

**EVALUACIÓN – PRUEBA DE HABILIDADES PRÁCTICAS CCNA
DIPLOMADO EN CISCO**

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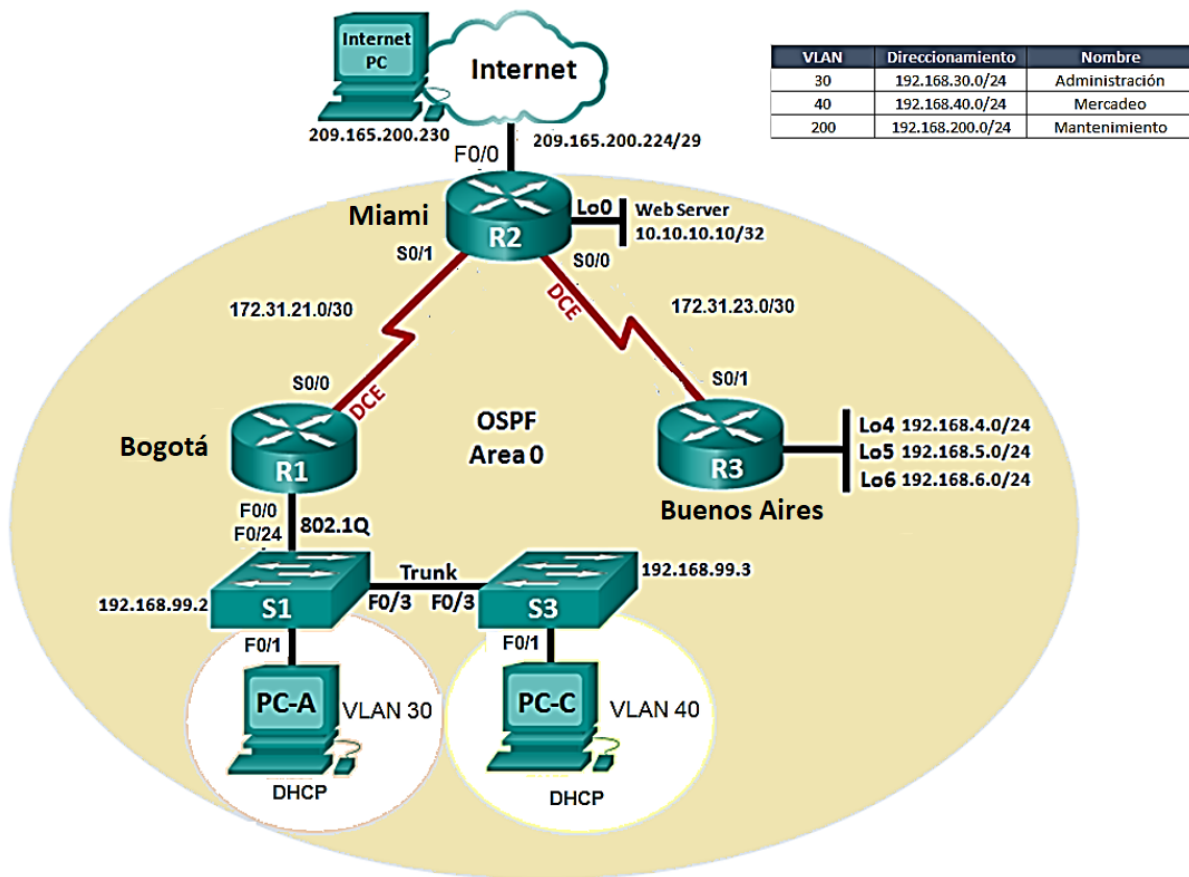
EVALUACIÓN – PRUEBA DE HABILIDADES PRÁCTICAS CCNA DIPLOMADO EN CISCO 1

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Una empresa de Tecnología posee tres sucursales distribuidas en las ciudades de Miami, Bogotá y Buenos Aires, en donde el estudiante será el administrador de la red, el cual deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con los lineamientos establecidos para el direccionamiento IP, protocolos de enrutamiento y demás aspectos que forman parte de la topología de red. 29



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INTRODUCCION

El diplomado con especialización en cisco que ofrece la universidad Nacional Abierta y a Distancia en convenio con CCNA-NETACAD permite a los estudiantes adquirir los mejores conocimientos de redes con un ambiente fresco, agradable e interactivo para ir navegando, jugando y aprendiendo a lo largo del curso. Es importante mencionar que se encuentra muy bien desarrollado pues gracias a las evaluaciones técnicas y prácticas podemos tener un concepto más claro y preciso de cómo vamos en el curso y qué temas debemos reforzar.

Dado a todos los esfuerzos realizados por la UNAD, hoy me siento plenamente capacitada para ejercer un cargo en redes y telecomunicaciones, y por esto realice los dos ejercicios que me permitieron poner a funcionar todos los conceptos, conocimientos y aprendizajes que me dejó este Diplomado, los invito para que vean el paso a paso de dos ejercicios que de lejos parece fácil pero cuando vamos a implementarlos debemos estar muy preparados en cada uno de los temas de CCNA1 Y CCNA2.

Escenario 1

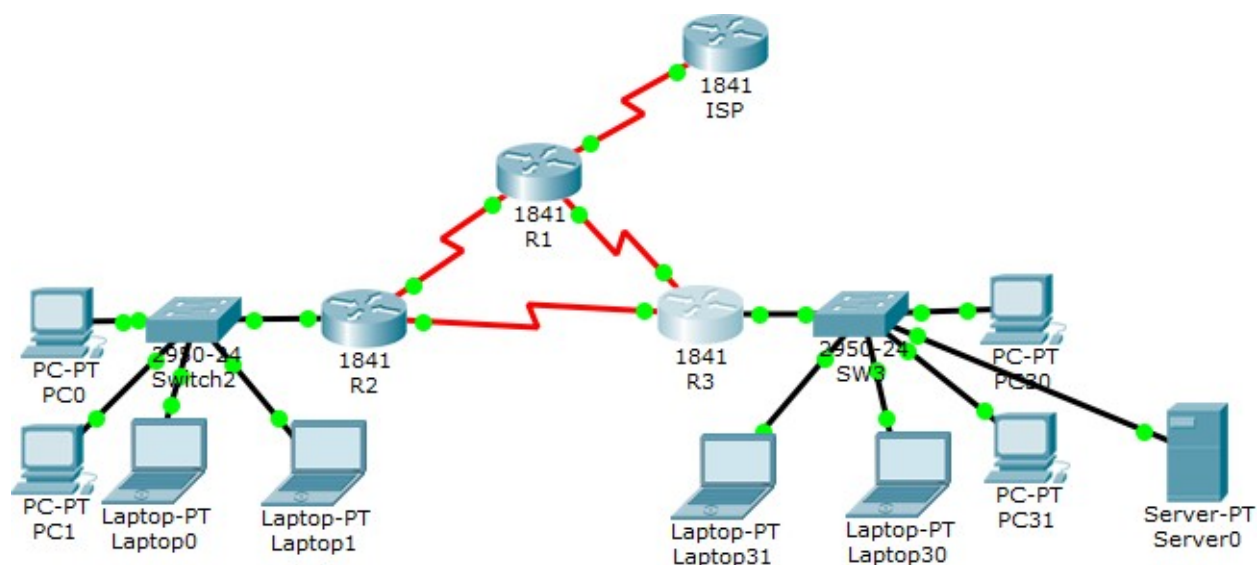


Tabla de direccionamiento

El administrador	Interfaces	Dirección IP	Máscara de subred	Gateway predeterminado
ISP	S0/0/0	200.123.211.1	255.255.255.0	N/D
	Se0/0/0	200.123.211.2	255.255.255.0	N/D
	Se0/1/0	10.0.0.1	255.255.255.252	N/D

R1	Se0/1/1	10.0.0.5	255.255.255.252	N/D
R2	Fa0/0,100	192.168.20.1	255.255.255.0	N/D
	Fa0/0,200	192.168.21.1	255.255.255.0	N/D
	Se0/0/0	10.0.0.2	255.255.255.252	N/D
	Se0/0/1	10.0.0.9	255.255.255.252	N/D
R3	Fa0/0	192.168.30.1	255.255.255.0	N/D
		2001:db8:130:: 9C0:80F:301	/64	N/D
	Se0/0/0	10.0.0.6	255.255.255.252	N/D
	Se0/0/1	10.0.0.10	255.255.255.252	N/D
	SW2	VLAN 100	N/D	N/D
	VLAN 200	N/D	N/D	N/D
SW3	VLAN1	N/D	N/D	N/D

PC20	NIC	DHCP	DHCP	DHCP
PC21	NIC	DHCP	DHCP	DHCP
PC30	NIC	DHCP	DHCP	DHCP
PC31	NIC	DHCP	DHCP	DHCP
Laptop20	NIC	DHCP	DHCP	DHCP

Laptop21	NIC	DHCP	DHCP	DHCP
Laptop30	NIC	DHCP	DHCP	DHCP
Laptop31	NIC	DHCP	DHCP	DHCP

Tabla de asignación de VLAN y de puertos

Dispositivo	VLAN	Nombre	Interfaz
SW2	100	LAPTOPS	Fa0/2-3
SW2	200	DESTOPS	Fa0/4-5
SW3	1	-	Todas las interfaces

Tabla de enlaces troncales

Dispositivo local	Interfaz local	Dispositivo remoto
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SW2	Fa0/2-3	100
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Situación

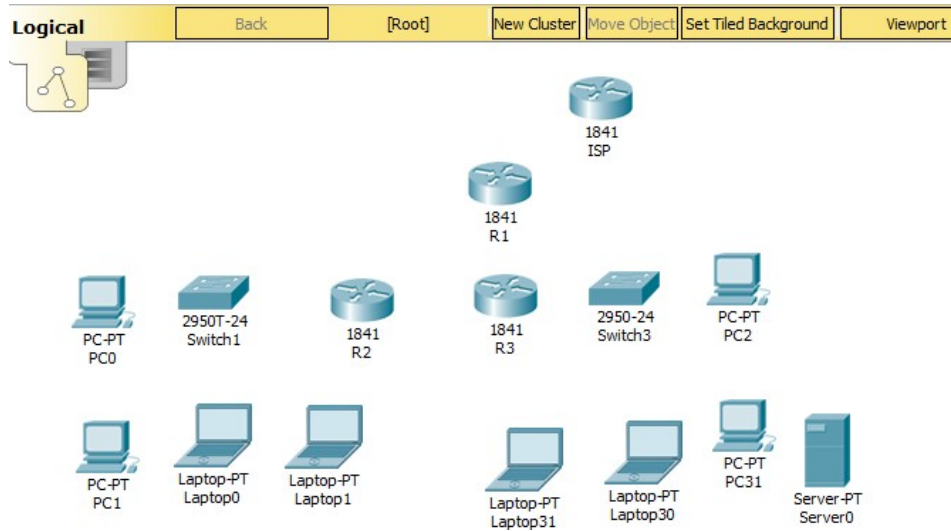
En esta actividad, demostrará y reforzará su capacidad para implementar NAT, servidor de DHCP, RIPv2 y el routing entre VLAN, incluida la configuración de direcciones IP, las VLAN, los enlaces troncales y las subinterfaces. Todas las pruebas de alcance deben realizarse a través de ping únicamente.

Descripción de las actividades

- **SW1** VLAN y las asignaciones de puertos de VLAN deben cumplir con la tabla 1.
- Los puertos de red que no se utilizan se deben deshabilitar.
- **La información** de dirección **IP R1, R2** y R3 debe cumplir con la tabla 1.
- **Laptop20, Laptop21, PC20, PC21, Laptop30, Laptop31, PC30 y PC31** deben obtener información IPv4 del servidor DHCP.
- **R1** debe realizar una NAT con sobrecarga sobre una dirección IPv4 pública. Asegúrese de que todos los terminales pueden comunicarse con Internet pública (haga ping a la dirección ISP) y la lista de acceso estándar se **llama INSIDE-DEVS**.
- **R1** debe tener una ruta estática predeterminada al ISP que se configuró y que incluye esa ruta en **el dominio** RIPv2.
- **R2** es un servidor de DHCP para los dispositivos conectados al puerto FastEthernet0/0.

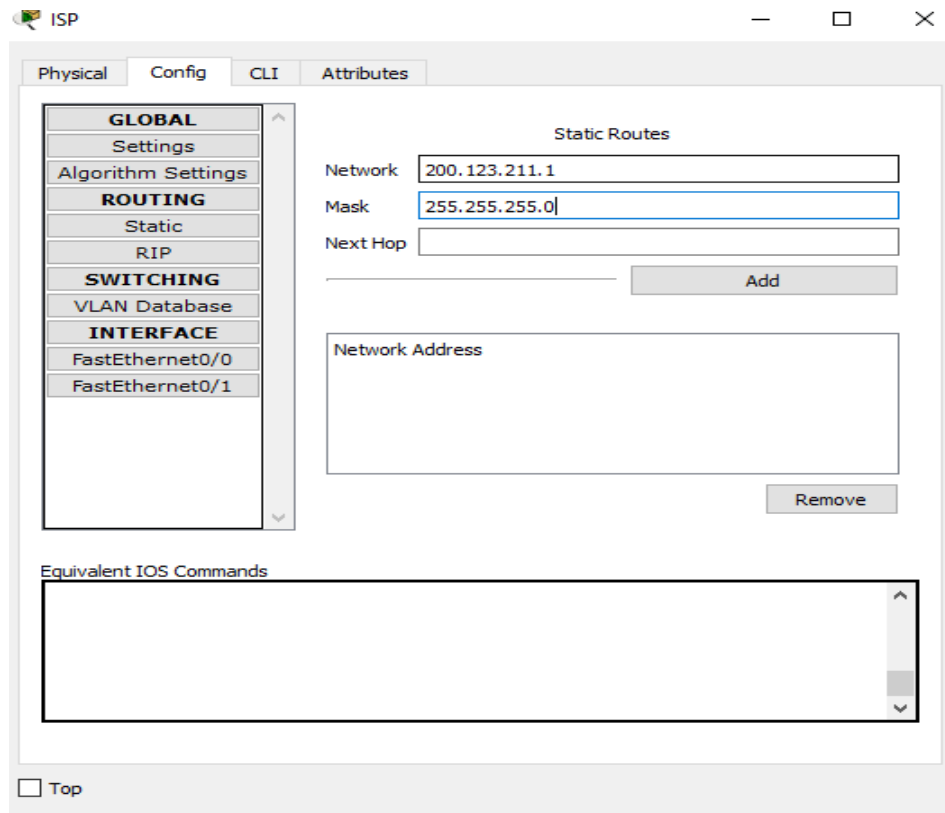
- **R2** debe, además de enrutamiento a otras partes de la red, ruta entre las VLAN 100 y 200.
- El Servidor0 es sólo un servidor IPv6 y solo debe ser accesibles para los dispositivos en R3 (ping).
- La NIC instalado en direcciones IPv4 e IPv6 de Laptop30, de Laptop31, de PC30 y obligación de configurados PC31 simultáneas (dual-stack). Las direcciones se deben configurar mediante DHCP y DHCPv6.
- La interfaz FastEthernet 0/0 del R3 también deben tener direcciones IPv4 e IPv6 configuradas (dual- stack).
- R1, R2 y R3 intercambian información de routing mediante RIP versión 2.
- R1, R2 y R3 deben saber sobre las rutas de cada uno y la ruta predeterminada desde R1.
- Verifique la conectividad. Todos los terminales deben poder hacer ping entre sí y a la dirección IP del ISP. Los terminales bajo **el R3** deberían poder hacer IPv6-ping entre ellos y el servidor.

Escenario 1 Montaje sin conexiones



1.1 Configuración ISP





1.2 Configuración R1



The screenshot shows a web-based configuration interface for a router named R1. The interface has a top navigation bar with tabs for Physical, Config, CLI, and Attributes. The Config tab is active. On the left, there is a vertical sidebar menu with categories: GLOBAL (Settings, Algorithm Settings), ROUTING (Static, RIP), SWITCHING (VLAN Database), and INTERFACE (FastEthernet0/0, FastEthernet0/1). The main content area is titled 'Static Routes' and contains three input fields: 'Network' with the value '200.123.211.2', 'Mask' with '255.255.255.0', and 'Next Hop' which is empty. Below these fields is an 'Add' button. A large empty text box labeled 'Network Address' is positioned below the 'Add' button, with a 'Remove' button to its right. At the bottom of the main area, there is a section titled 'Equivalent IOS Commands' containing a text area with the following commands:

```
Router(config)#  
Router(config)#  
Router(config)#interface FastEthernet0/0  
Router(config-if)#  
Router(config-if)#exit  
Router(config)#  
Router(config)#
```

At the very bottom of the interface, there is a 'Top' button.

The screenshot shows a network configuration window for a router named R1. The window has four tabs: Physical, Config, CLI, and Attributes. The Config tab is active, showing a tree view on the left and a configuration panel on the right. The tree view is expanded to the INTERFACE section, specifically to FastEthernet0/0. The configuration panel for FastEthernet0/0 includes the following settings:

- Port Status: On
- Bandwidth: 100 Mbps 10 Mbps Auto
- Duplex: Half Duplex Full Duplex Auto
- MAC Address: 0060.3E20.C401
- IP Configuration:
 - IP Address: 10.0.0.1
 - Subnet Mask: 255.255.255.252
- Tx Ring Limit: 10

Below the configuration panel is a section titled "Equivalent IOS Commands" with a scrollable text area containing the following commands:

```
Router(config-if)#
Router(config-if)#exit
Router(config)#
Router(config)#
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#
```

At the bottom left of the window, there is a checkbox labeled "Top".

The screenshot shows the configuration page for interface FastEthernet0/1 on router R1. The interface is divided into several sections:

- Physical**: Port Status (On), Bandwidth (100 Mbps, 10 Mbps, Auto), Duplex (Half Duplex, Full Duplex, Auto), MAC Address (0060.3E20.C402).
- Config**: IP Configuration (IP Address: 10.0.0.5, Subnet Mask: 255.255.255.252).
- Attributes**: Tx Ring Limit (10).

Below the configuration fields, there is a section for "Equivalent IOS Commands" showing the following commands:

```
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#ip address 10.0.0.1 255.255.255.252
Router(config-if)#ip address 10.0.0.1 255.255.255.252
Router(config-if)#ip address 10.0.0.1 255.255.255.252
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#ip address 10.0.0.5 255.255.255.252
Router(config-if)#ip address 10.0.0.5 255.255.255.252
Router(config-if)#
```

At the bottom left, there is a "Top" button.

1.3 Configuración R2

The screenshot shows a network configuration window for a router named R2. The window has four tabs: Physical, Config, CLI, and Attributes. The Config tab is active, showing the configuration for interface FastEthernet0/0. The left sidebar contains a tree view with categories: GLOBAL (Settings, Algorithm Settings), ROUTING (Static, RIP), SWITCHING (VLAN Database), and INTERFACE (FastEthernet0/0, FastEthernet0/1). The main configuration area for FastEthernet0/0 includes: Port Status (checkbox On), Bandwidth (radio buttons for 100 Mbps, 10 Mbps, and a checked checkbox for Auto), Duplex (radio buttons for Half Duplex, Full Duplex, and a checked checkbox for Auto), MAC Address (text field with value 00D0.D38E.7C01), IP Configuration (IP Address: 192.168.20.1, Subnet Mask: 255.255.255.0), and Tx Ring Limit (text field with value 10). Below the configuration area is a section titled "Equivalent IOS Commands" containing a terminal session transcript:

```
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address
% Incomplete command.
Router(config-if)#ip address 192.168.20.1 255.255.255.0
Router(config-if)#
```

At the bottom left of the window, there is a checkbox labeled "Top".

The screenshot shows the configuration page for the FastEthernet0/1 interface on a router named R2. The interface is currently in the 'Config' tab. The configuration is as follows:

- Port Status:** On
- Bandwidth:** 100 Mbps 10 Mbps Auto
- Duplex:** Half Duplex Full Duplex Auto
- MAC Address:** 00D0.D38E.7C02
- IP Configuration:**
 - IP Address:** 192.168.21.1
 - Subnet Mask:** 255.255.255.0
- Tx Ring Limit:** 10

Below the configuration fields, there is a section for 'Equivalent IOS Commands' which contains the following commands:

```
Router(config-if)#ip address 192.168.20.1 255.255.255.0
Router(config-if)#ip address 192.168.20.1 255.255.255.0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#ip address 192.168.21.1 255.255.255.0
Router(config-if)#
```

At the bottom left of the window, there is a checkbox labeled 'Top' which is currently unchecked.

The screenshot shows a network configuration window for a router named R2. The window has four tabs: Physical, Config, CLI, and Attributes. The Config tab is active. On the left, there is a navigation tree with the following categories: GLOBAL (Settings, Algorithm Settings), ROUTING (Static, RIP), SWITCHING (VLAN Database), and INTERFACE (FastEthernet0/0, FastEthernet0/1). The Static Routes section is selected. The main area displays the configuration for a static route with the following fields: Network (10.0.0.2), Mask (255.255.255.252), and Next Hop (empty). Below these fields is an 'Add' button. A 'Network Address' field is also present, which is currently empty, with a 'Remove' button below it. At the bottom, there is a section titled 'Equivalent IOS Commands' containing a text area with the following commands:

```
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#ip address 192.168.21.1 255.255.255.0
Router(config-if)#
Router(config-if)#exit
Router(config)#
Router(config)#
```

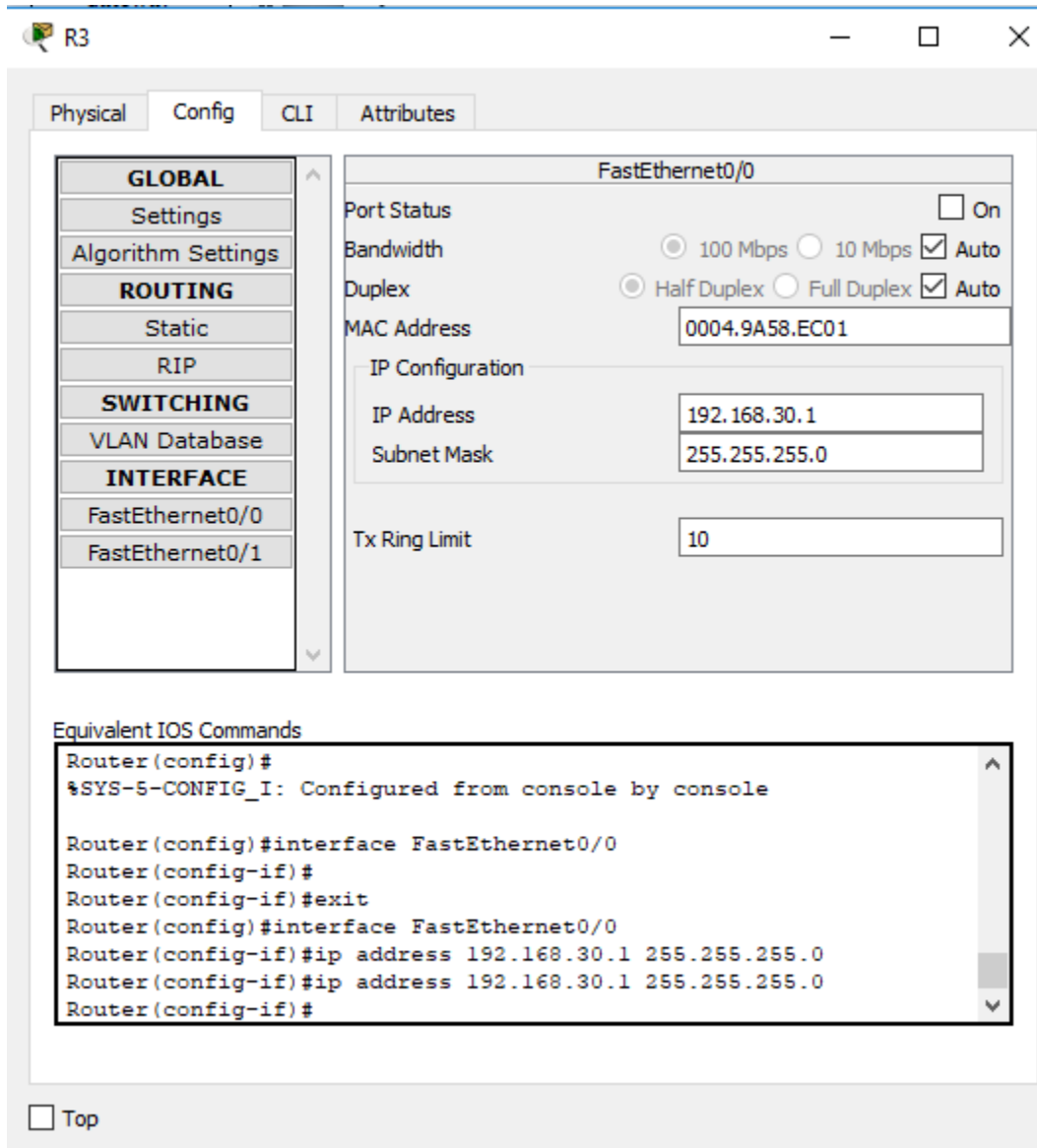
A 'Top' button is located at the bottom left of the window.

The screenshot shows a web-based configuration interface for a router named R2. The interface has a top navigation bar with tabs for Physical, Config, CLI, and Attributes. The Config tab is active. On the left, there is a sidebar menu with categories: GLOBAL (Settings, Algorithm Settings), ROUTING (Static, RIP), SWITCHING (VLAN Database), and INTERFACE (FastEthernet0/0, FastEthernet0/1). The main content area is titled "Static Routes" and contains three input fields: "Network" with the value "10.0.0.2", "Mask" with "255.255.255.252", and "Next Hop" which is empty. Below these fields is an "Add" button. A large empty text area labeled "Network Address" is positioned below the "Add" button, with a "Remove" button to its right. At the bottom of the main area, there is a section titled "Equivalent IOS Commands" containing a terminal-style text box with the following text:

```
Router(config-router)#end
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#
%SYS-5-CONFIG_I: Configured from console by console
```

At the very bottom left of the interface, there is a "Top" button.

1.4 Configuración R3



The screenshot shows the configuration window for router R3, specifically the configuration for interface FastEthernet0/0. The window is titled "R3" and has tabs for "Physical", "Config", "CLI", and "Attributes". The "Config" tab is active, and the "FastEthernet0/0" interface is selected in the left-hand navigation pane.

The configuration for FastEthernet0/0 is as follows:

- Port Status: On
- Bandwidth: 100 Mbps 10 Mbps Auto
- Duplex: Half Duplex Full Duplex Auto
- MAC Address: 0004.9A58.EC01
- IP Configuration:
 - IP Address: 192.168.30.1
 - Subnet Mask: 255.255.255.0
- Tx Ring Limit: 10

Below the configuration fields, there is a section for "Equivalent IOS Commands" which shows the following commands:

```
Router(config)#  
%SYS-5-CONFIG_I: Configured from console by console  
  
Router(config)#interface FastEthernet0/0  
Router(config-if)#  
Router(config-if)#exit  
Router(config)#interface FastEthernet0/0  
Router(config-if)#ip address 192.168.30.1 255.255.255.0  
Router(config-if)#ip address 192.168.30.1 255.255.255.0  
Router(config-if)#
```

At the bottom left of the window, there is a checkbox labeled "Top" which is currently unchecked.

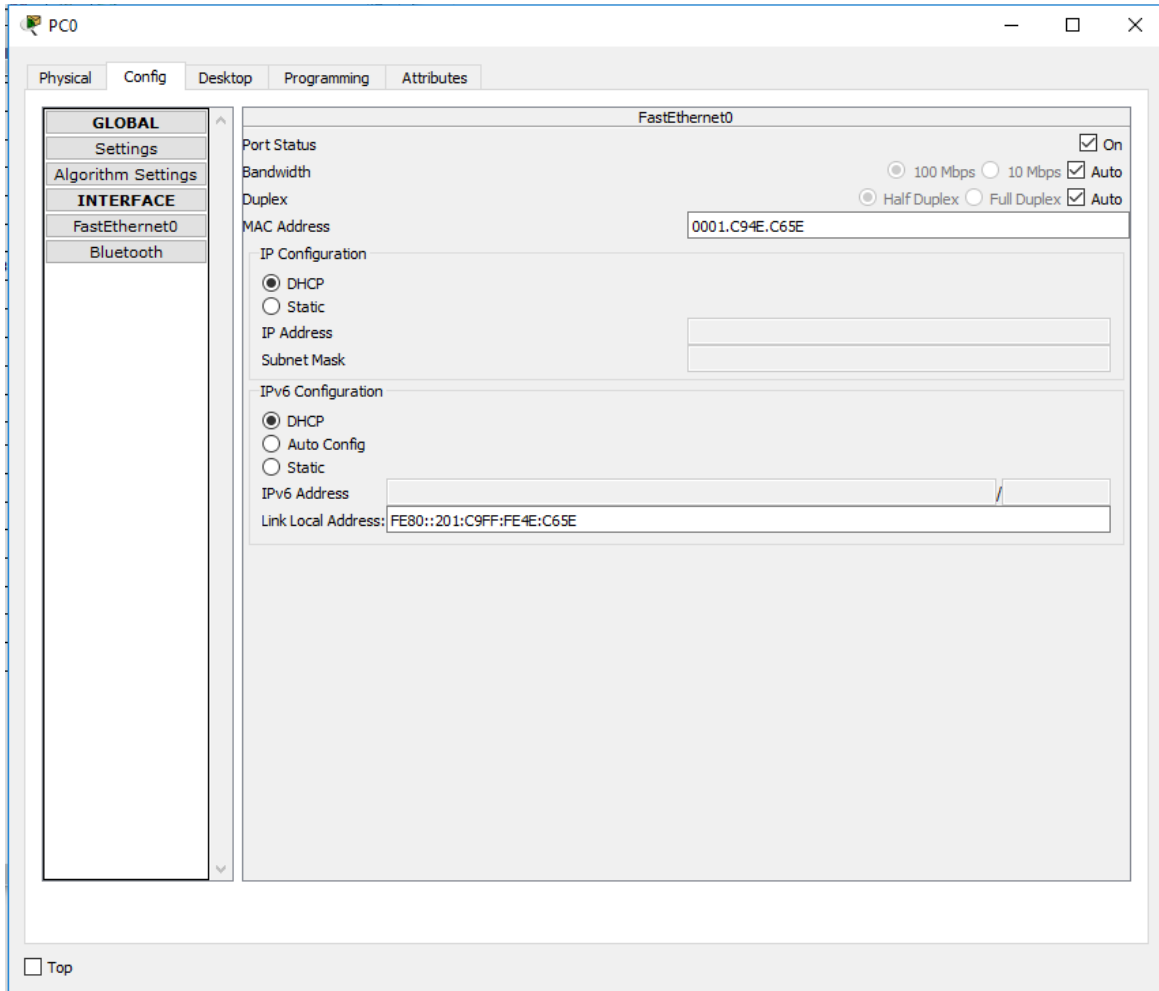
The screenshot shows a network configuration window for a router named R3. The window has four tabs: Physical, Config, CLI, and Attributes. The Config tab is active, and the interface FastEthernet0/1 is selected in the left-hand navigation pane. The main configuration area for FastEthernet0/1 includes the following settings:

- Port Status: On
- Bandwidth: 100 Mbps 10 Mbps Auto
- Duplex: Half Duplex Full Duplex Auto
- MAC Address: 0004.9A58.EC02
- IP Configuration:
 - IP Address: 10.0.0.10
 - Subnet Mask: 255.255.255.252
- Tx Ring Limit: 10

Below the configuration area, there is a section titled "Equivalent IOS Commands" which contains the following commands:

```
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#ip address 10.0.0.10 255.0.0.0
Router(config-if)#
```

At the bottom left of the window, there is a checkbox labeled "Top" which is currently unchecked.



Laptop1

Physical Config Desktop Programming Attributes

GLOBAL

- Settings
- Algorithm Settings

INTERFACE

- FastEthernet0
- Bluetooth

FastEthernet0

Port Status On

Bandwidth 100 Mbps 10 Mbps Auto

Duplex Half Duplex Full Duplex Auto

MAC Address 0009.7CB5.DB25

IP Configuration

- DHCP
- Static

IP Address

Subnet Mask

IPv6 Configuration

- DHCP
- Auto Config
- Static

IPv6 Address

Link Local Address: FE80::209:7CFF:FEB5:DB25

Top

Laptop31

Physical Config Desktop Programming Attributes

GLOBAL

- Settings
- Algorithm Settings

INTERFACE

- FastEthernet0
- Bluetooth

FastEthernet0

Port Status On

Bandwidth 100 Mbps 10 Mbps Auto

Duplex Half Duplex Full Duplex Auto

MAC Address: 00E0.A354.7482

IP Configuration

- DHCP
- Static

IP Address:

Subnet Mask:

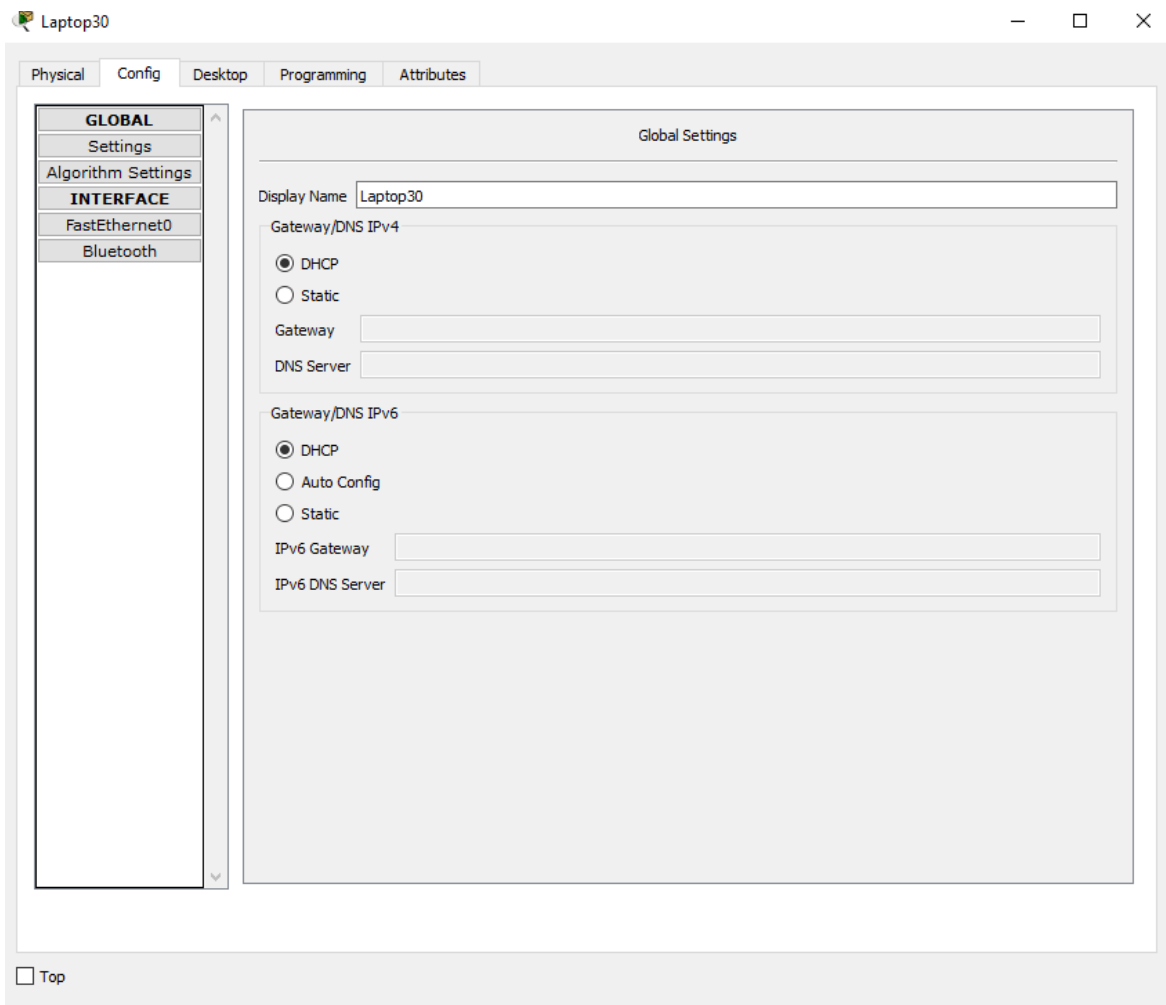
IPv6 Configuration

- DHCP
- Auto Config
- Static

IPv6 Address:

Link Local Address: FE80::2E0:A3FF:FE54:7482

Top



PC1

Physical Config Desktop Programming Attributes

GLOBAL

- Settings
- Algorithm Settings

INTERFACE

- FastEthernet0
- Bluetooth

FastEthernet0

Port Status On

Bandwidth 100 Mbps 10 Mbps Auto

Duplex Half Duplex Full Duplex Auto

MAC Address 0090.2B0A.2709

IP Configuration

- DHCP
- Static

IP Address

Subnet Mask

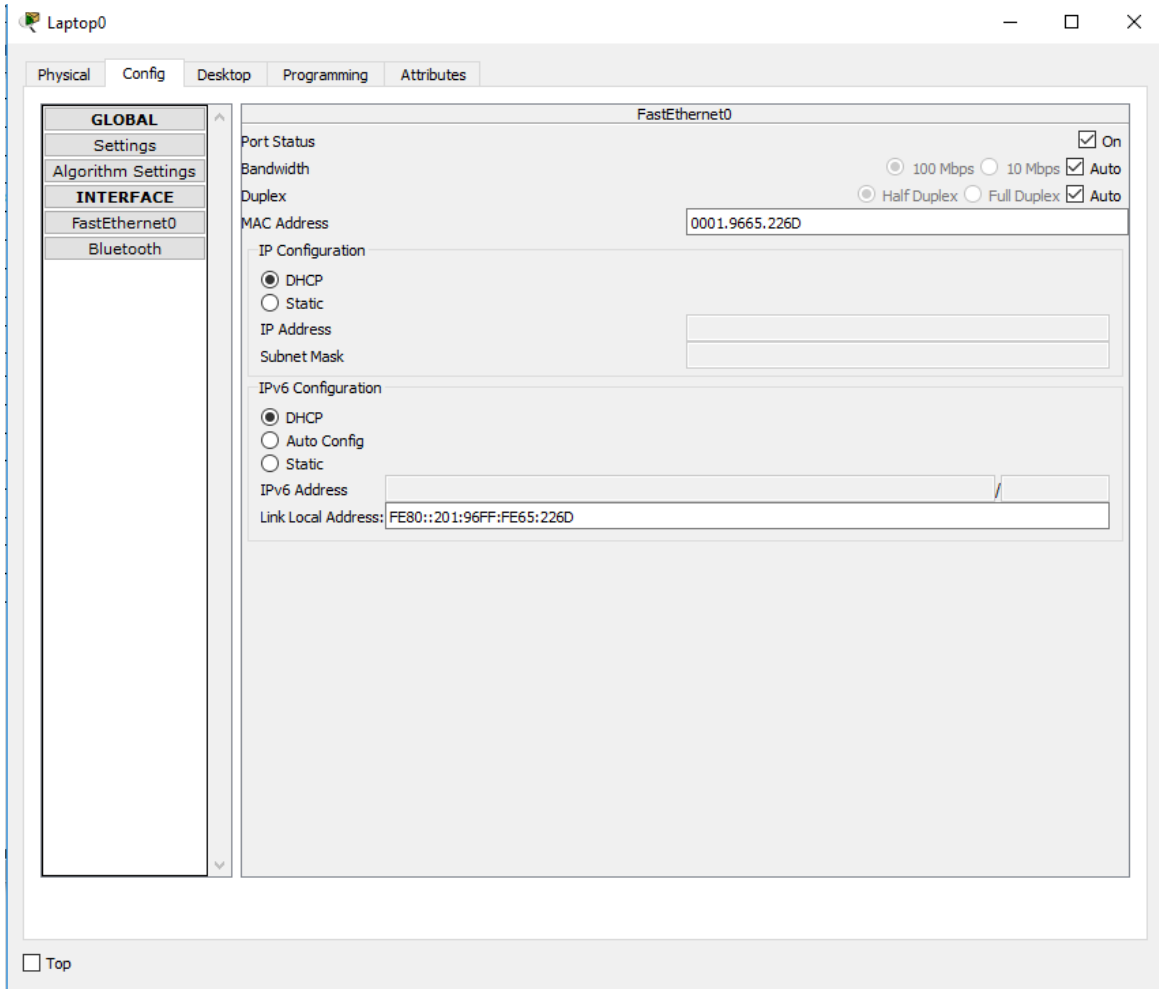
IPv6 Configuration

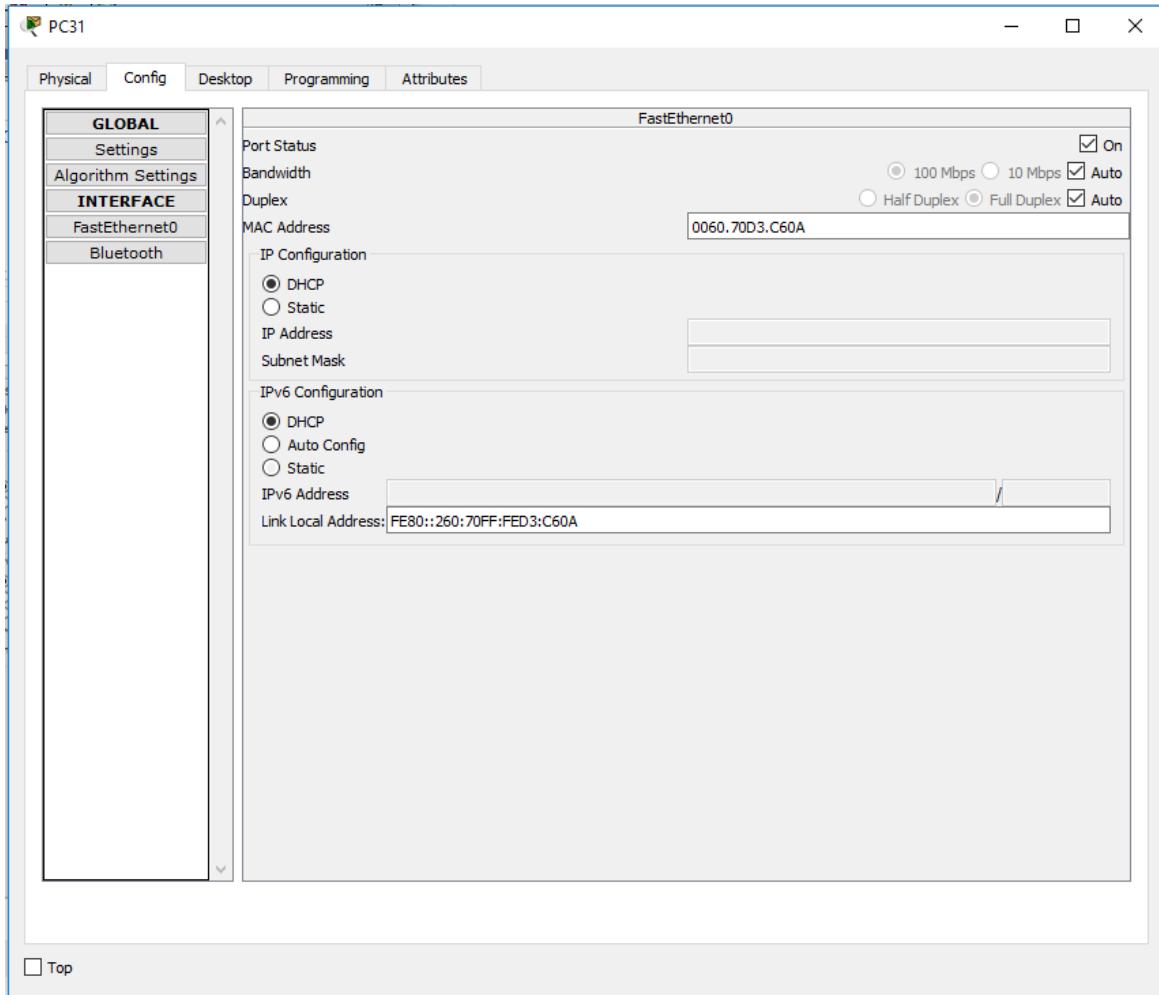
- DHCP
- Auto Config
- Static

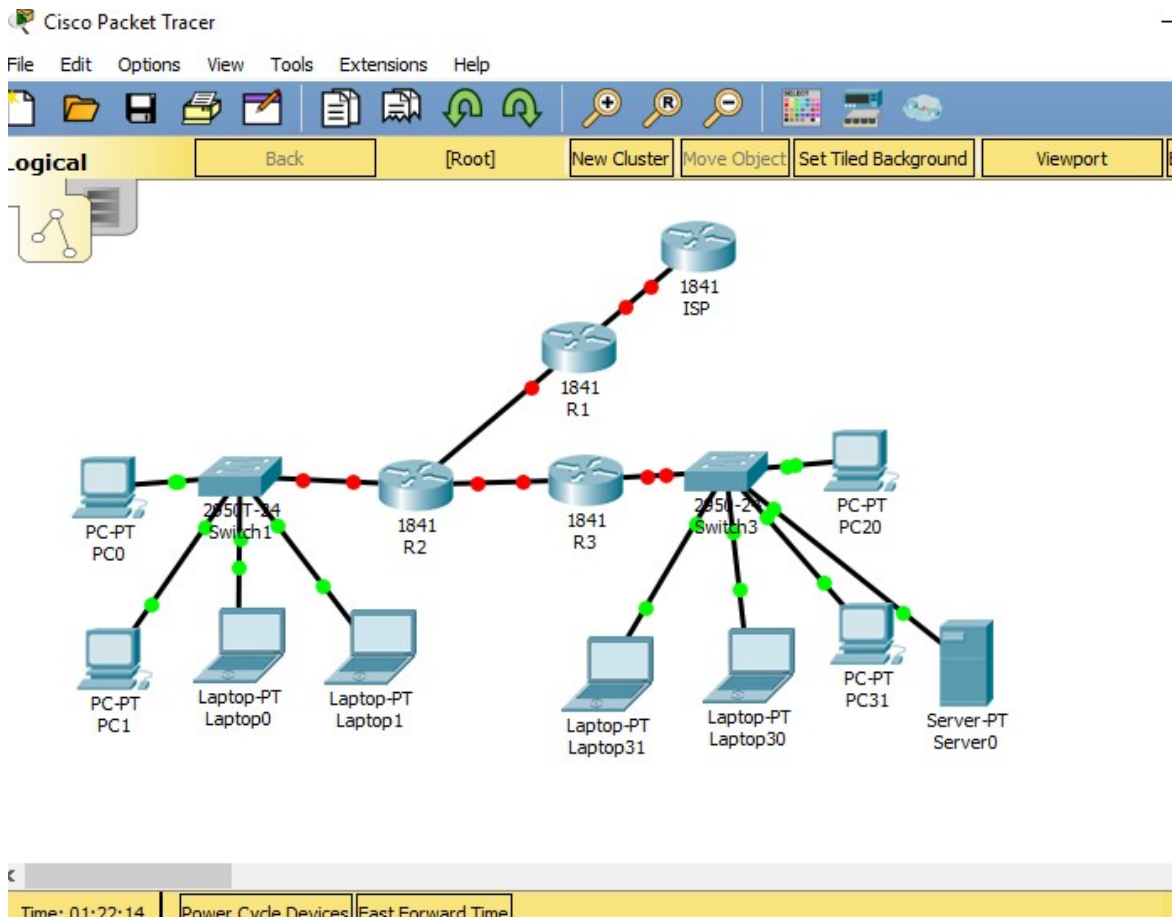
IPv6 Address

Link Local Address: FE80::290:2BFF:FE0A:2709

Top

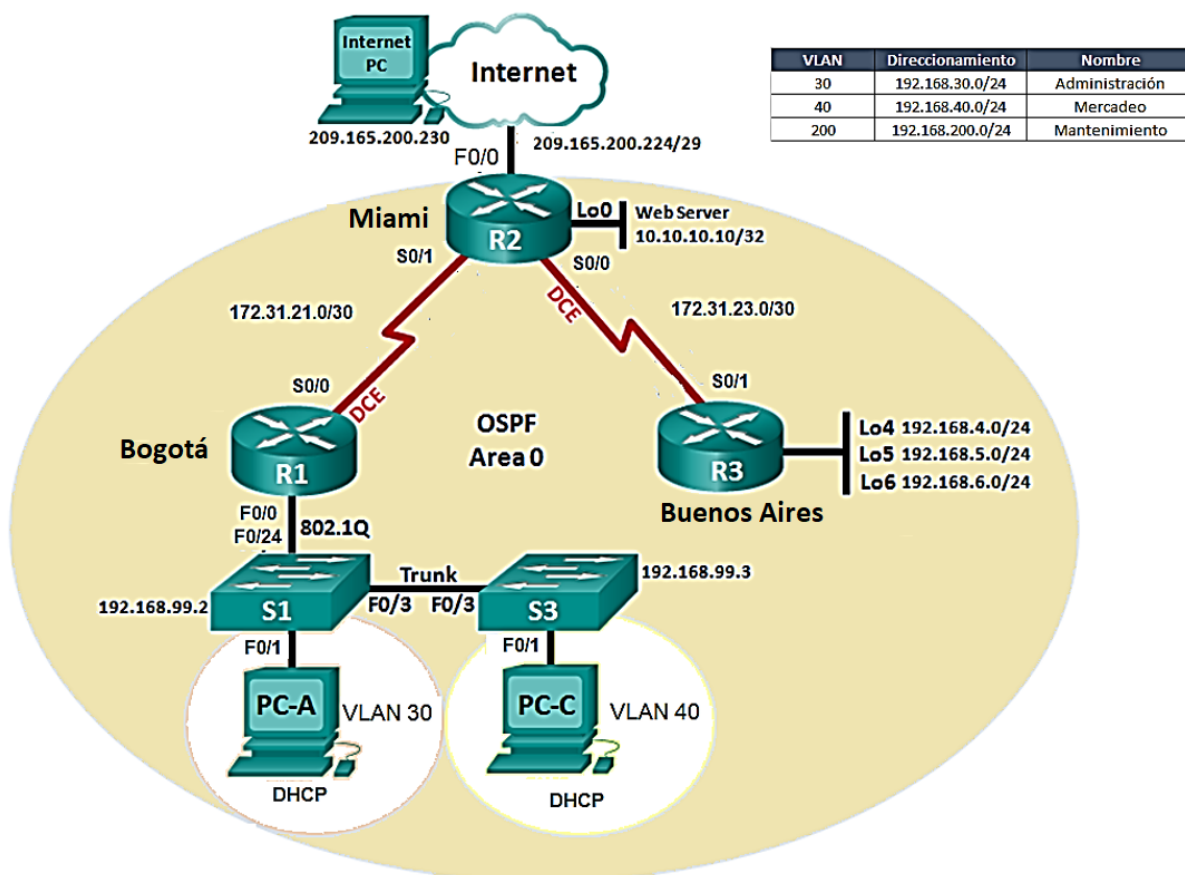






Escenario 2

Una empresa de Tecnología posee tres sucursales distribuidas en las ciudades de Miami, Bogotá y Buenos Aires, en donde el estudiante será el administrador de la red, el cual deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con los lineamientos establecidos para el direccionamiento IP, protocolos de enrutamiento y demás aspectos que forman parte de la topología de red.



1. Configurar el direccionamiento IP acorde con la topología de red para cada uno de los dispositivos que forman parte del escenario

Dispositivo	Interface	Dirección IPV4	Mascara de Subred	Gateway por Default
R1-Bogotá	S0/3/0	172.31.21.2	255.255.255.0	No requiere
	Fa0/2/0	192.168.99.1	255.255.255.0	
R2-Miami	S0/3/0	172.31.21.1	255.255.255.0	No requiere
	S0/3/1	172.31.23.1	255.255.255.0	No requiere
	Internet	209.165.200.226	255.255.255.0	
PC-Internet		209.165.200.230	255.255.255.0	209.165.200.225
R3-Buenos Aires		172.31.23.1	255.255.255.0	No requiere
	Lo4	192.168.4.0	255.255.255.0	No requiere
	Lo5	192.168.5.0	255.255.255.0	No requiere
	Lo6	192.168.6.0	255.255.255.0	No requiere
S1	Fa 0/1	192.168.99.2	255.255.255.0	192.168.99.1
S3	Fa 0/1	192.168.99.3	255.255.255.0	192.168.99.1

```

Bogotá
Physical Config CLI Attributes
IOS Command Line Interface

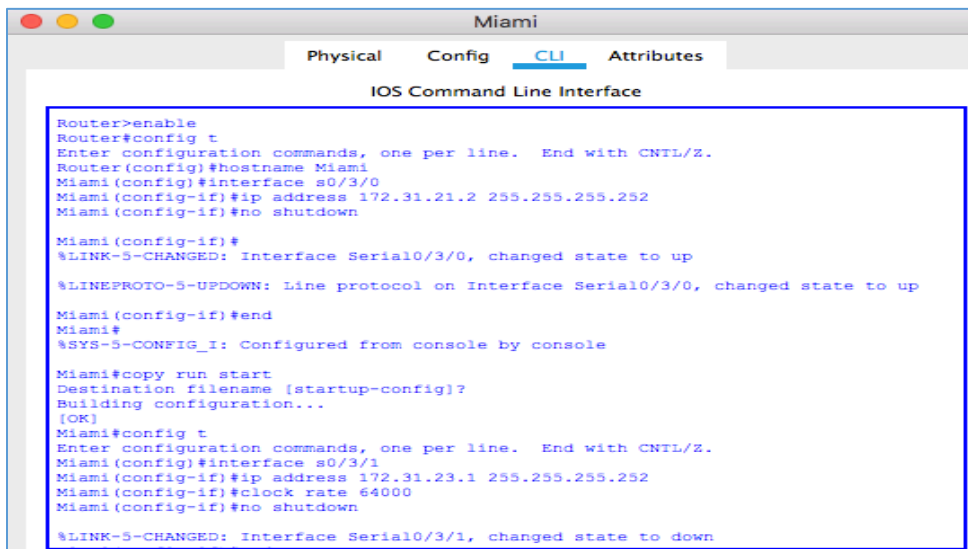
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname Bogota
Bogota(config)#clock rate 64000
^
% Invalid input detected at '^' marker.
Bogota(config)#interface s0/3/0
Bogota(config-if)#ip address 172.31.21.1 255.255.255.252
Bogota(config-if)#clock rate 64000
Bogota(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/3/0, changed state to down
Bogota(config-if)#en
% Ambiguous command: "en"
Bogota(config)#end
Bogota#
%SYS-5-CONFIG_I: Configured from console by console

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

```

Configuración básica de R1



```

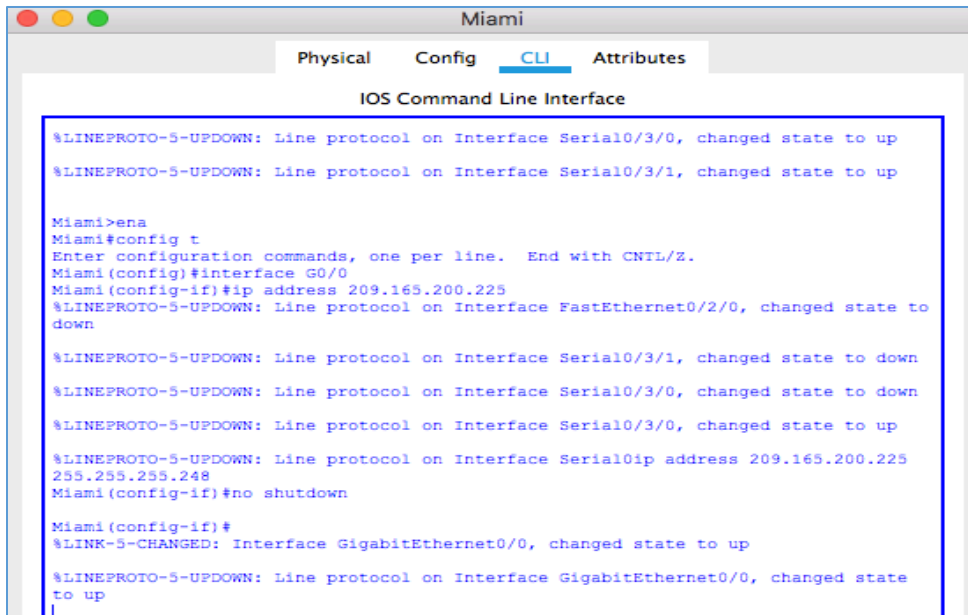
Miami
Physical Config CLI Attributes
IOS Command Line Interface
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname Miami
Miami(config)#interface s0/3/0
Miami(config-if)#ip address 172.31.21.2 255.255.255.252
Miami(config-if)#no shutdown

Miami(config-if)#
%LINK-5-CHANGED: Interface Serial0/3/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/3/0, changed state to up
Miami(config-if)#end
Miami#
%SYS-5-CONFIG_I: Configured from console by console

Miami#copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
Miami#config t
Enter configuration commands, one per line. End with CNTL/Z.
Miami(config)#interface s0/3/1
Miami(config-if)#ip address 172.31.23.1 255.255.255.252
Miami(config-if)#clock rate 64000
Miami(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/3/1, changed state to down

```



```

Miami
Physical Config CLI Attributes
IOS Command Line Interface

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/3/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/3/1, changed state to up

Miami>ena
Miami#config t
Enter configuration commands, one per line. End with CNTL/Z.
Miami(config)#interface G0/0
Miami(config-if)#ip address 209.165.200.225
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2/0, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/3/1, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/3/0, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/3/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0ip address 209.165.200.225
255.255.255.248
Miami(config-if)#no shutdown

Miami(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
|

```

Configuración básica de R2

```

Buenos Aires
Physical  Config  CLI  Attributes
IOS Command Line Interface

Router(config)#hostname BuenosAires
^
% Invalid input detected at '^' marker.
Router(config)#hostname Buenos Aires
^
% Invalid input detected at '^' marker.
Router(config)#hostname BuenosAires
BuenosAires(config)#interface s0/3/0
BuenosAires(config-if)#ip address 173.31.23.2 255.255.255.252
BuenosAires(config-if)#no shutdown

BuenosAires(config-if)#
%LINK-5-CHANGED: Interface Serial0/3/0,| changed state to up

BuenosAires(config-if)#en
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/3/0, changed state to up
d
BuenosAires#
%SYS-5-CONFIG_I: Configured from console by console
copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
BuenosAires#

Command+F6 to exit CLI focus
Copy Paste

```

Configuración básica de R3

2. Configurar el protocolo de enrutamiento OSPFv2 bajo los siguientes criterios:

OSPFv2 area 0

Configuration Item or Task	Specification
Router ID R1	1.1.1.1
Router ID R2	5.5.5.5
Router ID R3	8.8.8.8
Configurar todas las interfaces LAN como pasivas	
Establecer el ancho de banda para enlaces seriales en	256 Kb/s

Ajustar el costo en la métrica de S0/0 a	9500
--	------

Bogota#config t

Enter configuration commands, one per line. End with CNTL/Z.

Bogota(config)#interface Serial 0/3/0

Bogota(config-if)#bandwidth 256000

Bogota(config-if)#exit

Bogota(config)#router ospf 10

Bogota(config-router)#router-id 1.1.1.1

Bogota(config-router)#network 191.168.99.0 0.0.0.255 area 0

Bogota(config-router)#network 172.31.21.0 0.0.0.3 area 0

Bogota(config-router)#exit

Bogota(config)#interface Serial 0/3/0

Bogota(config-if)#router ospf 10

Bogota(config-router)#auto-cost reference-bandwidth 9500

% OSPF: Reference bandwidth is changed.

Please ensure reference bandwidth is consistent across all routers.

Bogota(config-router)#end

Bogota(config-if)#router ospf 10

Bogota(config-router)#passive-interface G0/0

Bogota(config-router)#end

Bogota#

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

copy run start

Destination filename [startup-config]?

Building configuration...

[OK]

```
Miami(config-if)#interface s0/3/0
Miami(config-if)#bandwidth 256000
Miami(config-if)#exit
Miami(config)#router ospf 10
Miami(config-router)#router-id 5.5.5.5
Miami(config-router)#auto-cost reference-bandwidth 9500
% OSPF: Reference bandwidth is changed.
Please ensure reference bandwidth is consistent across all routers.
Miami(config-router)#network 172.31.21.0 0.0.0.3 area 0
Miami(config-router)#
00:26:59: %OSPF-5-ADJCHG: Process 10, Nbr 1.1.1.1 on Serial0/3/0 from LOADING to
FULL, Loading Done
network 172.31.23.0 0.0.0.3 area 0
Miami(config-router)#network 209.165.200.0 0.0.0.7 area 0
Miami(config-router)#passive-interface G0/0
Miami(config-router)#end
Miami#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
```

[OK]

```
BuenosAires>ena
BuenosAires#config t
Enter configuration commands, one per line. End with CNTL/Z.
BuenosAires(config)#interface s0/3/0
BuenosAires(config-if)#bandwidth 256000
BuenosAires(config-if)#exit
BuenosAires(config)#router ospf 10
BuenosAires(config-router)#router-id 8.8.8.8
BuenosAires(config-router)#auto-cost reference-bandwidth 9500
% OSPF: Reference bandwidth is changed.
Please ensure reference bandwidth is consistent across all routers.
BuenosAires(config-router)#network 172.31.23.0 0.0.0.3 area 0
BuenosAires(config-router)#end
BuenosAires#
%SYS-5-CONFIG_I: Configured from console by console
copy run start
Destination filename [startup-config]?
Building configuration...

[OK]
```

Verificar información de OSPF

- Visualizar tablas de enrutamiento y routers conectados por OSPFv2

Para este paso utilizamos el comando Show ip Route encada router.

```

Bogota#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

      172.31.0.0/16 is variably subnetted, 3 subnets, 2 masks
C       172.31.21.0/24 is directly connected, Serial0/3/0
L       172.31.21.2/32 is directly connected, Serial0/3/0
O       172.31.23.0/24 [110/65] via 172.31.21.1, 00:04:52, Serial0/3/0
      192.168.99.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.99.0/24 is directly connected, GigabitEthernet0/0
L       192.168.99.1/32 is directly connected, GigabitEthernet0/0

```

```

Miami#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

      10.0.0.0/32 is subnetted, 1 subnets
C       10.10.10.10/32 is directly connected, Loopback0
      172.31.0.0/16 is variably subnetted, 4 subnets, 2 masks
C       172.31.21.0/24 is directly connected, Serial0/3/0
L       172.31.21.1/32 is directly connected, Serial0/3/0
C       172.31.23.0/24 is directly connected, Serial0/3/1
L       172.31.23.1/32 is directly connected, Serial0/3/1
      209.165.200.0/24 is variably subnetted, 2 subnets, 2 masks
C       209.165.200.0/24 is directly connected, GigabitEthernet0/0
L       209.165.200.225/32 is directly connected, GigabitEthernet0/0

```

En el router 2 no tiene rutas por Ospf ya que todas son directamente conectadas

```

BuenosAires#
BuenosAires#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

      172.31.0.0/16 is variably subnetted, 3 subnets, 2 masks
O       172.31.21.0/24 [110/2] via 172.31.23.1, 00:09:14, Serial0/3/0
C       172.31.23.0/24 is directly connected, Serial0/3/0
L       172.31.23.2/32 is directly connected, Serial0/3/0
      192.168.5.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.5.0/24 is directly connected, Loopback4
L       192.168.5.1/32 is directly connected, Loopback4
      192.168.6.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.6.0/24 is directly connected, Loopback6
L       192.168.6.1/32 is directly connected, Loopback6

```

- Visualizar lista resumida de interfaces por OSPF en donde se ilustre el costo de cada interface

show ip ospf interface

```

Bogota#show ip ospf interface

Serial0/3/0 is up, line protocol is up
 Internet address is 172.31.21.2/24, Area 0
 Process ID 10, Router ID 1.1.1.1, Network Type POINT-TO-POINT, Cost: 1
 Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
 No designated router on this network
 No backup designated router on this network
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
   Hello due in 00:00:08
 Index 1/1, flood queue length 0
 Next 0x0(0)/0x0(0)
 Last flood scan length is 1, maximum is 1
 Last flood scan time is 0 msec, maximum is 0 msec
 Neighbor Count is 1 , Adjacent neighbor count is 1
   Adjacent with neighbor 5.5.5.5
 Suppress hello for 0 neighbor(s)
Bogota#

```

```

Miami#show ip ospf interface

Serial0/3/1 is up, line protocol is up
 Internet address is 172.31.23.1/24, Area 0
 Process ID 10, Router ID 5.5.5.5, Network Type POINT-TO-POINT, Cost: 64
 Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
 No designated router on this network
 No backup designated router on this network
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
   Hello due in 00:00:02
 Index 1/1, flood queue length 0
 Next 0x0(0)/0x0(0)
 Last flood scan length is 1, maximum is 1
 Last flood scan time is 0 msec, maximum is 0 msec
 Neighbor Count is 1 , Adjacent neighbor count is 1
   Adjacent with neighbor 8.8.8.8
 Suppress hello for 0 neighbor(s)
Serial0/3/0 is up, line protocol is up
 Internet address is 172.31.21.1/24, Area 0
 Process ID 10, Router ID 5.5.5.5, Network Type POINT-TO-POINT, Cost: 1
 Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
 No designated router on this network
 No backup designated router on this network
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
   Hello due in 00:00:02
 Index 2/2, flood queue length 0
 Next 0x0(0)/0x0(0)
 Last flood scan length is 1, maximum is 1
 Last flood scan time is 0 msec, maximum is 0 msec
 Neighbor Count is 1 , Adjacent neighbor count is 1
   Adjacent with neighbor 1.1.1.1
 Suppress hello for 0 neighbor(s)
Miami#

```

```

BuenosAires#show ip ospf interface

Serial0/3/0 is up, line protocol is up
 Internet address is 172.31.23.2/24, Area 0
 Process ID 10, Router ID 8.8.8.8, Network Type POINT-TO-POINT, Cost: 1
 Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
 No designated router on this network
 No backup designated router on this network
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
   Hello due in 00:00:02
 Index 1/1, flood queue length 0
 Next 0x0(0)/0x0(0)
 Last flood scan length is 1, maximum is 1
 Last flood scan time is 0 msec, maximum is 0 msec
 Neighbor Count is 1 , Adjacent neighbor count is 1
   Adjacent with neighbor 5.5.5.5
 Suppress hello for 0 neighbor(s)
BuenosAires#

```

- Visualizar el OSPF Process ID, Router ID, Address summarizations, Routing Networks, and passive interfaces configuradas en cada router.

```

Bogota#show ip protocols

Routing Protocol is "ospf 10"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 1.1.1.1
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    191.168.99.0 0.0.0.255 area 0
    172.31.21.0 0.0.0.3 area 0
  Passive Interface(s):
    GigabitEthernet0/0
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110           00:21:29
    5.5.5.5          110           00:19:04
    8.8.8.8          110           00:19:04
  Distance: (default is 110)

```

```

Miami#
Miami#show ip protocols

Routing Protocol is "ospf 10"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 5.5.5.5
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.31.21.0 0.0.0.3 area 0
    172.31.23.0 0.0.0.3 area 0
    209.165.200.0 0.0.0.7 area 0
  Passive Interface(s):
    GigabitEthernet0/0
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110           00:22:19
    5.5.5.5          110           00:19:53
    8.8.8.8          110           00:19:53
  Distance: (default is 110)

```

```

BuenosAires#
BuenosAires#show ip protocols

Routing Protocol is "ospf 10"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 8.8.8.8
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.31.23.0 0.0.0.3 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110           00:23:30
    5.5.5.5          110           00:21:03
    8.8.8.8          110           00:21:03
  Distance: (default is 110)

```

3. Configurar VLANs, Puertos troncales, puertos de acceso, encapsulamiento, Inter-VLAN Routing y Seguridad en los Switches acorde a la topología de red establecida.

VLAN	DIRECCION	NOMBRE
VLAN 30	192.168.30.0/24	Administración
VLAN 40	192.168.40.0/24	Mercadeo
VLAN 200	192.168.200.0/24	Mantenimiento

```
S1#show vlan
VLAN Name                Status    Ports
-----
1    default                active    Fa0/16, Fa0/17, Fa0/18, Fa0/19
                                           Fa0/20, Fa0/21, Fa0/22, Fa0/23
                                           Fa0/24, Gig0/1, Gig0/2
30  Administracion          active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                           Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                           Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                           Fa0/13, Fa0/14, Fa0/15
1002 fddi-default          active
1003 token-ring-default   active
1004 fddinet-default      active
1005 trnet-default        active

VLAN Type  SAID      MTU   Parent RingNo BridgeNo  Stp  BrdgMode Trans1 Trans2
-----
1    enet  100001   1500  -     -     -     -     -     0     0
30   enet  100030   1500  -     -     -     -     -     0     0
1002 fddi  101002   1500  -     -     -     -     -     0     0
1003 tr   101003   1500  -     -     -     -     -     0     0
1004 fdnet 101004   1500  -     -     -     ieee -     0     0
--More--
```

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

S3#show vlan
VLAN Name                Status    Ports
-----
1    default                active    Fa0/16, Fa0/17, Fa0/18, Fa0/19
                                           Fa0/20, Fa0/21, Fa0/22, Fa0/23
                                           Fa0/24, Gig0/1, Gig0/2
40  Mercadeo                active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                           Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                           Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                           Fa0/13, Fa0/14, Fa0/15
1002 fddi-default          active
1003 token-ring-default   active
1004 fddinet-default      active
1005 trnet-default        active

VLAN Type  SAID      MTU   Parent RingNo BridgeNo  Stp  BrdgMode Trans1 Trans2
-----
1    enet  100001   1500  -     -     -     -     -     0     0
40   enet  100040   1500  -     -     -     -     -     0     0
1002 fddi  101002   1500  -     -     -     -     -     0     0
1003 tr   101003   1500  -     -     -     -     -     0     0
1004 fdnet 101004   1500  -     -     -     ieee -     0     0
--More--
%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on FastEthernet0/1
(40), with S1 FastEthernet0/2 (1).
```

```
S1(config-if)#switchport mode trunk
```

```
S1(config-if)#
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state  
to down
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state  
to up
```

```
no shutdown
```

```
S1(config-if)#exit
```

```
S1(config)#
```

```
%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on  
FastEthernet0/2 (30), with S3 FastEthernet0/1 (40).
```

```
S1(config)#interface F0/2
```

```
S1(config-if)#switchport mode trunk
```

```
S1(config-if)#
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to  
down
```

```
S3(config)#
```

```
S3(config)# interface fastEthernet 0/1
```

```
S3(config-if)#switchport mode trunk
```

```
S3(config-if)#
```


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

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to
up
no shutdown

S3(config-if)#

4. En el Switch 3 deshabilitar DNS lookup

S3#ena

S3#config t

Enter configuration commands, one per line. End with CNTL/Z.

S3(config)#no ip domain-lookup

S3(config)#exit

S3#

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

5. Asignar direcciones IP a los Switches acorde a los lineamientos.

```
S1#config t
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#inte vlan 99
S1(config-if)#ip address 192.168.99.2 255.255.255.0
S1(config-if)#no sht
^
% Invalid input detected at '^' marker.

S1(config-if)#no sh
S1(config-if)#
```

```
S3#config t
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#int vlan 99
S3(config-if)#ip address 192.168.99.3 255.255.255.0
S3(config-if)#no sh
S3(config-if)#
```

6. Desactivar todas las interfaces que no sean utilizadas en el esquema de red.

```
S1(config-if)#no sh
S1(config-if)#interface range F0/3-24
S1(config-if-range)#shutdown

%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to administratively down
```

```
S3(config-if)#int range f0/3-24
S3(config-if-range)#shutdown

%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to administratively down
```

7. Implement DHCP and NAT for IPv4

```
Miami#config t
Enter configuration commands, one per line. End with CNTL/Z.
Miami(config)#ip nat pool INTERNET 172.31.21.0 172.31.21.2 netmask 255.255.255.0
Miami(config)#ip nat pool INTERNET 172.31.23.0 172.31.23.2 netmask 255.255.255.0
Miami(config)#access-list 50 permit 172.31.21.0 255.255.255.0
Miami(config)#access-list 52 permit 172.31.23.0 255.255.255.0
Miami(config)#end
Miami#
```

8. Configurar R1 como servidor DHCP para las VLANs 30 y 40.

```

Bogota>ena
Bogota#config t
Enter configuration commands, one per line. End with CNTL/Z.
Bogota(config)#ip dhcp pool SERVER-VLAN
Bogota(dhcp-config)#network 192.168.30.0 255.255.255.0
Bogota(dhcp-config)#network 192.168.40.0 255.255.255.0
Bogota(dhcp-config)#network 192.168.200.0 255.255.255.0
Bogota(dhcp-config)#?
  default-router  Default routers
  dns-server      Set name server
  domain-name     Domain name
  exit            Exit from DHCP pool configuration mode
  network         Network number and mask
  no              Negate a command or set its defaults
  option          Raw DHCP options
Bogota(dhcp-config)#
Bogota(dhcp-config)#
Bogota(dhcp-config)#default-router 192.168.99.1
Bogota(dhcp-config)#domain-name ccna-unad.com
Bogota(dhcp-config)#dns-server 10.10.10.11
Bogota(dhcp-config)#exit
Bogota(config)#ip dhcp pool MERCADEO
Bogota(dhcp-config)#network 192.168.40.0 255.255.255.0
Bogota(dhcp-config)#default-router 192.168.99.1
Bogota(dhcp-config)#dns-server 10.10.10.11
Bogota(dhcp-config)#domain-name ccna-unad.com
Bogota(dhcp-config)#end
Bogota#

```

9. Reservar las primeras 30 direcciones IP de las VLAN 30 y 40 para configuraciones estáticas.

```

Bogota#config t
Enter configuration commands, one per line. End with CNTL/Z.
Bogota(config)#ip dhcp excluded-address 192.168.30.2 192.168.30.32
Bogota(config)#ip dhcp excluded-address 192.168.30.2 192.168.30.32
Bogota(config)#|

```

<p>Configurar DHCP pool para VLAN 30</p>	<p>Name: ADMINISTRACION DNS-Server: 10.10.10.11 Domain-Name: ccna-unad.com Establecer default gateway.</p>
--	---

Configurar DHCP pool para VLAN 40	Name: MERCADEO DNS-Server: 10.10.10.11 Domain-Name: ccna-unad.com Establecer default gateway.
--------------------------------------	--

10. Configurar NAT en R2 para permitir que los host puedan salir a internet

```
Miami(config)#ip nat pool INTERNET 209.165.200.224 209.165.200.230 netmask
255.255.255.248
Miami(config)#access-list 1 permit 192.168.30.0 255.255.255.0
Miami(config)#access-list 2 permit 192.168.40.0 255.255.255.0
Miami(config)#
```

11. Configurar al menos dos listas de acceso de tipo estándar a su criterio en para restringir o permitir tráfico desde R1 o R3 hacia R2.

```
Miami#config t
Enter configuration commands, one per line. End with CNTL/Z.
Miami(config)#ip nat pool INTERNET 172.31.21.0 172.31.21.2 netmask 255.255.255.0
Miami(config)#ip nat pool INTERNET 172.31.23.0 172.31.23.2 netmask 255.255.255.0
Miami(config)#access-list 50 permit 172.31.21.0 255.255.255.0
Miami(config)#access-list 52 permit 172.31.23.0 255.255.255.0
Miami(config)#end
Miami#
```

12. Configurar al menos dos listas de acceso de tipo extendido o nombradas a su criterio en para restringir o permitir tráfico desde R1 o R3 hacia R2.

```
Miami#config t
Enter configuration commands, one per line. End with CNTL/Z.
Miami(config)#access-list 3 deny 192.168.200.0 0.0.0.255
Miami(config)#access-list 4 Permit 192.168.99.0 0.0.0.255
Miami(config)#end
Miami#
%SYS-5-CONFIG_I: Configured from console by console
WR
Building configuration...
```

13. Verificar procesos de comunicación y redireccionamiento de tráfico en los routers mediante el uso de Ping y Traceroute.

```
BuenosAires>ping 172.31.21.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.21.2, timeout is 2 seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 2/19/74 ms

BuenosAires>
```

```
Bogota>ping 172.31.23.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.23.2, timeout is 2 seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 18/25/31 ms

Bogota>
```

```
Pinging 172.31.21.1 with 32 bytes of data:
Reply from 172.31.21.1: bytes=32 time=1ms TTL=255
Reply from 172.31.21.1: bytes=32 time<1ms TTL=255
Reply from 172.31.21.1: bytes=32 time<1ms TTL=255
Reply from 172.31.21.1: bytes=32 time<1ms TTL=255

Ping statistics for 172.31.21.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

CONCLUSIONES

Gracias a cada uno de los conceptos y temas que me ofreció el diplomado en Cisco pude afianzar mis conocimientos en las diferentes capas de redes y protocolos de enrutamiento.

Si bien es cierto que tenemos todos los temas en el entorno, sé que del que más aprendí fue el protocolo de enrutamiento OSPF, pues no lo conocía muy bien pero gracias a los diferentes ejercicios logré ponerlo en marcha.

Logré implementar NAT, así como el servidor DHCP y el routing entre VLAN y configuraciones IP en una red donde ya tenía definida su estructura y funcionamiento para lograr todo por medio del ping.

Realicé y configuré la red de una empresa de tecnología conectando los servidores, internet y demás protocolos en 3 ciudades de diferente país interconectando cada uno de los dispositivos que se usarán en dicha empresa.

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