "Registration Server Login" page, which includes fields for "Username:" and "Password:", a "Sign In" button, and a link for "Don't have an IoT account? Sign up now".

Server1-iot

Physical Config **Services** Desktop Programming Attributes

SERVICES

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

Registration Server

This service runs on top of the HTTP or HTTPS service.

Service ☒ On ☐ Off

Delete

Top

Smartphone1

Physical Config **Desktop** Programming Attributes

Web Browser X

< > URL http://192.168.1.5 Go Stop

Registration Server Login

Username:

Password:

Sign In

Don't have an IoT account? [Sign up now](#)

9.5 IoT9

The image shows a Smartphone1 emulator window with a Web Browser application open. The browser's address bar shows the URL `http://192.168.1.5/create_account.html`. The page content is titled "Registration Server Account Creation" and contains a form with two input fields: "Username:" with the value "wendy" and "Password:" with masked characters "....". A "Create" button is located below the password field. The browser window has a blue title bar and a close button (X). The emulator's top bar shows tabs for Physical, Config, Desktop, Programming, and Attributes, with Desktop selected. A "Top" button is visible below the browser window.

Smartphone1

Physical Config Desktop Programming Attributes

Web Browser X

< > URL `http://192.168.1.5/create_account.html` Go Stop

Registration Server Account Creation

Username: wendy

Password:

Create

Top

Smartphone1

Physical Config Desktop Programming Attributes

Web Browser X

< > URL `http://192.168.1.5/home.html` Go Stop

IoT Server - Devices Home | [Conditions](#) | [Editor](#) | [Log Out](#)

10. Optimisation du réseau

Cette section analyse les **paramètres réseaux avancés** et propose des améliorations.

10.1 Configuration du serveur IoT

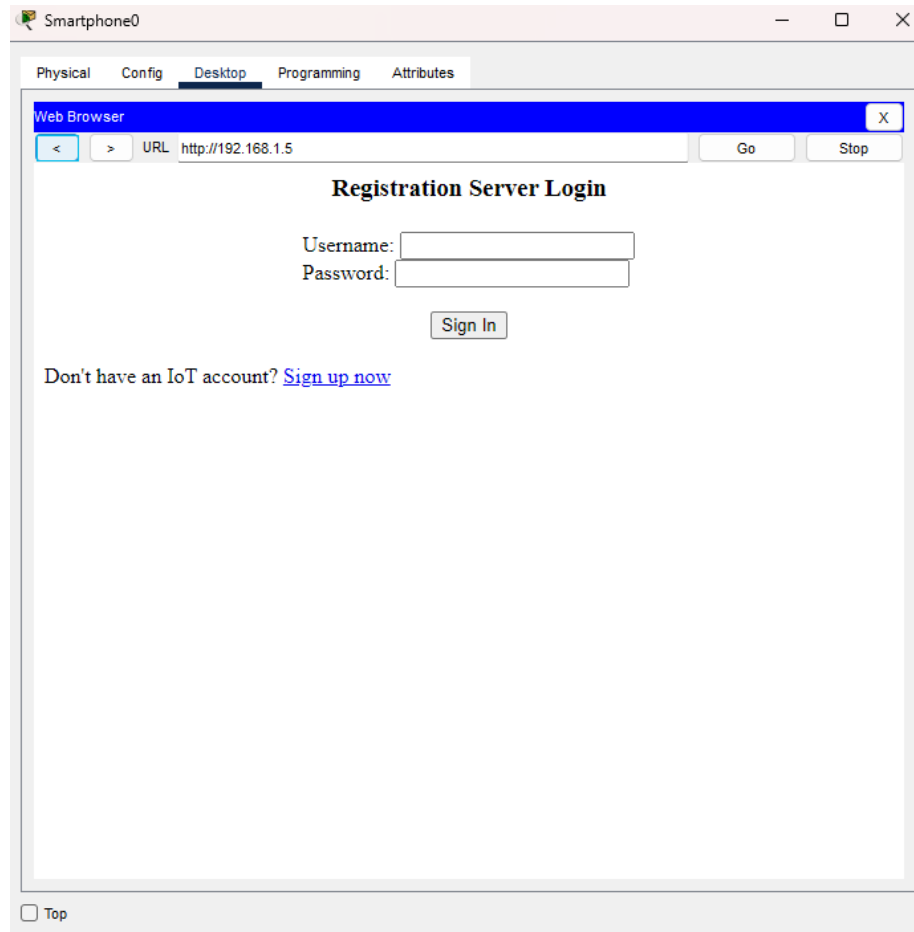
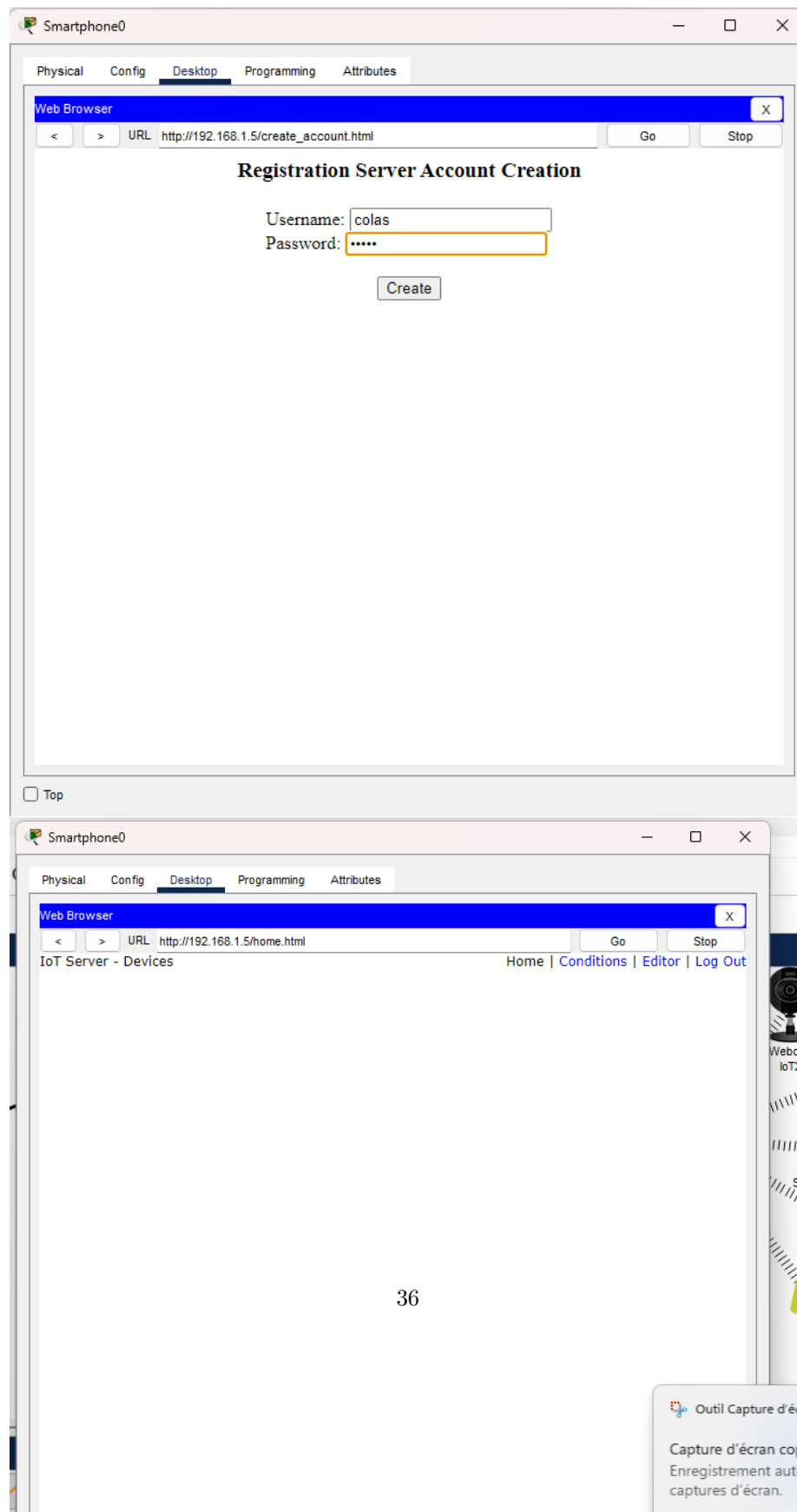
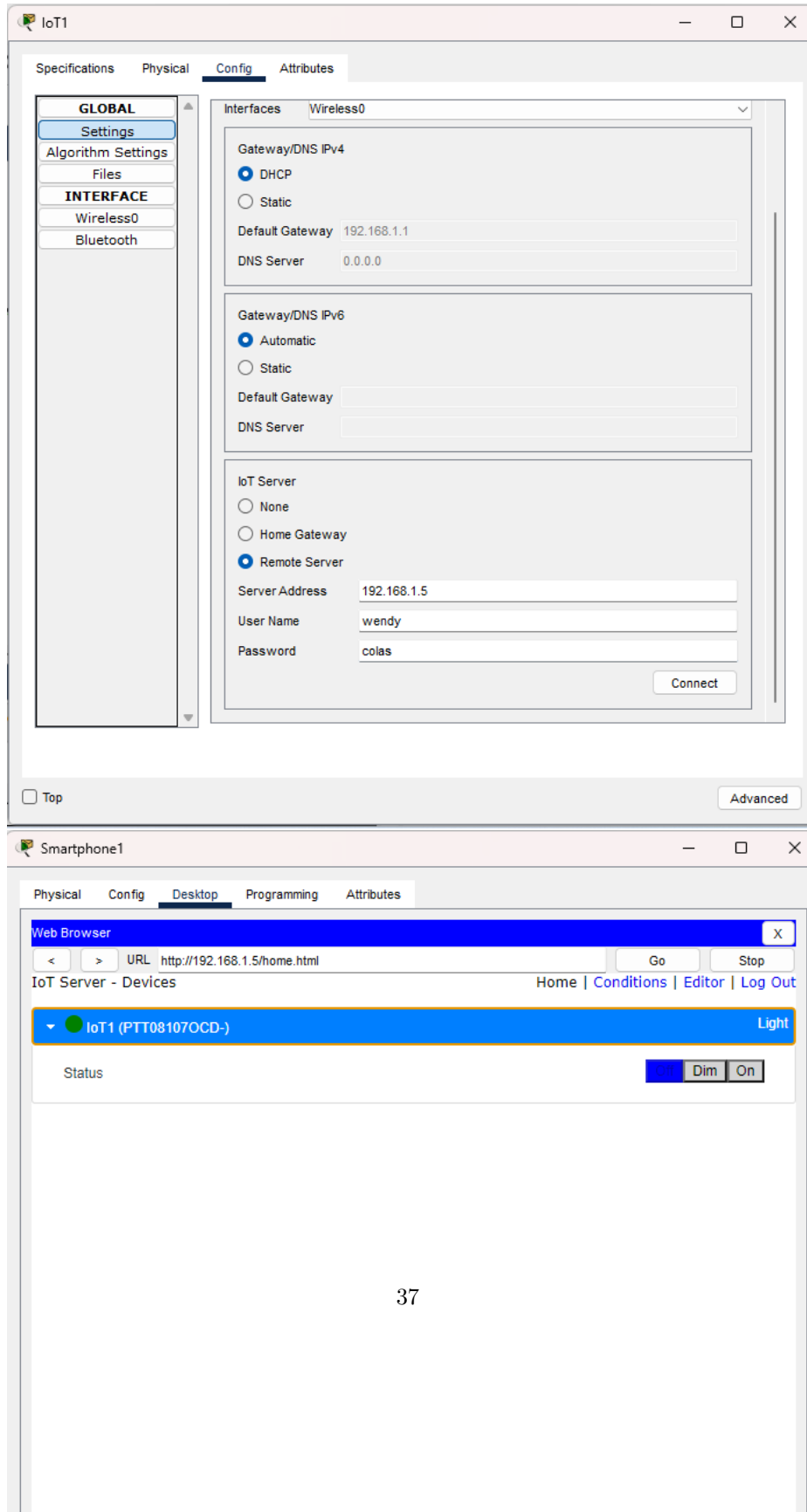


Figure 16: image 43

10.2 Vérification des adresses IP



10.3 Analyse des performances réseau



10.4 Tests complémentaires

IoT3

Specifications Physical **Config** Attributes

GLOBAL

- Settings
- Algorithm Settings
- Files

INTERFACE

- Wireless0
- Bluetooth

Interfaces: Wireless0

Gateway/DNS IPv4

☒ DHCP

☐ Static

Default Gateway: 192.168.1.1

DNS Server: 0.0.0.0

Gateway/DNS IPv6

☒ Automatic

☐ Static

Default Gateway:

DNS Server:

IoT Server

☐ None

☐ Home Gateway

☒ Remote Server

Server Address: 192.168.1.5

User Name: wendy

Password: colas

Connect

☐ Top Advanced

IoT0

Specifications Physical **Config** Attributes

GLOBAL

- Settings
- Algorithm Settings
- Files

INTERFACE

- Wireless0
- Bluetooth

Interfaces: Wireless0

Gateway/DNS IPv4

☒ DHCP

☐ Static

Default Gateway: 192.168.1.1

DNS Server: 0.0.0.0

Gateway/DNS IPv6

☒ Automatic

☐ Static

Default Gateway:

DNS Server:

IoT Server

☐ None

☐ Home Gateway

☒ Remote Server

Server Address: 192.168.1.5

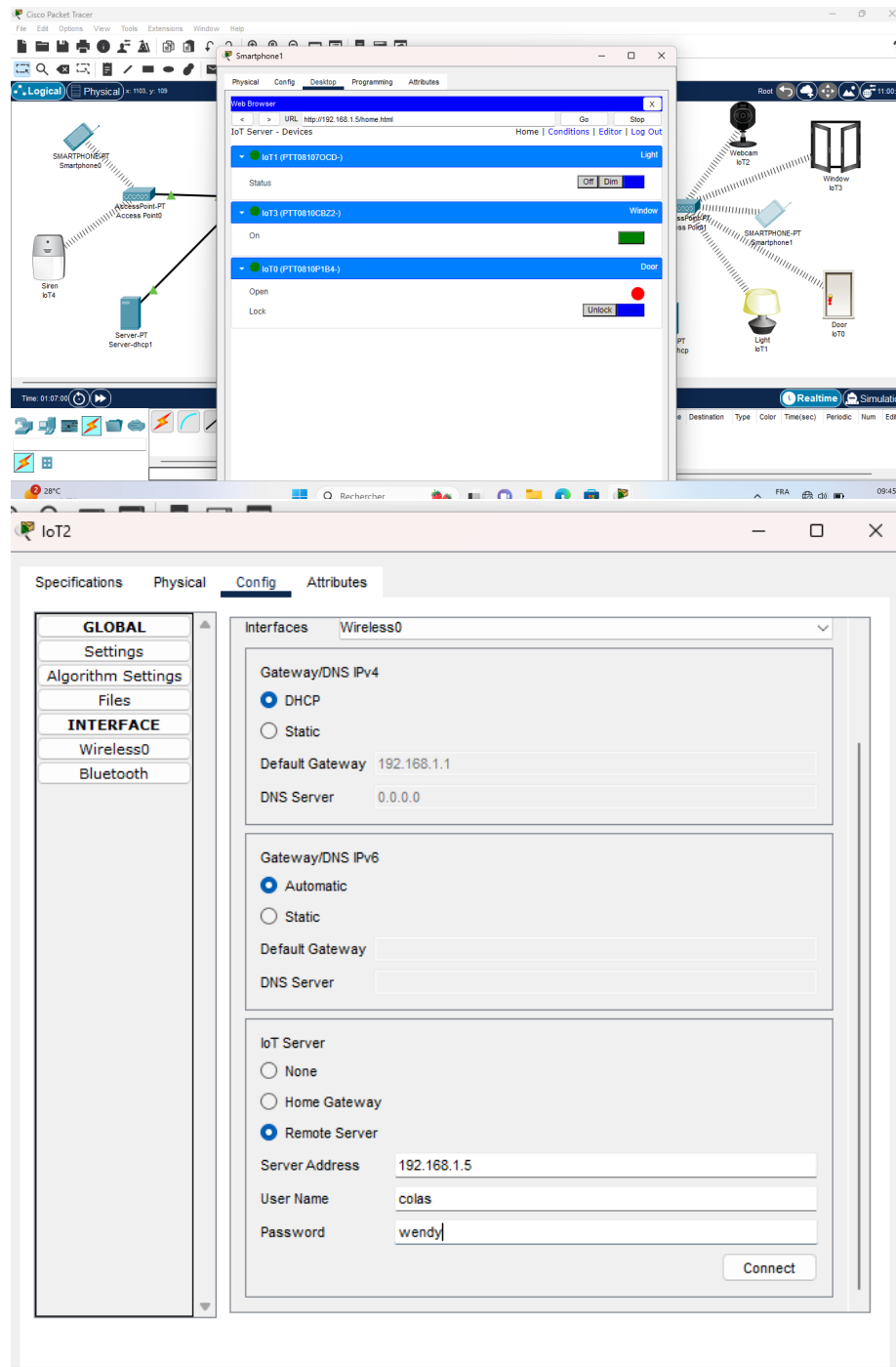
User Name: wendy

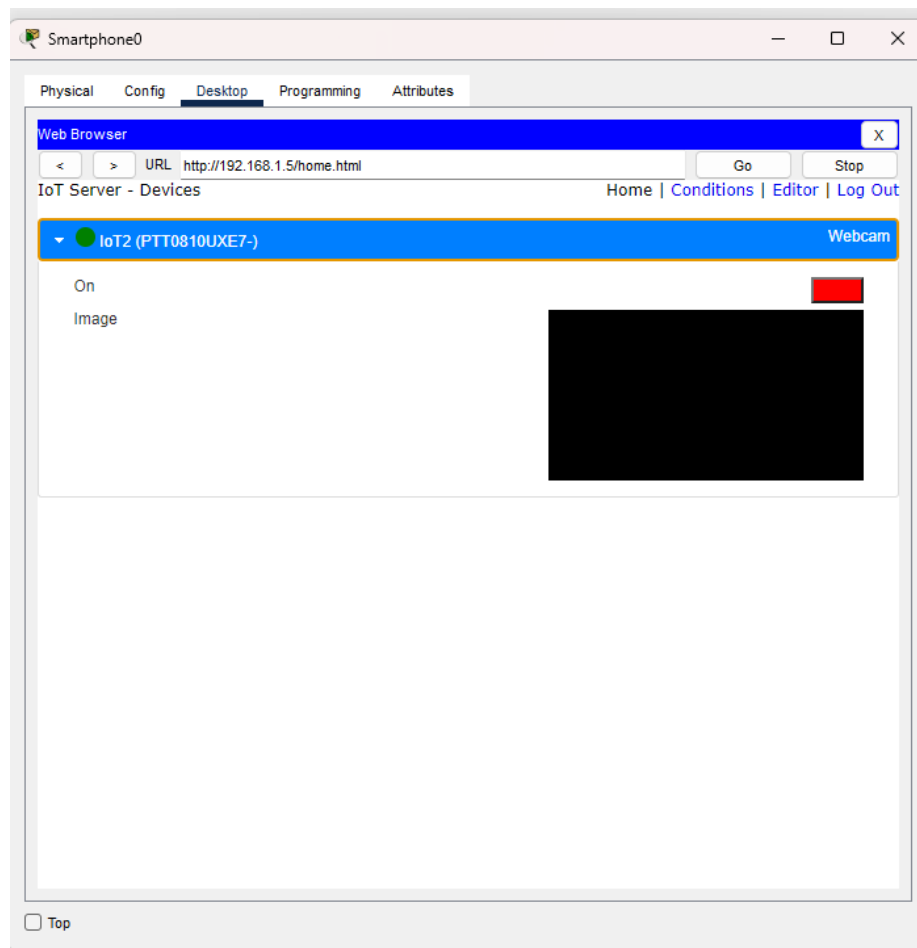
Password: colas

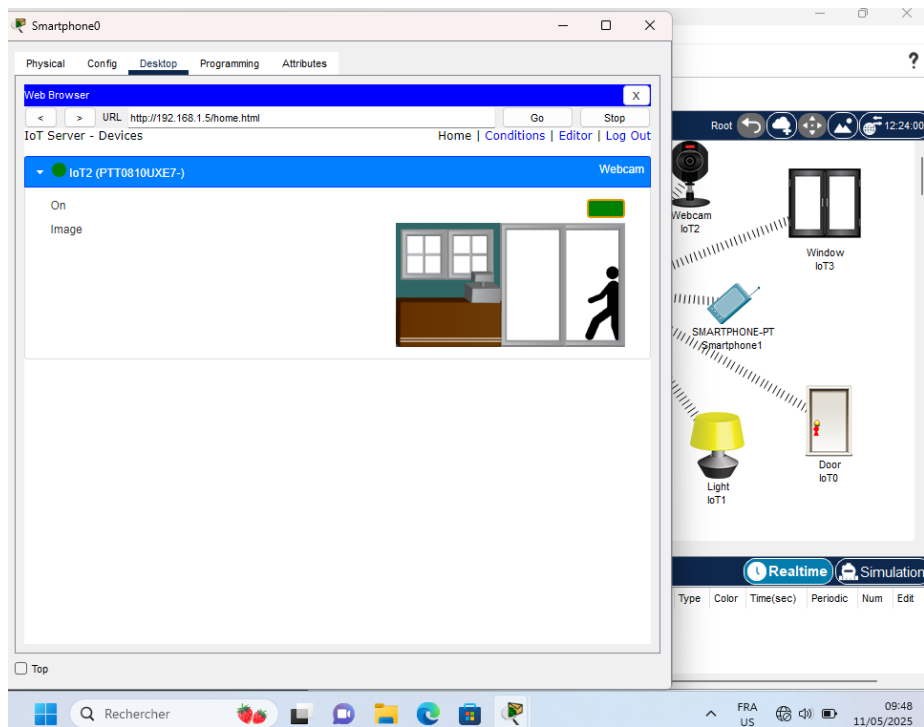
Connecting

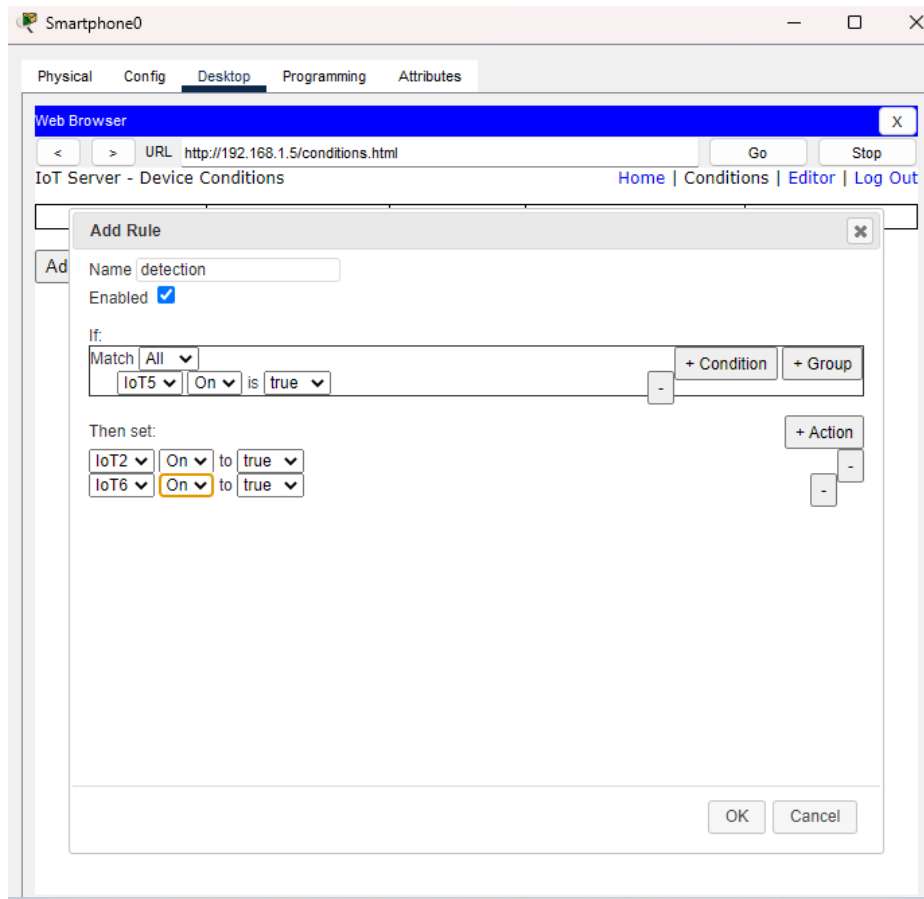
38

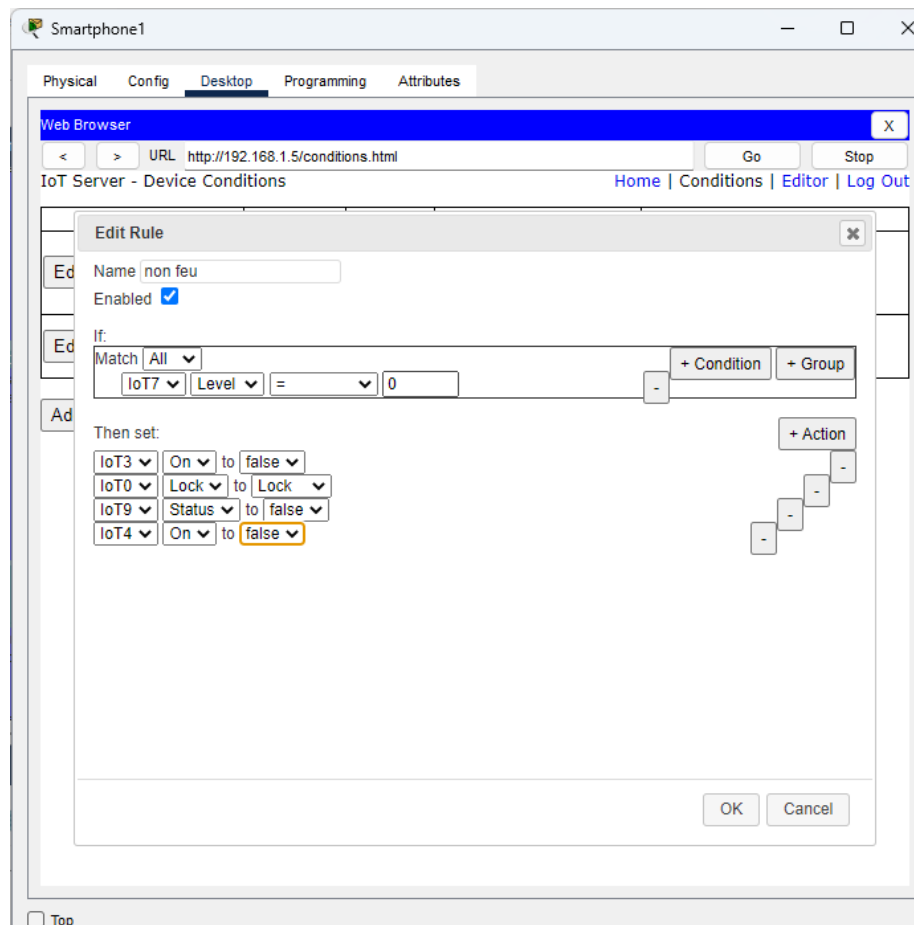
10.5 Finalisation des tests et ajustements











Conclusion

Ce rapport documente l'ensemble du **processus de configuration d'un réseau IoT** dans **Cisco Packet Tracer**, illustrant la mise en place des **serveurs DHCP**, des **routeurs OSPF**, des **points d'accès Wi-Fi** et des **appareils IoT**. Il met en avant la nécessité de sécuriser les **connexions IoT** et d'optimiser la **gestion des équipements** pour garantir un **réseau performant et résilient**.