



Cisco Networking Academy®



**DIPLOMADO DE PROFUNDIZACIÓN CISCO  
(PRUEBA DE HABILIDADES PRÁCTICAS CCNA)**

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**CÓDIGO DEL CURSO 203092**

**NÚMERO DEL GRUPO 8**

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UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA UNAD  
JULIO DE 2019**

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## 2. INTRODUCCIÓN

Hoy en día la tecnología es un resultado de lo que con esfuerzo el ser humano ha alcanzado, las redes informáticas y telecomunicaciones son una herramienta que nos hace dependientes. El internet, intranet y entre otras clasificaciones de redes privadas son una muestra de tan importante constancia en el estudio y conocimiento que estas dejan en el presente y futuras generaciones.

CISCO siendo una compañía multinacional, ha brindado en el presente trabajo la gran oportunidad de capacitar a millones de personas a nivel mundial, y que más, en esta oportunidad de implementar su tecnología a los estudiantes de la UNAD.

En esta entrega se aplicará la herramienta Packet Tracer para la emulación de una red, que no es nada distinto a lo que realmente se aplica con dispositivos físicos reales CISCO. La arquitectura e implementación es la misma solo que esta vez es emulada.

En el presente trabajo se evalúa al especialista en redes todos los conocimientos adquiridos durante el semestre en el diplomado de profundización CCNA, buscando que el estudiante identifique las soluciones en un escenario topológico de redes relacionado con todos los aspectos del networking.

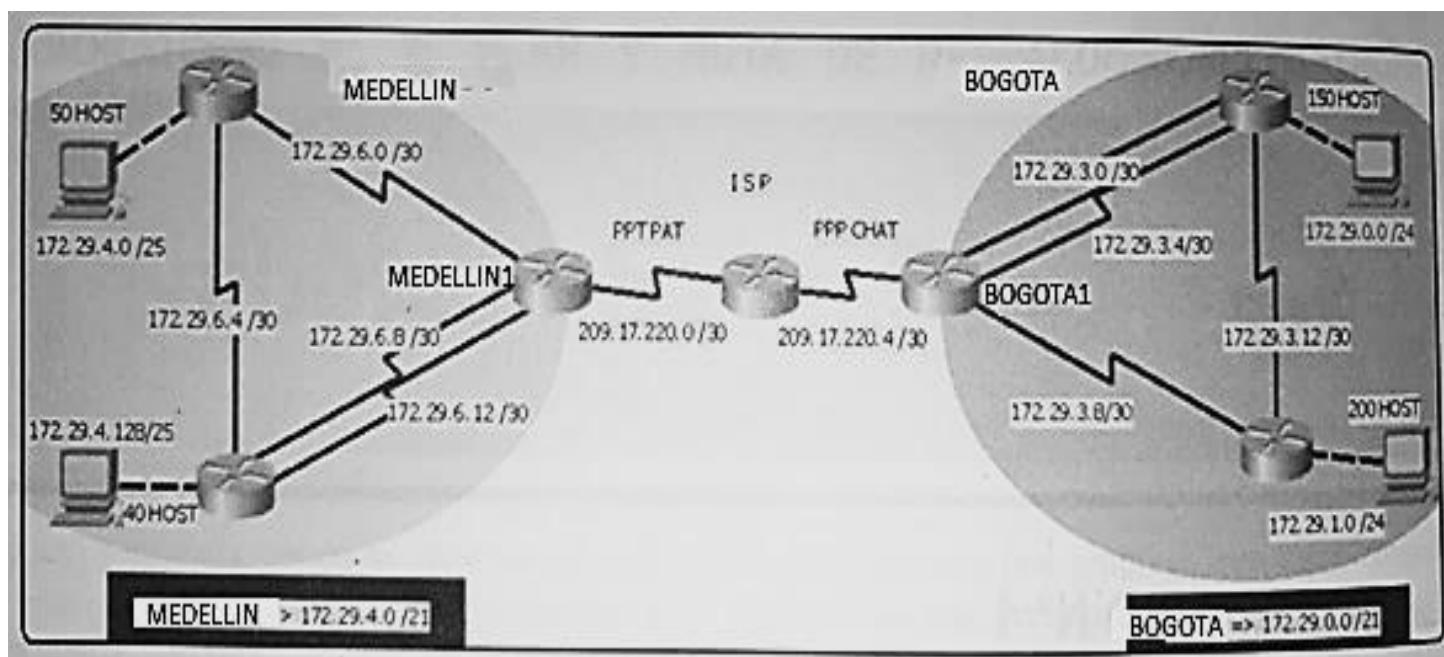
El presente documento se compone de dos escenarios que se plantean como finalización del diplomado de profundización CISCO. El objetivo principal es de dar solución a los interrogantes e instrucciones a implementar, de acuerdo con el panorama que se entrega en cada ejercicio.

### 3. DESARROLLO DE LOS ESCENARIOS

#### 3.1. Escenario 1

Una empresa posee sucursales distribuidas en las ciudades de Bogotá y Medellín, 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.

#### Topología de red



Este escenario plantea el uso de RIP como protocolo de enrutamiento, considerando que se tendrán rutas por defecto redistribuidas; asimismo, habilitar el encapsulamiento PPP y su autenticación.

Los routers Bogota2 y medellin2 proporcionan el servicio DHCP a su propia red LAN y a los routers 3 de cada ciudad.

Debe configurar PPP en los enlaces hacia el ISP, con autenticación.

Debe habilitar NAT de sobrecarga en los routers Bogota1 y medellin1.

#### Desarrollo

Como trabajo inicial se debe realizar lo siguiente.

- Realizar las rutinas de diagnóstico y dejar los equipos listos para su configuración (asignar nombres de equipos, asignar claves de seguridad, etc).
- Realizar la conexión física de los equipos con base en la topología de red



Configurar la topología de red, de acuerdo con las siguientes especificaciones.

### 3.1.1. Parte 1: Configuración del enrutamiento

- 3.1.1.a. Configurar el enrutamiento en la red usando el protocolo RIP versión 2, declare la red principal, desactive la summarización automática.

Iniciamos la configuracion de cada puerto acuerdo a las necesidades y encendiendolos:

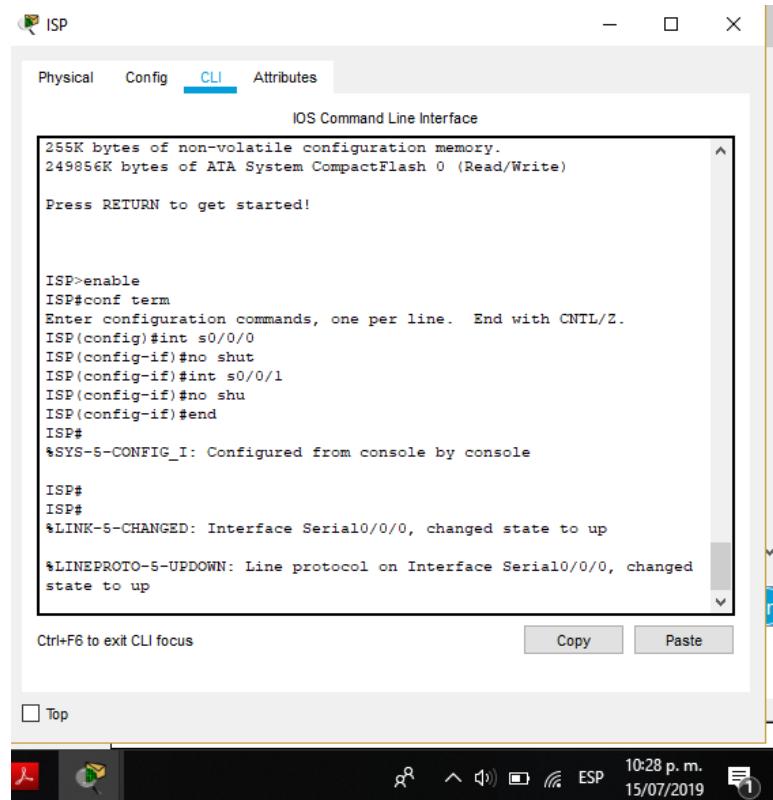
#### ISP

```
Router>enable  
Router#conf term  
Enter configuration commands, one per line. End with CNTL/Z.  
Router(config)#int s0/0/0  
Router(config-if)#ip address 209.17.220.1 255.255.255.252  
Router(config-if)#clock rate 4000000  
Router(config-if)#no shutdown
```

```
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down  
Router(config-if)#int s0/0/1  
Router(config-if)#ip address 209.17.220.5 255.255.255.252  
Router(config-if)#clock rate 4000000  
Router(config-if)#no shutdown
```

```
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down  
Router(config-if)#end  
Router#  
%SYS-5-CONFIG_I: Configured from console by console
```

```
Router#wr  
Building configuration...  
[OK]  
Router#  
Router#conf term  
Enter configuration commands, one per line. End with CNTL/Z.  
Router(config)#hostname ISP  
ISP(config)#END  
ISP#  
%SYS-5-CONFIG_I: Configured from console by console  
WR  
Building configuration...  
[OK]  
ISP#
```



## MEDELLIN-1

```
Router>
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname MEDELLIN-1
MEDELLIN-1(config)#int s0/0/0
MEDELLIN-1(config-if)#ip address 209.17.220.2 255.255.255.252
MEDELLIN-1(config-if)#clock rate 4000000
This command applies only to DCE interfaces
MEDELLIN-1(config-if)#no shutdown
```

```
MEDELLIN-1(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
```

```
MEDELLIN-1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
```

```
MEDELLIN-1(config-if)#int s0/0/1
MEDELLIN-1(config-if)#ip address 209.29.6.1 255.255.255.252
```



```
MEDELLIN-1(config-if)#clock rate 4000000
MEDELLIN-1(config-if)#no shutdown
```

```
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
MEDELLIN-1(config-if)#int s0/1/0
MEDELLIN-1(config-if)#ip address 209.29.6.9 255.255.255.252
MEDELLIN-1(config-if)#clock rate 4000000
MEDELLIN-1(config-if)#no shutdown
MEDELLIN-1(config)#int s0/1/1
MEDELLIN-1(config-if)#ip address 209.29.6.13 255.255.255.252
MEDELLIN-1(config-if)#clock rate 4000000
MEDELLIN-1(config-if)#no shutdown
```

```
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
MEDELLIN-1(config-if)#end
MEDELLIN-1#
%SYS-5-CONFIG_I: Configured from console by console
```

```
MEDELLIN-1#wr
Building configuration...
[OK]
MEDELLIN-1#
```

```
MEDELLIN-1(config-if)#
*LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to up

MEDELLIN-1(config-if)#int s0/0/1
MEDELLIN-1(config-if)#ip address 209.29.6.1 255.255.255.252
MEDELLIN-1(config-if)#clock rate 4000000
MEDELLIN-1(config-if)#no shutdown

*LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
MEDELLIN-1(config-if)#int s0/1/0
MEDELLIN-1(config-if)#ip address 209.29.6.9 255.255.255.252
MEDELLIN-1(config-if)#clock rate 4000000
MEDELLIN-1(config-if)#no shutdown

*LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
MEDELLIN-1(config-if)#end
MEDELLIN-1#
%SYS-5-CONFIG_I: Configured from console by console

MEDELLIN-1#wr
Building configuration...
[OK]
MEDELLIN-1#
```



## MEDELLIN-2

```
Router>enable  
Router#conf term  
Enter configuration commands, one per line. End with CNTL/Z.  
Router(config)#int s0/0/0  
Router(config-if)#ip address 172.29.6.2 255.255.255.252  
Router(config-if)#clock rate 4000000  
Router(config-if)#no shutdown
```

```
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down  
Router(config-if)#int s0/0/1  
Router(config-if)#ip address 172.29.6.5 255.255.255.252  
Router(config-if)#clock rate 4000000  
Router(config-if)#no shutdown
```

```
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down  
Router(config-if)#int g0/0  
Router(config-if)#ip address 172.29.4.1 255.255.255.128  
Router(config-if)#no shutdown
```

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

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

```
Router#wr  
Building configuration...  
[OK]  
Router#conf term  
Enter configuration commands, one per line. End with CNTL/Z.  
Router(config)#hostname MEDELLIN-2  
MEDELLIN-2(config)#{
```



```
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 172.29.6.2 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.6.5 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
Router(config-if)#int g0/0
Router(config-if)#ip address 172.29.4.1 255.255.255.128
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
Router(config-if)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

### MEDELLIN-3

```
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname MEDELLIN-3
MEDELLIN-3(config)#int s0/0/0
MEDELLIN-3(config-if)#ip address 172.29.6.10 255.255.255.252
MEDELLIN-3(config-if)#clock rate 4000000
MEDELLIN-3(config-if)#no shutdown
```

```
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
MEDELLIN-3(config-if)#int s0/0/1
MEDELLIN-3(config-if)#ip address 172.29.6.14 255.255.255.252
MEDELLIN-3(config-if)#clock rate 4000000
MEDELLIN-3(config-if)#no shutdown
```

```
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
MEDELLIN-3(config-if)#int s0/1/0
%Invalid interface type and number
```



```
MEDELLIN-3(config)#int g0/0
MEDELLIN-3(config-if)#ip address 172.29.4.129 255.255.255.128
MEDELLIN-3(config-if)#no shutdown
```

```
MEDELLIN-3(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
MEDELLIN-3(config)#int s0/1/0
MEDELLIN-3(config-if)#ip address 172.29.6.6 255.255.255.252
MEDELLIN-3(config-if)#clock rate 4000000
MEDELLIN-3(config-if)#no shutdown
MEDELLIN-3(config-if)#end
MEDELLIN-3#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
MEDELLIN-3#
```

The screenshot shows a Windows-style application window titled "MEDELLIN-3". The window has tabs at the top: "Physical", "Config", "CLI" (which is selected), and "Attributes". The main area is a text terminal window titled "IOS Command Line Interface". It displays the following configuration commands:

```
4 LOW-speed serial(sync/async) network interface(s)
DRAM configuration is 64 bits wide with parity disabled.
255K bytes of non-volatile configuration memory.
249086K bytes of ATA System CompactFlash 0 (Read/Write)

Press RETURN to get started!

MEDELLIN-3>
MEDELLIN-3>enable
MEDELLIN-3>conf term
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-3(config)#int s0/1/0
MEDELLIN-3(config-if)#ip address 172.29.6.6 255.255.255.252
MEDELLIN-3(config-if)#clock rate 4000000
MEDELLIN-3(config-if)#no shutdown
MEDELLIN-3(config-if)#end
MEDELLIN-3#
%SYS-5-CONFIG_I: Configured from console by console

MEDELLIN-3#wr
Building configuration...
[OK]
MEDELLIN-3#
```

At the bottom of the terminal window, there are "Copy" and "Paste" buttons. Below the terminal window, there is a status bar with icons for file operations and a timestamp: "10:44 p.m. 15/07/2019".



## BOGOTA-1

```
Router>en
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 209.17.220.6 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shut
```

```
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
Router(config-if)#int s0/0/1
Router(config-if)#ip address 209.29.3.9 255.255.255.252
Router(config-if)#clock rate 4000000
This command applies only to DCE interfaces
Router(config-if)#ip address 172.29.3.9 255.255.255.252
Router(config-if)#clock rate 4000000
This command applies only to DCE interfaces
Router(config-if)#no shut
```

```
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
```

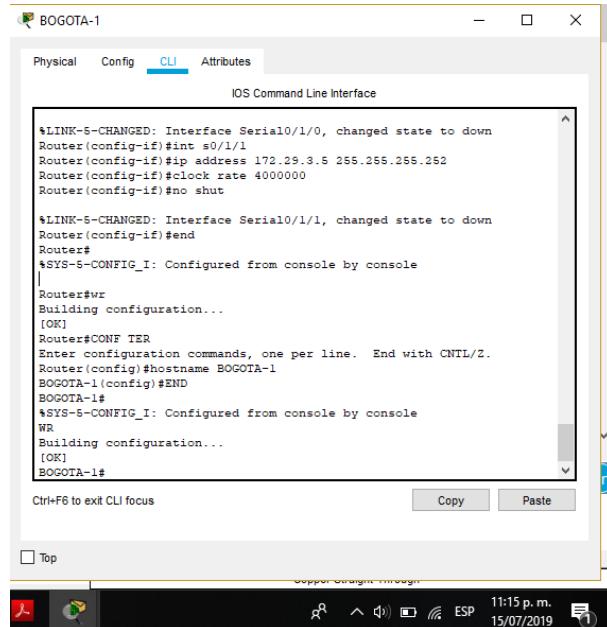
```
Router(config-if)#clock rate 4000000
This command applies only to DCE interfaces
Router(config-if)#ip address 209.29.3.9 255.255.255.252
%LINEPROTO-5-UPDOWN: Line protocol on Interf
Router(config-if)#int s0/1/0
Router(config-if)#ip address 172.29.3.1 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shut
```

```
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
Router(config-if)#int s0/1/1
Router(config-if)#ip address 172.29.3.5 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shut
```

```
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
Router(config-if)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
```



```
Router#wr  
Building configuration...  
[OK]  
Router#  
Router(config)#hostname BOGOTA-1  
BOGOTA-1(config)#END  
BOGOTA-1#
```



## BOGOTA-2

```
Router>  
Router>EN  
Router#conf ter  
Enter configuration commands, one per line. End with CNTL/Z.  
Router(config)#hostname BOGOTA-2  
BOGOTA-2(config)#int s0/0/0  
BOGOTA-2(config-if)#ip address 172.29.3.10 255.255.255.252  
BOGOTA-2(config-if)#no shutdown
```

```
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down  
BOGOTA-2(config-if)#clock rate 4000000  
BOGOTA-2(config-if)#int s0/0/1  
BOGOTA-2(config-if)#ip address 172.29.3.13 255.255.255.252  
BOGOTA-2(config-if)#clock rate 4000000  
BOGOTA-2(config-if)#no shutdown
```

```
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down  
BOGOTA-2(config-if)#int g0/0
```



```
BOGOTA-2(config-if)#ip address 172.29.1.1 255.255.255.0
BOGOTA-2(config-if)#no shutdown
```

```
BOGOTA-2(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
```

```
BOGOTA-2(config-if)#wr
^
% Invalid input detected at '^' marker.
BOGOTA-2(config-if)#end
BOGOTA-2#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
BOGOTA-2#
```

The screenshot shows the Cisco Configuration Professional (CCP) interface. The window title is "BOGOTA-2". The tabs at the top are "Physical", "Config", "CLI" (which is selected), and "Attributes". The main area is titled "IOS Command Line Interface". The command-line history is as follows:

```
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname BOGOTA-2
Router(config)#int s0/0/0
BOGOTA-2(config)#int s0/0/0
BOGOTA-2(config-if)#ip address 172.29.3.10 255.255.255.252
BOGOTA-2(config-if)#no shutdown

*LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
BOGOTA-2(config-if)#clock rate 4000000
BOGOTA-2(config-if)#int s0/0/1
BOGOTA-2(config-if)#ip address 172.29.3.13 255.255.255.252
BOGOTA-2(config-if)#clock rate 4000000
BOGOTA-2(config-if)#no shutdown

*LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
BOGOTA-2(config-if)#int g0/0
BOGOTA-2(config-if)#ip address 172.29.1.1 255.255.255.0
BOGOTA-2(config-if)#no shutdown

BOGOTA-2(config-if)#
*LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

BOGOTA-2(config-if)#wr
^
* Invalid input detected at '^' marker
```

At the bottom of the CLI window, there are "Copy" and "Paste" buttons. Below the window, the taskbar shows icons for File, Undo, Redo, Cut, Copy, Paste, and Save. The system tray indicates "Copper Straight-through", the date "15/07/2019", and the time "11:21 p.m.". A notification icon in the tray shows the number "1".

**BOGOTA-3**

```
Router>EN
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname
% Incomplete command.
Router(config)#hostname BOGOTA-3
BOGOTA-3(config)#int 0/0/0
^
% Invalid input detected at '^' marker.
BOGOTA-3(config)#ip address 172.29.3.2 255.255.255.252
^
% Invalid input detected at '^' marker.
BOGOTA-3(config)#int s0/0/0
BOGOTA-3(config-if)#ip address 172.29.3.2 255.255.255.252
BOGOTA-3(config-if)#no shut

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
BOGOTA-3(config-if)#int s0/0/1
BOGOTA-3(config-if)#ip address 172.29.3.6 255.255.255.252
BOGOTA-3(config-if)#clock rate 4000000
BOGOTA-3(config-if)#int s0/0/0
BOGOTA-3(config-if)#clock rate 4000000
BOGOTA-3(config-if)#int s0/1/0
BOGOTA-3(config-if)#ip address 172.29.3.4 255.255.255.252
Bad mask /30 for address 172.29.3.4
BOGOTA-3(config-if)#ip address 172.29.3.14 255.255.255.252
BOGOTA-3(config-if)#clock rate 4000000
BOGOTA-3(config-if)#no shut

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
BOGOTA-3(config-if)#int s0/0/1
BOGOTA-3(config-if)#no shut

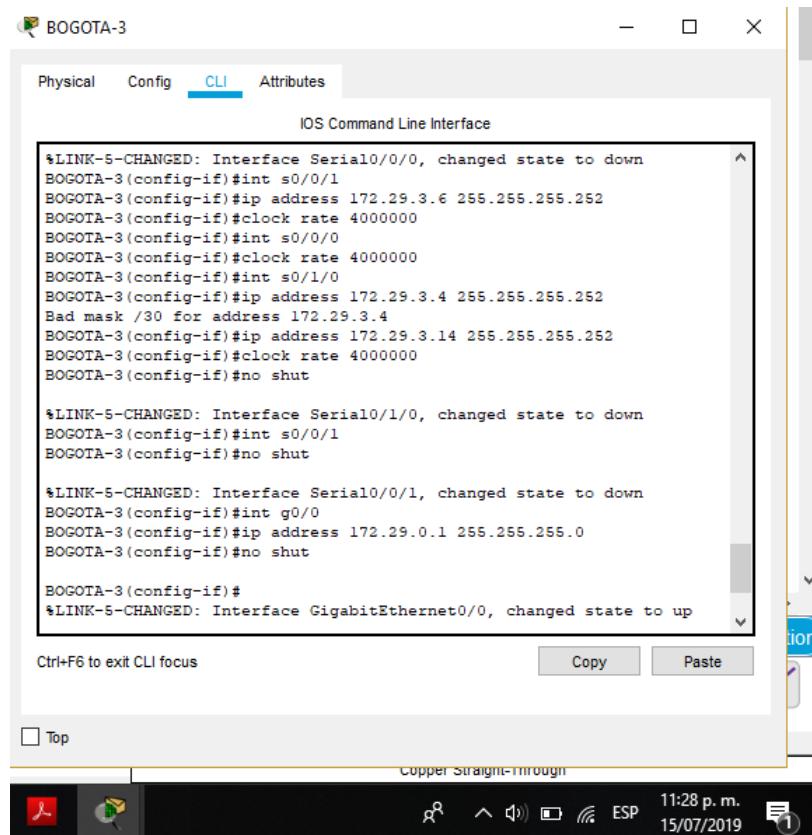
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
BOGOTA-3(config-if)#int g0/0
BOGOTA-3(config-if)#ip address 172.29.0.1 255.255.255.0
BOGOTA-3(config-if)#no shut

BOGOTA-3(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

BOGOTA-3(config-if)#end
BOGOTA-3#
%SYS-5-CONFIG_I: Configured from console by console
```



BOGOTA-3#wr  
Building configuration...  
[OK]  
BOGOTA-3#



## Configuración de la RIP

### MEDELLIN-1

```
MEDELLIN-1>
MEDELLIN-1>ENABLE
MEDELLIN-1#CONF TERM
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-1(config)#ROUTER RIP
MEDELLIN-1(config-router)#version 2
MEDELLIN-1(config-router)#no auto-sumary
^
% Invalid input detected at '^' marker.
MEDELLIN-1(config-router)#exit
```

```

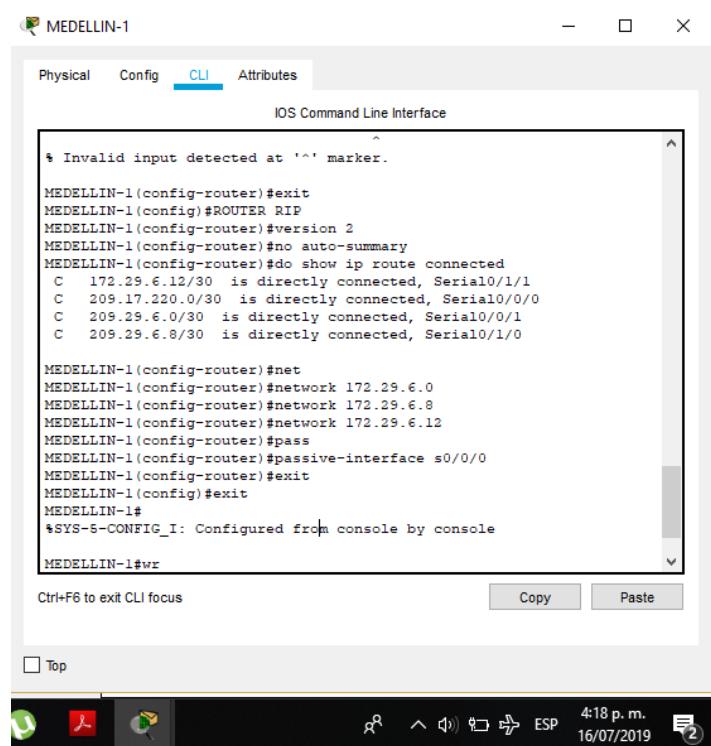
MEDELLIN-1(config)#ROUTER RIP
MEDELLIN-1(config-router)#version 2
MEDELLIN-1(config-router)#no auto-summary
MEDELLIN-1(config-router)#do show ip route connected
C 172.29.6.12/30 is directly connected, Serial0/1/1
C 209.17.220.0/30 is directly connected, Serial0/0/0
C 209.29.6.0/30 is directly connected, Serial0/0/1
C 209.29.6.8/30 is directly connected, Serial0/1/0
  
```

```

MEDELLIN-1(config-router)#net
MEDELLIN-1(config-router)#network 172.29.6.0
MEDELLIN-1(config-router)#network 172.29.6.8
MEDELLIN-1(config-router)#network 172.29.6.12
MEDELLIN-1(config-router)#pass
MEDELLIN-1(config-router)#passive-interface s0/0/0
MEDELLIN-1(config-router)#exit
MEDELLIN-1(config)#exit
MEDELLIN-1#
%SYS-5-CONFIG_I: Configured from console by console
  
```

```

MEDELLIN-1#wr
Building configuration...
[OK]
MEDELLIN-1#
MEDELLIN-1#
  
```





## MEDELLIN-2

MEDELLIN-2>ENA

MEDELLIN-2#conf ter

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

MEDELLIN-2(config)#router rip

MEDELLIN-2(config-router)#version 2

MEDELLIN-2(config-router)#no auto-summary

MEDELLIN-2(config-router)#do show ip route connected

C 172.29.4.0/25 is directly connected, GigabitEthernet0/0

C 172.29.6.0/30 is directly connected, Serial0/0/0

C 172.29.6.4/30 is directly connected, Serial0/0/1

MEDELLIN-2(config-router)#network 172.29.4.0

MEDELLIN-2(config-router)#network 172.29.6.0

MEDELLIN-2(config-router)#network 172.29.6.4

MEDELLIN-2(config-router)#passive-interface g0/0

MEDELLIN-2(config-router)#end

MEDELLIN-2#

%SYS-5-CONFIG\_I: Configured from console by console

MEDELLIN-2#wr

Building configuration...

[OK]

MEDELLIN-2#



## MEDELLIN-3

```
MEDELLIN-3>
MEDELLIN-3>ENA
MEDELLIN-3#conf term
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-3(config)#router rip
MEDELLIN-3(config-router)#version 2
MEDELLIN-3(config-router)#no auto-summary
MEDELLIN-3(config-router)#do show ip route connected
C 172.29.4.128/25 is directly connected, GigabitEthernet0/0
C 172.29.6.4/30 is directly connected, Serial0/1/0
C 172.29.6.8/30 is directly connected, Serial0/0/0
C 172.29.6.12/30 is directly connected, Serial0/0/1
```

```
MEDELLIN-3(config-router)#network 172.29.4.128
MEDELLIN-3(config-router)#network 172.29.6.4
MEDELLIN-3(config-router)#network 172.29.6.8
MEDELLIN-3(config-router)#network 172.29.6.12
MEDELLIN-3(config-router)#pass
MEDELLIN-3(config-router)#passive-interface g0/0
MEDELLIN-3(config-router)#end
MEDELLIN-3#
```

%SYS-5-CONFIG\_I: Configured from console by console

```
MEDELLIN-3#wr
Building configuration...
[OK]
MEDELLIN-3#
```

```
MEDELLIN-3>
MEDELLIN-3>ENA
MEDELLIN-3#conf term
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-3(config)#router rip
MEDELLIN-3(config-router)#version 2
MEDELLIN-3(config-router)#no auto-summary
MEDELLIN-3(config-router)#do show ip route connected
C 172.29.4.128/25 is directly connected, GigabitEthernet0/0
C 172.29.6.4/30 is directly connected, Serial0/1/0
C 172.29.6.8/30 is directly connected, Serial0/0/0
C 172.29.6.12/30 is directly connected, Serial0/0/1

MEDELLIN-3(config-router)#network 172.29.4.128
MEDELLIN-3(config-router)#network 172.29.6.4
MEDELLIN-3(config-router)#network 172.29.6.8
MEDELLIN-3(config-router)#network 172.29.6.12
MEDELLIN-3(config-router)#pass
MEDELLIN-3(config-router)#passive-interface g0/0
MEDELLIN-3(config-router)#end
MEDELLIN-3#
%SYS-5-CONFIG_I: Configured from console by console
```

**BOGOTA-1**

```
BOGOTA-1>
BOGOTA-1>ENA
BOGOTA-1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA-1(config)#router rip
BOGOTA-1(config-router)#version 2
BOGOTA-1(config-router)#no auto-summary
BOGOTA-1(config-router)#do show ip route connected
C 172.29.3.0/30 is directly connected, Serial0/1/0
C 172.29.3.4/30 is directly connected, Serial0/1/1
C 172.29.3.8/30 is directly connected, Serial0/0/1
C 209.17.220.4/30 is directly connected, Serial0/0/0

BOGOTA-1(config-router)#network 172.29.3.0
BOGOTA-1(config-router)#network 172.29.3.4
BOGOTA-1(config-router)#network 172.29.3.8
BOGOTA-1(config-router)#passive-interface s0/0/0
BOGOTA-1(config-router)#end
BOGOTA-1#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
BOGOTA-1#
```

```
BOGOTA-1>
BOGOTA-1>ENA
BOGOTA-1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA-1(config)#router rip
BOGOTA-1(config-router)#version 2
BOGOTA-1(config-router)#no auto-summary
BOGOTA-1(config-router)#do show ip route connected
C 172.29.3.0/30 is directly connected, Serial0/1/0
C 172.29.3.4/30 is directly connected, Serial0/1/1
C 172.29.3.8/30 is directly connected, Serial0/0/1
C 209.17.220.4/30 is directly connected, Serial0/0/0

BOGOTA-1(config-router)#network 172.29.3.0
BOGOTA-1(config-router)#network 172.29.3.4
BOGOTA-1(config-router)#network 172.29.3.8
BOGOTA-1(config-router)#passive-interface s0/0/0
BOGOTA-1(config-router)#end
BOGOTA-1#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
BOGOTA-1#
```

**BOGOTA-2**

```

BOGOTA-2>
BOGOTA-2>enable
BOGOTA-2#conf term
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA-2(config)#router rip
BOGOTA-2(config-router)#version 2
BOGOTA-2(config-router)#no auto-summary
BOGOTA-2(config-router)#do show ip route connected
C 172.29.1.0/24 is directly connected, GigabitEthernet0/0
C 172.29.3.8/30 is directly connected, Serial0/0/0
C 172.29.3.12/30 is directly connected, Serial0/0/1

BOGOTA-2(config-router)#network 172.29.3.8
BOGOTA-2(config-router)#network 172.29.3.12
BOGOTA-2(config-router)#passive-interface g0/0
BOGOTA-2(config-router)#end
BOGOTA-2#
%SYS-5-CONFIG_I: Configured from console by console

```

```

BOGOTA-2#wr
Building configuration...
[OK]
BOGOTA-2#

```

The screenshot displays the Cisco IOS Command Line Interface (CLI) window for device BOGOTA-2. The window title is "BOGOTA-2". The "CLI" tab is active. The main pane shows the following configuration commands:

```

BOGOTA-2>
BOGOTA-2>enable
BOGOTA-2#conf term
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA-2(config)#router rip
BOGOTA-2(config-router)#version 2
BOGOTA-2(config-router)#no auto-summary
BOGOTA-2(config-router)#do show ip route connected
C 172.29.1.0/24 is directly connected, GigabitEthernet0/0
C 172.29.3.8/30 is directly connected, Serial0/0/0
C 172.29.3.12/30 is directly connected, Serial0/0/1

BOGOTA-2(config-router)#network 172.29.3.8
BOGOTA-2(config-router)#network 172.29.3.12
BOGOTA-2(config-router)#passive-interface g0/0
BOGOTA-2(config-router)#end
BOGOTA-2#
%SYS-5-CONFIG_I: Configured from console by console

BOGOTA-2#wr
Building configuration...
[OK]
BOGOTA-2#

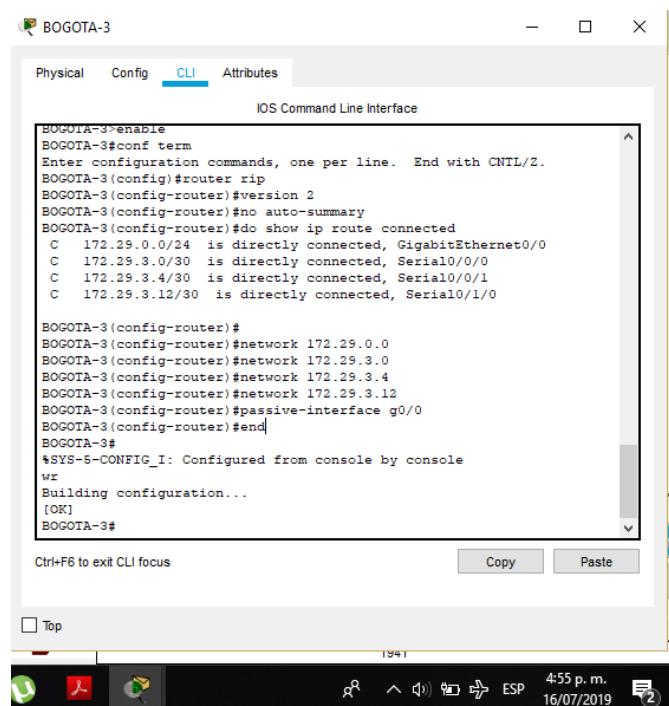
```

At the bottom of the window, there are "Copy" and "Paste" buttons. The status bar at the bottom right shows the time as 4:49 p.m. and the date as 16/07/2019.

BOGOTA-3

```
BOGOTA-3>enable
BOGOTA-3#conf term
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA-3(config)#router rip
BOGOTA-3(config-router)#version 2
BOGOTA-3(config-router)#no auto-summary
BOGOTA-3(config-router)#do show ip route connected
C 172.29.0.0/24 is directly connected, GigabitEthernet0/0
C 172.29.3.0/30 is directly connected, Serial0/0/0
C 172.29.3.4/30 is directly connected, Serial0/0/1
C 172.29.3.12/30 is directly connected, Serial0/1/0
```

```
BOGOTA-3(config-router)#  
BOGOTA-3(config-router)#network 172.29.0.0  
BOGOTA-3(config-router)#network 172.29.3.0  
BOGOTA-3(config-router)#network 172.29.3.4  
BOGOTA-3(config-router)#network 172.29.3.12  
BOGOTA-3(config-router)#passive-interface g0/0  
BOGOTA-3(config-router)#end  
BOGOTA-3#  
%SYS-5-CONFIG_I: Configured from console by console  
wr  
Building configuration...  
[OK]  
BOGOTA-3#
```



## Verificación de las redes conectadas en MEDELLIN-1 y BOGOTA-1:

**MEDELLIN-1**

Physical    Config    **CLI**    Attributes

IOS Command Line Interface

```

MEDELLIN-1>
MEDELLIN-1>ENA
MEDELLIN-1#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

        172.29.0.0/16 is variably subnetted, 5 subnets, 3 masks
R            172.29.4.128/25 [120/1] via 172.29.6.14, 00:00:14,
Serial0/1/1
R            172.29.6.4/30 [120/1] via 172.29.6.14, Serial0/1/1
R            172.29.6.8/30 [120/1] via 172.29.6.14, Serial0/1/1
C            172.29.6.12/30 is directly connected, Serial0/1/1
L            172.29.6.13/32 is directly connected, Serial0/1/1
        209.17.220.0/24 is variably subnetted, 2 subnets, 2 masks
C            209.17.220.0/30 is directly connected, Serial0/0/0
L            209.17.220.2/32 is directly connected, Serial0/0/0
        209.29.6.0/24 is variably subnetted, 4 subnets, 2 masks
C            209.29.6.0/30 is directly connected, Serial0/0/1
L            209.29.6.1/32 is directly connected, Serial0/0/1
C            209.29.6.8/30 is directly connected, Serial0/1/0
L            209.29.6.9/32 is directly connected, Serial0/1/0

MEDELLIN-1#

```

Ctrl+F6 to exit CLI focus           

Top

4:59 p.m.    16/07/2019    2



BOGOTA-1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
BOGOTA-1>ena
BOGOTA-1#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

    172.29.0.0/16 is variably subnetted, 8 subnets, 3 masks
R      172.29.0.0/24 [120/1] via 172.29.3.2, 00:00:03, Serial0/1/0
C      172.29.3.0/30 is directly connected, Serial0/1/0
L      172.29.3.1/32 is directly connected, Serial0/1/0
C      172.29.3.4/30 is directly connected, Serial0/1/1
L      172.29.3.5/32 is directly connected, Serial0/1/1
C      172.29.3.8/30 is directly connected, Serial0/0/1
L      172.29.3.9/32 is directly connected, Serial0/0/1
R      172.29.3.12/30 [120/1] via 172.29.3.2, 00:00:03, Serial0/1/0
    209.17.220.0/24 is variably subnetted, 2 subnets, 2 masks
C      209.17.220.4/30 is directly connected, Serial0/0/0
L      209.17.220.6/32 is directly connected, Serial0/0/0

BOGOTA-1#
```

Ctrl+F6 to exit CLI focus

Top

Copy Paste

4:59 p.m. 16/07/2019

*3.1.1.B. Los routers Bogota1 y Medellín deberán añadir a su configuración de enrutamiento una ruta por defecto hacia el ISP y, a su vez, redistribuirla dentro de las publicaciones de RIP.*

### MEDELLIN-1

MEDELLIN-1#conf term

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

MEDELLIN-1(config)#ip route 0.0.0.0 0.0.0.0 209.17.220.1

MEDELLIN-1(config)#router rip

MEDELLIN-1(config-router)#default-information originate

MEDELLIN-1(config-router)#show ip-route

^

% Invalid input detected at '^' marker.

MEDELLIN-1(config-router)#end

MEDELLIN-1#

%SYS-5-CONFIG\_I: Configured from console by console

show ip route

```

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 209.17.220.1 to network 0.0.0.0

      172.29.0.0/16 is variably subnetted, 5 subnets, 3 masks
R        172.29.4.128/25 [120/1] via 172.29.6.14, 00:00:17, Serial0/1/1
R        172.29.6.4/30 [120/1] via 172.29.6.14, 00:00:17, Serial0/1/1
R        172.29.6.8/30 [120/1] via 172.29.6.14, 00:00:17, Serial0/1/1
C        172.29.6.12/30 is directly connected, Serial0/1/1
L        172.29.6.13/32 is directly connected, Serial0/1/1
      209.17.220.0/24 is variably subnetted, 2 subnets, 2 masks
C          209.17.220.0/30 is directly connected, Serial0/0/0
L          209.17.220.2/32 is directly connected, Serial0/0/0
      209.29.6.0/24 is variably subnetted, 4 subnets, 2 masks
C          209.29.6.0/30 is directly connected, Serial0/0/1
L          209.29.6.1/32 is directly connected, Serial0/0/1
C          209.29.6.8/30 is directly connected, Serial0/1/0
L          209.29.6.9/32 is directly connected, Serial0/1/0
S*        0.0.0.0/0 [1/0] via 209.17.220.1

MEDELLIN-1#
MEDELLIN-1#
```

Ctrl+F6 to exit CLI focus      Copy      Paste

Top

2901

ESP 16/07/2019 5:08 p.m.

## BOGOTA-1

BOGOTA-1#CONF TERM

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

BOGOTA-1(config)#ip route 0.0.0.0 0.0.0.0 209.17.220.5

BOGOTA-1(config)#router rip

BOGOTA-1(config-router)#default-information originate

BOGOTA-1(config-router)#end

BOGOTA-1#

```

BOGOTA-1#CONF TERM
Enter configuration commands, one per line. End with CNTL/Z.

BOGOTA-1(config)#ip route 0.0.0.0 0.0.0.0 209.17.220.5
BOGOTA-1(config)#router rip
BOGOTA-1(config-router)#default-information originate
BOGOTA-1(config-router)#end
BOGOTA-1#


* Invalid input detected at '^' marker.

BOGOTA-1#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 209.17.220.5 to network 0.0.0.0

      172.29.0.0/16 is variably subnetted, 8 subnets, 3 masks
R        172.29.0.0/24 [120/1] via 172.29.3.2, 00:00:22, Serial0/1/0
C        172.29.3.0/30 is directly connected, Serial0/1/0
L        172.29.3.1/32 is directly connected, Serial0/1/0
C        172.29.3.4/30 is directly connected, Serial0/1/1
L        172.29.3.5/32 is directly connected, Serial0/1/1
C        172.29.3.8/30 is directly connected, Serial0/0/1
L        172.29.3.9/32 is directly connected, Serial0/0/1
R        172.29.3.12/30 [120/1] via 172.29.3.2, 00:00:22, Serial0/1/0
      209.17.220.0/24 is variably subnetted, 2 subnets, 2 masks
C        209.17.220.4/30 is directly connected, Serial0/0/0
L        209.17.220.6/32 is directly connected, Serial0/0/0
S*      0.0.0.0/0 [1/0] via 209.17.220.5

BOGOTA-1#


Ctrl+F6 to exit CLI focus
 Top
Copy Paste

```

3.1.1.C. El router ISP deberá tener una ruta estática dirigida hacia cada red interna de Bogotá y Medellín para el caso se sumarizan las subredes de cada uno a /22.

Se calcula y se procede a configurar las rutas en el ISP:

MEDELLIN			128	64	32	16	8	4	2	1	128	64	32	16	8	4	2	1
172.29.4.0	172	29	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
172.29.4.128	172	29	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0
172.29.6.0	172	29	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
172.29.6.12	172	29	0	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0
172.29.6.8	172	29	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0
172.29.6.4	172	29	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0
172.29.4.0/22	172	29	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0

BOGOTA			128	64	32	16	8	4	2	1	128	64	32	16	8	4	2	1
172.29.1.0	172	29	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
172.29.3.0	172	29	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
172.29.0.0	172	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
172.29.3.8	172	29	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
172.29.3.4	172	29	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0
172.29.3.12	172	29	0	0	0	0	0	0	1	1	0	0	0	0	1	1	0	0
172.29.4.0/22	172	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

## ISP

```

ISP>
ISP>EN
ISP#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
ISP(config)#ip route 172.29.4.0 255.255.255.0 209.17.220.2
ISP(config)#ip route 172.29.0.0 255.255.255.0 209.17.220.6
ISP(config)#

```

```

DRAM configuration is 64 bits wide with parity disabled.
255K bytes of non-volatile configuration memory.
249086K bytes of ATA System CompactFlash 0 (Read/Write)

Press RETURN to get started!

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

ISP>
ISP>EN
ISP#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
ISP(config)#ip route 172.29.4.0 255.255.255.0 209.17.220.2
ISP(config)#ip route 172.29.0.0 255.255.255.0 209.17.220.6
ISP(config)#

```

Ctrl+F6 to exit CLI focus      Copy      Paste

Top

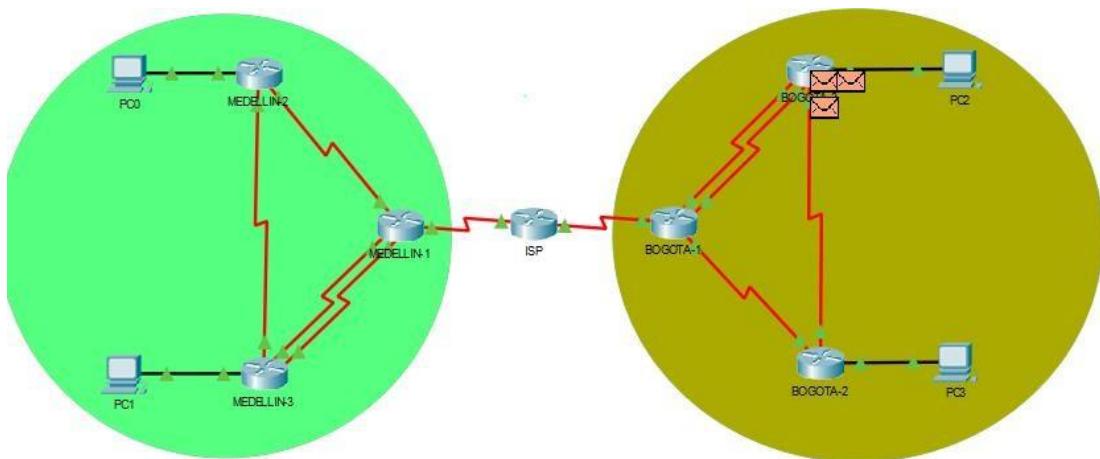
8:26 p.m. 16/07/2019

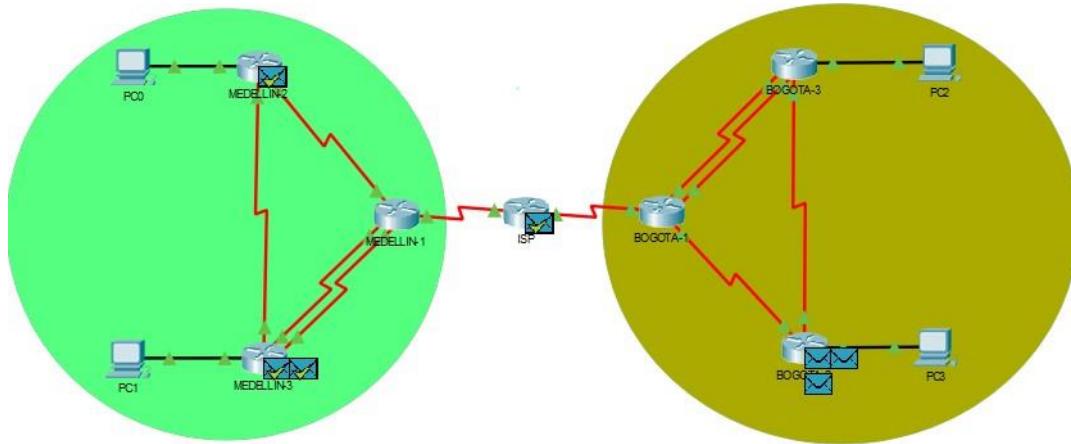
### 3.1.2. Parte 2: Tabla de Enrutamiento.

3.1.2.A. Verificar la tabla de enrutamiento en cada uno de los routers para comprobar las redes y sus rutas.

3.1.2.B.

Se verifica envío de paquetes y el enrutamiento:





### 3.1.2.C. Verificar el balanceo de carga que presentan los routers.

A continuación se visualiza en la imagen las rutas de transito que se encuentran balanceadas:

#### **BOGOTA-1**

BOGOTA-1>en

BOGOTA-1#sh ip route

```

BOGOTA-1>
BOGOTA-1>en
BOGOTA-1>sh 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 209.17.220.5 to network 0.0.0.0

172.29.0.0/16 is variably subnetted, 8 subnets, 3 masks
R 172.29.0.0/24 [120/1] via 172.29.3.2, 00:00:24, Serial0/1/0
C 172.29.3.0/30 is directly connected, Serial0/1/0
L 172.29.3.1/32 is directly connected, Serial0/1/0
C 172.29.3.4/30 is directly connected, Serial0/1/1
L 172.29.3.5/32 is directly connected, Serial0/1/1
C 172.29.3.8/30 is directly connected, Serial0/0/1
L 172.29.3.9/32 is directly connected, Serial0/0/1
R 172.29.3.12/30 [120/1] via 172.29.3.2, 00:00:24, Serial0/1/0
209.17.220.0/24 is variably subnetted, 2 subnets, 2 masks
C 209.17.220.4/30 is directly connected, Serial0/0/0
L 209.17.220.6/32 is directly connected, Serial0/0/0
S* 0.0.0.0/0 [1/0] via 209.17.220.5

BOGOTA-1#

```

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*3.1.2.D.Observese en los routers Bogotá1 y Medellín1 cierta similitud por su ubicación, por tener dos enlaces de conexión hacia otro router y por la ruta por defecto que manejan.*

Se analiza que MEDELLIN-1 y BOGOTA-1 poseen conexiones similares con ISP y su comportamiento es igual por la misma cantidad de conexiones y enlaces.

*3.1.2.E.Los routers Medellín2 y Bogotá2 también presentan redes conectadas directamente y recibidas mediante RIP.*

## MEDELLIN-2

```

MEDELLIN-2>
MEDELLIN-2#ena
MEDELLIN-2#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

      172.29.0.0/16 is variably subnetted, 6 subnets, 3 masks
C        172.29.4.0/25 is directly connected, GigabitEthernet0/0
L        172.29.4.1/32 is directly connected, GigabitEthernet0/0
C        172.29.6.0/30 is directly connected, Serial0/0/0
L        172.29.6.2/32 is directly connected, Serial0/0/0
C        172.29.6.4/30 is directly connected, Serial0/0/1
L        172.29.6.5/32 is directly connected, Serial0/0/1

```

## BOGOTA-2

```

BOGOTA-2>
BOGOTA-2>EN
BOGOTA-2#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

      172.29.0.0/16 is variably subnetted, 6 subnets, 3 masks
C       172.29.1.0/24 is directly connected, GigabitEthernet0/0
L       172.29.1.1/32 is directly connected, GigabitEthernet0/0
C       172.29.3.8/30 is directly connected, Serial0/0/0
L       172.29.3.10/32 is directly connected, Serial0/0/0
C       172.29.3.12/30 is directly connected, Serial0/0/1
L       172.29.3.13/32 is directly connected, Serial0/0/1
BOGOTA-2#
    
```

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*3.1.2.F. Las tablas de los routers restantes deben permitir visualizar rutas redundantes para el caso de la ruta por defecto.*

De igual manera las conexiones redundantes se muestran en el balanceo de cargas con MEDELLIN-3 y BOGOTA-3

## MEDELLIN-3

```

MEDELLIN-3>EN
MEDELLIN-3#sh 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

      172.29.0.0/16 is variably subnetted, 8 subnets, 3 masks
C       172.29.4.128/25 is directly connected, GigabitEthernet0/0
L       172.29.4.129/32 is directly connected, GigabitEthernet0/0
C       172.29.6.4/30 is directly connected, Serial0/1/0
L       172.29.6.6/32 is directly connected, Serial0/1/0
C       172.29.6.8/30 is directly connected, Serial0/0/0
L       172.29.6.10/32 is directly connected, Serial0/0/0
C       172.29.6.12/30 is directly connected, Serial0/0/1
L       172.29.6.14/32 is directly connected, Serial0/0/1
MEDELLIN-3#
    
```

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**BOGOTA-3**

```

BOGOTA-3#sh 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

172.29.0.0/16 is variably subnetted, 9 subnets, 3 masks
C     172.29.0.0/24 is directly connected, GigabitEthernet0/0
L     172.29.0.1/32 is directly connected, GigabitEthernet0/0
C     172.29.3.0/30 is directly connected, Serial0/0/0
L     172.29.3.2/32 is directly connected, Serial0/0/0
C     172.29.3.4/30 is directly connected, Serial0/0/1
L     172.29.3.6/32 is directly connected, Serial0/0/1
R     172.29.3.6/30 [120/1] via 172.29.3.1, 00:00:09, Serial0/0/0
C     172.29.3.12/30 is directly connected, Serial0/1/0
L     172.29.3.14/32 is directly connected, Serial0/1/0
BOGOTA-3#

```

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### 3.1.2.G. El router ISP solo debe indicar sus rutas estáticas adicionales a las directamente conectadas.

Una vez se configura RIP, se visualiza que las interfaces pasivas de los routers se encuentran implementadas a los asignados.

Passive-interface s0/0/0 MEDELLIN-1  
 Passive-interface g0/0 MEDELLIN-2  
 Passive-interface g0/0 MEDELLIN-3  
 Passive-interface s0/0/0 BOGOTA-1  
 Passive-interface g0/0 BOGOTA-2  
 Passive-interface g0/0 BOGOTA-3

### 3.1.3. Parte 3: Deshabilitar la propagación del protocolo RIP.

- a. Para no propagar las publicaciones por interfaces que no lo requieran se debe deshabilitar la propagación del protocolo RIP, en la siguiente tabla se indican las interfaces de cada router que no necesitan desactivación.

ROUTER	INTERFAZ
<b>Bogota1</b>	SERIAL0/0/1; SERIAL0/1/0; SERIAL0/1/1
<b>Bogota2</b>	SERIAL0/0/0; SERIAL0/0/1
<b>Bogota3</b>	SERIAL0/0/0; SERIAL0/0/1; SERIAL0/1/0
<b>Medellín1</b>	SERIAL0/0/0; SERIAL0/0/1; SERIAL0/1/1
<b>Medellín2</b>	SERIAL0/0/0; SERIAL0/0/1
<b>Medellín3</b>	SERIAL0/0/0; SERIAL0/0/1; SERIAL0/1/0
<b>ISP</b>	No lo requiere

Este paso se realizó en la parte 1 en donde solo se habilitan las interfaces que se encuentran conectadas y funcionando, las demás se encuentran apagadas y sin asignación de direccionamiento.

### 3.1.4. Parte 4: Verificación del protocolo RIP.

- 3.1.4.A. *Verificar y documentar las opciones de enrutamiento configuradas en los routers, como el passive interface para la conexión hacia el ISP, la versión de RIP y las interfaces que participan de la publicación entre otros datos.*

**Rip version 2:** Estas soportan subredes, CIDR y VLSM, autenticación usando uno de los siguientes mecanismos: no autenticación, autenticación mediante contraseña, autenticación mediante contraseña codificada.

**passive interface:** Es una interface pasiva lo que hace es que no envía ningún tipo de paquete, ni hellos ni cualquier otro tipo de paquetes. O más bien que por esta interface no se puede tener neighbors o vecinos pero si anuncia las redes de dichas interfaces.

**3.1.4.B. Verificar y documentar la base de datos de RIP de cada router, donde se informa de manera detallada de todas las rutas hacia cada red.**

**BOGOTA-1**

Physical Config **CLI** Attributes

IOS Command Line Interface

```

BOGOTA-1>
BOGOTA-1>ena
BOGOTA-1#router rip
^
* Invalid input detected at '^' marker.

BOGOTA-1#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA-1(config)#router rip
BOGOTA-1(config-router)#do show ip route connected
C 172.29.3.0/30 is directly connected, Serial0/1/0
C 172.29.3.4/30 is directly connected, Serial0/1/1
C 172.29.3.8/30 is directly connected, Serial0/0/1
C 209.17.220.4/30 is directly connected, Serial0/0/0

BOGOTA-1(config-router)#

```

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**BOGOTA-2**

Physical Config **CLI** Attributes

IOS Command Line Interface

```

Press RETURN to get started.

BOGOTA-2>en
BOGOTA-2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA-2(config)#router rip
BOGOTA-2(config-router)#do show ip route connected
C 172.29.1.0/24 is directly connected, GigabitEthernet0/0
C 172.29.3.8/30 is directly connected, Serial0/0/0
C 172.29.3.12/30 is directly connected, Serial0/0/1

BOGOTA-2(config-router)#

```

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BOGOTA-3

Physical Config **CLI** Attributes

IOS Command Line Interface

```
BOGOTA-3>
BOGOTA-3>ena
BOGOTA-3>conf ter
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA-3(config)#router rip
BOGOTA-3(config-router)#do show ip route connected
C 172.29.0.0/24 is directly connected, GigabitEthernet0/0
C 172.29.3.0/30 is directly connected, Serial0/0/0
C 172.29.3.4/30 is directly connected, Serial0/0/1
C 172.29.3.12/30 is directly connected, Serial0/1/0
BOGOTA-3(config-router)#
Ctrl+F6 to exit CLI focus
```

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MEDELLIN-1

Physical Config **CLI** Attributes

IOS Command Line Interface

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

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

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

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

MEDELLIN-1>en
MEDELLIN-1>conf t
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-1(config)#router rip
MEDELLIN-1(config-router)#version 2
MEDELLIN-1(config-router)#do show ip route connected
C 172.29.6.12/30 is directly connected, Serial0/1/1
C 209.17.220.0/30 is directly connected, Serial0/0/0
C 209.29.6.0/30 is directly connected, Serial0/0/1
C 209.29.6.8/30 is directly connected, Serial0/1/0
MEDELLIN-1(config-router)#
Ctrl+F6 to exit CLI focus
```

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MEDELLIN-2

Physical Config **CLI** Attributes

IOS Command Line Interface

```
MEDELLIN-2>
MEDELLIN-2>ena
MEDELLIN-2#cnf te
^
% Invalid input detected at '^' marker.

MEDELLIN-2#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-2(config-router)#do show ip route connected
C 172.29.4.0/25 is directly connected, GigabitEthernet0/0
C 172.29.6.0/30 is directly connected, Serial0/0/0
C 172.29.6.4/30 is directly connected, Serial0/0/1

MEDELLIN-2(config-router)#
Ctrl+F6 to exit CLI focus
```

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MEDELLIN-3

Physical Config **CLI** Attributes

IOS Command Line Interface

```
MEDELLIN-3>
MEDELLIN-3>ena
MEDELLIN-3#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-3(config)#router rip
MEDELLIN-3(config-router)#do show ip router connected
show ip router connected
^
% Invalid input detected at '^' marker.

MEDELLIN-3(config-router)#do show ip route connected
C 172.29.4.128/25 is directly connected, GigabitEthernet0/0
C 172.29.6.4/30 is directly connected, Serial0/0/0
C 172.29.6.8/30 is directly connected, Serial0/0/0
C 172.29.6.12/30 is directly connected, Serial0/0/1

MEDELLIN-3(config-router)#
Ctrl+F6 to exit CLI focus
```

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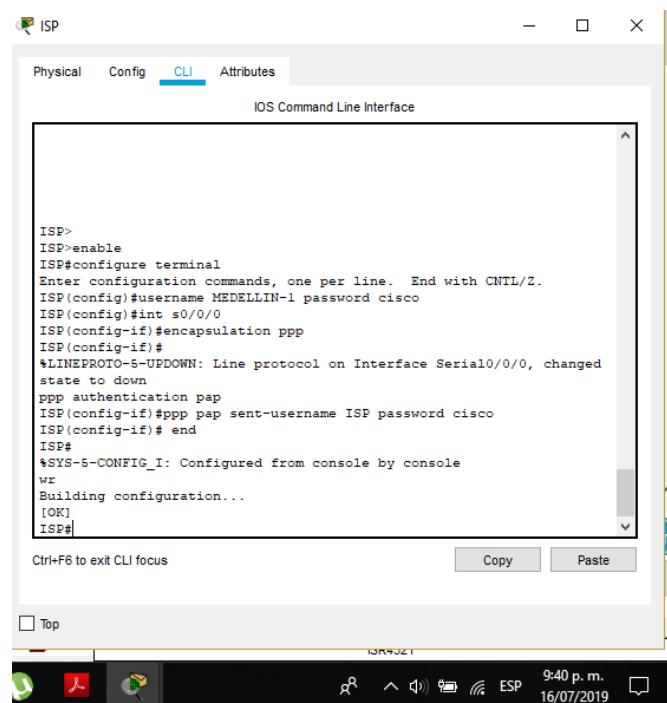
### 3.1.5. Parte 5: Configurar encapsulamiento y autenticación PPP.

3.1.5.A. Según la topología se requiere que el enlace Medellín1 con ISP sea configurado con autenticación PAT.

**ISP**

```

ISP>
ISP>enable
ISP#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
ISP(config)#username MEDELLIN-1 password cisco
ISP(config)#int s0/0/0
ISP(config-if)#encapsulation ppp
ISP(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to down
ppp authentication pap
ISP(config-if)#ppp pap sent-username ISP password cisco
ISP(config-if)# end
ISP#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
ISP#
  
```



## MEDELLIN-1

MEDELLIN-1#conf term

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

MEDELLIN-1(config)#username ISP password cisco

MEDELLIN-1(config)#int 0/0/0

^

% Invalid input detected at '^' marker.

MEDELLIN-1(config)#exit

MEDELLIN-1#

%SYS-5-CONFIG\_I: Configured from console by console

MEDELLIN-1#conf term

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

MEDELLIN-1(config)#inter s0/0/0

MEDELLIN-1(config-if)#encapsulation ppp

MEDELLIN-1(config-if)#ppp authentication pap

MEDELLIN-1(config-if)#ppp pap sent-username ISP password cisco

PPP: Warning: You have chosen a username/password combination that

is valid for CHAP. This is a potential security hole.

MEDELLIN-1(config-if)#

```

MEDELLIN-1#int s0/0/0
MEDELLIN-1(config-if)#no encapsulation ppp
MEDELLIN-1(config-if)#
*L1NEPROTO-5-UPDOWNN: Line protocol on Interface Serial0/0/0, changed state to up

MEDELLIN-1(config-if)#end
MEDELLIN-1#
%SYS-5-CONFIG_I: Configured from console by console
ping 209.17.220.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.17.220.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/6 ms

MEDELLIN-1#ping 209.17.220.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.17.220.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 2/5/8 ms

MEDELLIN-1#

```



3.1.5.B. El enlace Bogotá1 con ISP se debe configurar con autenticación CHAP.

### BOGOTA-1

BOGOTA-1#conf ter

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

BOGOTA-1(config)#username ISP password cisco

BOGOTA-1(config)#int s0/0/0

BOGOTA-1(config-if)#encapsulation ppp

BOGOTA-1(config-if)#

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

ppp authentication chap

BOGOTA-1(config-if)#end

BOGOTA-1#

%SYS-5-CONFIG\_I: Configured from console by console

wr

Building configuration...

[OK]

BOGOTA-1#conf ter

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

BOGOTA-1(config)#int s0/0/0

BOGOTA-1(config-if)#no encapsulation ppp

BOGOTA-1(config-if)#

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

BOGOTA-1(config-if)#end

BOGOTA-1#

%SYS-5-CONFIG\_I: Configured from console by console

BOGOTA-1#

BOGOTA-1#ping 209.17.220.1

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 209.17.220.1, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/5 ms

BOGOTA-1#

### ISP

ISP#conf

Configuring from terminal, memory, or network [terminal]?

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

ISP(config)#int s0/0/0

ISP(config-if)#no ppp authentication chap

Must set encapsulation to PPP before using PPP subcommands

ISP(config-if)#end

ISP#

%SYS-5-CONFIG\_I: Configured from console by console

ISP#

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

### 3.1.6. Parte 6: Configuración de PAT.

3.1.6.A. En la topología, si se activa NAT en cada equipo de salida (Bogotá1 y Medellín1), los routers internos de una ciudad no podrán llegar hasta los routers internos en el otro extremo, sólo existirá comunicación hasta los routers Bogotá1, ISP y Medellín1.

3.1.6.B. Despues de verificar lo indicado en el paso anterior proceda a configurar el NAT en el router Medellín1. Compruebe que la traducción de direcciones indique las interfaces de entrada y de salida. Al realizar una prueba de ping, la dirección debe ser traducida automáticamente a la dirección de la interfaz serial 0/1/o del router Medellín1, como diferente puerto.

3.1.6.C. Proceda a configurar el NAT en el router Bogotá1. Compruebe que la traducción de direcciones indique las interfaces de entrada y de salida. Al realizar una prueba de ping, la dirección debe ser traducida automáticamente a la dirección de la interfaz serial 0/1/o del router Bogotá1, como diferente puerto.

#### BOGOTA-1

BOGOTA-1#conf ter

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

BOGOTA-1(config)#ip nat inside source list 1 interface s0/0/0 overload

BOGOTA-1(config)#access-list 1 permit 172.29.0.0 0.0.3.255

BOGOTA-1(config)#int 0/0/0

^

% Invalid input detected at '^' marker.

BOGOTA-1(config)#int s0/0/0

BOGOTA-1(config-if)#ip nat outside

BOGOTA-1(config-if)#int s0/0/1

BOGOTA-1(config-if)#ip nat inside

BOGOTA-1(config-if)#int s0/1/0

BOGOTA-1(config-if)#ip nat inside

BOGOTA-1(config-if)#int s0/1/1

BOGOTA-1(config-if)#ip nat inside

BOGOTA-1(config-if)#end

BOGOTA-1#

%SYS-5-CONFIG\_I: Configured from console by console

BOGOTA-1#

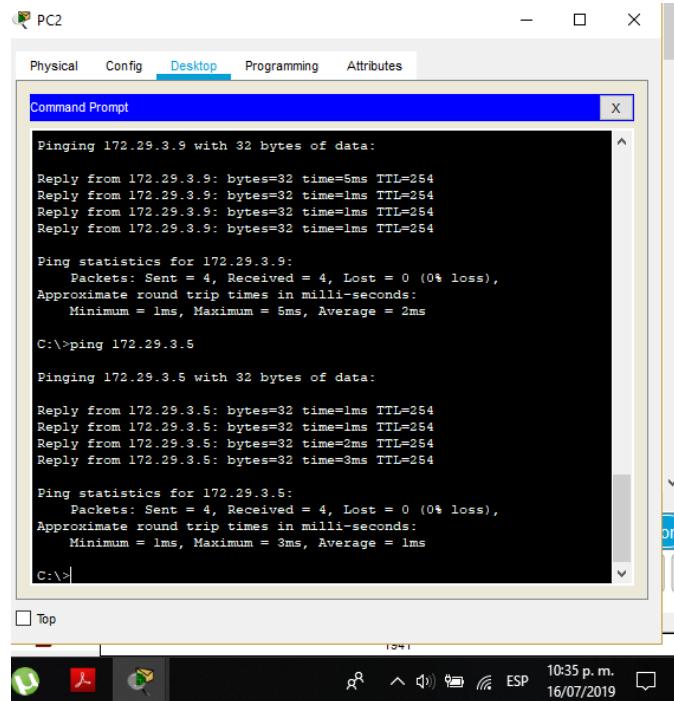


```
BOGOTA-1#
BOGOTA-1#sh ip nat translations
BOGOTA-1#
```

## MEDELLIN.1

```
MEDELLIN-1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-1(config)#ip nat inside list 1 interface s0/0/0 overload
^
% Invalid input detected at '^' marker.
MEDELLIN-1(config)#ip nat inside?
inside
MEDELLIN-1(config)#ip nat insi
MEDELLIN-1(config)#ip nat inside ?
source Source address translation
MEDELLIN-1(config)#ip nat inside source list 1 interface s0/0/0 overload
MEDELLIN-1(config)#access-list 1 permit 172.29.4.0 0.0.3.255
MEDELLIN-1(config)#int s0/0/0
MEDELLIN-1(config-if)#ip nat outside
MEDELLIN-1(config-if)#int s0/0/1
MEDELLIN-1(config-if)#ip nat inside
MEDELLIN-1(config-if)#int s0/1/0
MEDELLIN-1(config-if)#ip nat inside
MEDELLIN-1(config-if)#int s0/1/1
MEDELLIN-1(config-if)#ip nat inside
MEDELLIN-1(config-if)#end
MEDELLIN-1#
%SYS-5-CONFIG_I: Configured from console by console
```

```
MEDELLIN-1#
MEDELLIN-1#
MEDELLIN-1#sh ip nat translations
MEDELLIN-1#
MEDELLIN-1#
```



### 3.1.7. Parte 7: Configuración del servicio DHCP.

3.1.7.A. Configurar la red Medellín2 y Medellín3 donde el router Medellín 2 debe ser el servidor DHCP para ambas redes Lan.

3.1.7.B. El router Medellín3 deberá habilitar el paso de los mensajes broadcast hacia la IP del router Medellín2.

#### MEDELLIN-2

```
MEDELLIN-2>
MEDELLIN-2>en
MEDELLIN-2#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-2(config)#ip dhcp excluded-address 172.29.4.1 172.29.4.5
MEDELLIN-2(config)#ip dhcp excluded-address 172.29.4.129 172.29.4.133
MEDELLIN-2(config)#ip dhcp pool MEDELLIN-2
MEDELLIN-2(dhcp-config)#NETWORK 172.29.4.0 255.255.255.128
MEDELLIN-2(dhcp-config)#default-router 172.29.4.1
MEDELLIN-2(dhcp-config)#dns-server 5.5.5.5
```

```

MEDELLIN-2(dhcp-config)#exit
MEDELLIN-2(config)#ip dhcp pool MEDELLIN-3
MEDELLIN-2(dhcp-config)#NETWORK 172.29.4.128 255.255.255.128
MEDELLIN-2(dhcp-config)#default-router 172.29.4.129
MEDELLIN-2(dhcp-config)#dns-server 5.5.5.5
MEDELLIN-2(dhcp-config)#EXIT
MEDELLIN-2(config)#end
MEDELLIN-2#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
MEDELLIN-2#
    
```

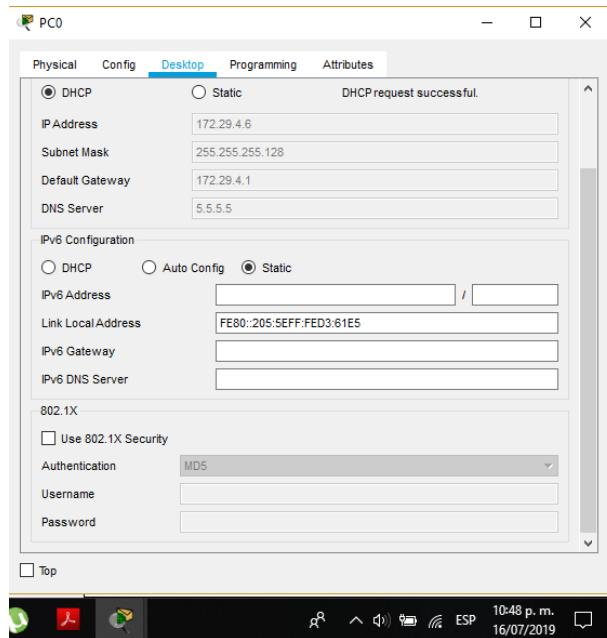
The screenshot shows the Cisco IOS CLI window for device 'MEDELLIN-2'. The window title is 'MEDELLIN-2'. The tabs at the top are 'Physical', 'Config', 'CLI' (which is selected), and 'Attributes'. The main area is labeled 'IOS Command Line Interface' and contains the following configuration commands:

```

MEDELLIN-2>
MEDELLIN-2>en
MEDELLIN-2#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-2(config)#ip dhcp excluded-address 172.29.4.1 172.29.4.5
MEDELLIN-2(config)#ip dhcp excluded-address 172.29.4.129 172.29.4.133
MEDELLIN-2(config)#ip dhcp pool MEDELLIN-3
MEDELLIN-2(dhcp-config)#NETWORK 172.29.4.0 255.255.255.128
MEDELLIN-2(dhcp-config)#default-router 172.29.4.1
MEDELLIN-2(dhcp-config)#dns-server 5.5.5.5
MEDELLIN-2(dhcp-config)#exit
MEDELLIN-2(config)#ip dhcp pool MEDELLIN-3
MEDELLIN-2(dhcp-config)#NETWORK 172.29.4.128 255.255.255.128
MEDELLIN-2(dhcp-config)#default-router 172.29.4.129
MEDELLIN-2(dhcp-config)#dns-server 5.5.5.5
MEDELLIN-2(dhcp-config)#EXIT
MEDELLIN-2(config)#end
MEDELLIN-2#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
MEDELLIN-2#
MEDELLIN-2#
    
```

At the bottom of the window, there are 'Copy' and 'Paste' buttons. The status bar at the bottom right shows the time as '10:46 p.m.' and the date as '16/07/2019'.

Verificamos configuración en DHCP de PCo



```
MEDELLIN-3>
MEDELLIN-3>ena
MEDELLIN-3#conf term
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN-3(config)#int g0/0
MEDELLIN-3(config-if)#ip helper-address 172.29.6.5
MEDELLIN-3(config-if)#end
MEDELLIN-3#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
MEDELLIN-3#
```

3.1.7.C. Configurar la red Bogotá2 y Bogotá3 donde el router Medellín2 debe ser el servidor DHCP para ambas redes Lan.

3.1.7.D. Configure el router Bogotá1 para que habilite el paso de los mensajes Broadcast hacia la IP del router Bogotá2.

## BOGOTA-2

```
BOGOTA-2>
BOGOTA-2>ENA
BOGOTA-2#conf term
```

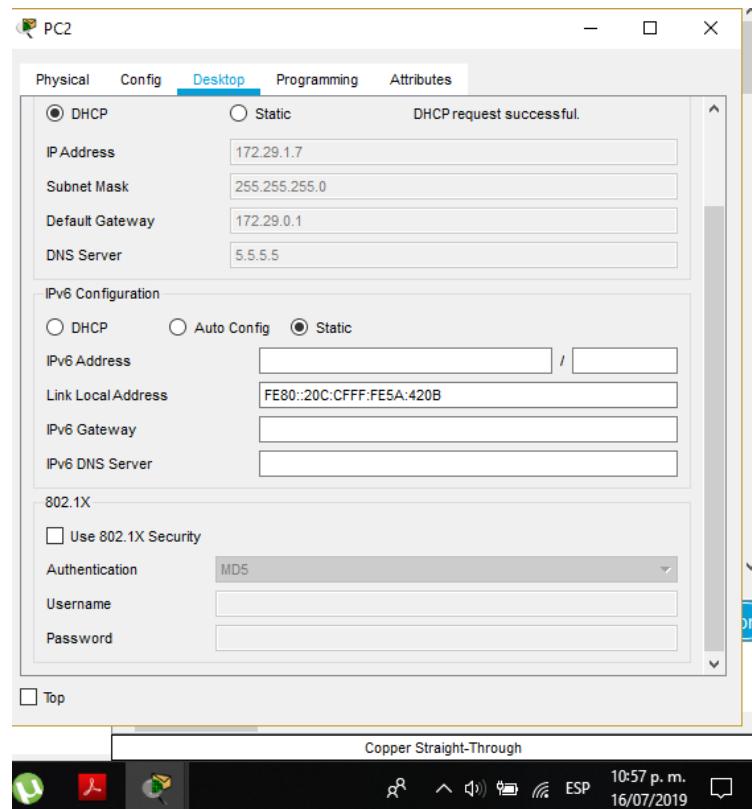
Enter configuration commands, one per line. End with CNTL/Z.

```

BOGOTA-2(config)#ip dhcp excluded-address 172.29.1.1 172.29.1.5
BOGOTA-2(config)#ip dhcp excluded-address 172.29.0.1 172.29.0.5
BOGOTA-2(config)#ip dhcp pool BOGOTA-2
BOGOTA-2(dhcp-config)#network 172.29.1.0 255.255.255.0
BOGOTA-2(dhcp-config)#default-router 172.29.0.1
BOGOTA-2(dhcp-config)#dns-server 5.5.5.5
BOGOTA-2(dhcp-config)#exit
BOGOTA-2(config)#ip dhcp pool BOGOTA-3
BOGOTA-2(dhcp-config)#network 172.29.4.1 255.255.255.128
BOGOTA-2(dhcp-config)#default-router 172.29.0.1
BOGOTA-2(dhcp-config)#dns-server 5.5.5.5
BOGOTA-2(dhcp-config)#exit
BOGOTA-2(config)#end
BOGOTA-2#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
BOGOTA-2#

```

Verificamos el DHCP en PC2

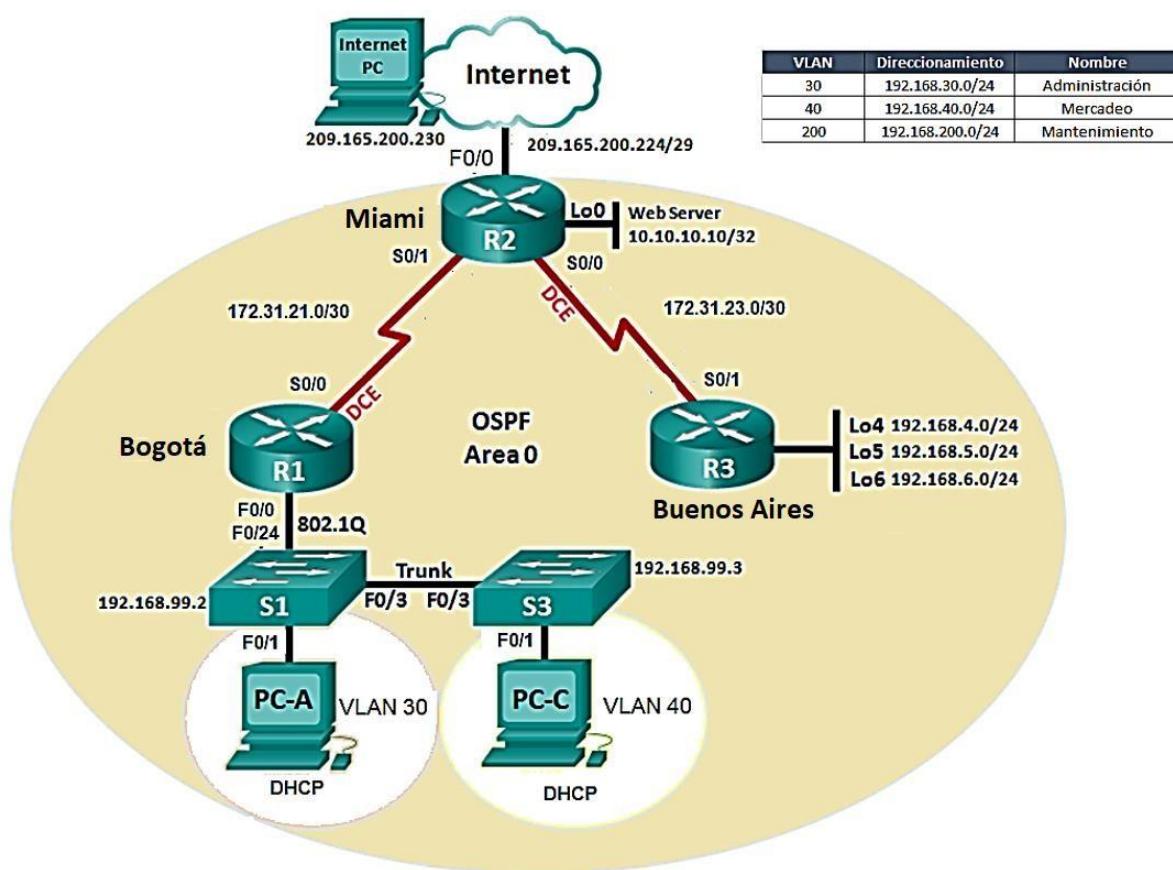


**BOGOTA-3**

```
BOGOTA-3>
BOGOTA-3>ena
BOGOTA-3#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA-3(config)#int g0/0
BOGOTA-3(config-if)#ip helper-address 172.29.3.13
BOGOTA-3(config-if)#end
BOGOTA-3#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
BOGOTA-3#
```

### 3.2. Escenario 2

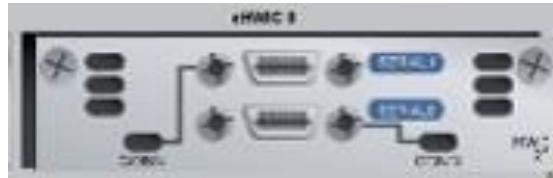
**Escenario:** Una empresa de Tecnología posee tres sucursales distribuidas en las ciudades de Miami, Bogotá y Buenos Aires, en donde el estudiante será el administrador de la red, el cual deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con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



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

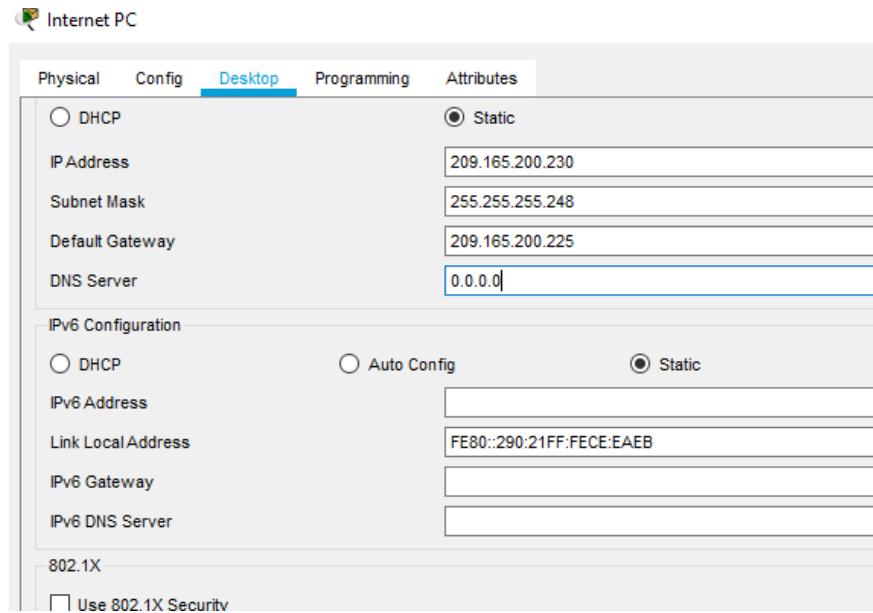
Dispositivo	Interface	Direccion IP	Masdca de Subred	Puerta de enlace predeterminada
R1 - Bogotá	Go/0	192.168.99.1	255.255.255.0	
	So/o/o	172.31.21.1	255.255.255.252	
R2 - Miami	So/o/1	172.31.21.2	255.255.255.252	
	So/o/o	172.31.23.1	255.255.255.252	
	Go/1 (Loo)	10.10.10.10	255.255.255.255	
	Go/o	209.165.200.225	255.255.255.248	
R3 - Buenos Aires	So/o/1	172.31.23.2	255.255.255.252	
	Lo4	192.168.4.1	255.255.255.0	
	Lo5	192.168.5.1	255.255.255.0	
	Lo6	192.168.6.1	255.255.255.0	
PC-A	NIC	DHCP	DCHP	DHCP
PC-B	NIC	DHCP	DHCP	DHC
PC Internet	NIC	209.165.200.230	255.255.255.248	209.168.200.225

Inicialmente se añade el módulo HWIC-2T para realizar la conexión con cable de consola y poder así iniciar la configuración.



**PC Internet**

Dirección IP 209.165.200.230  
 MascaradaSubred 255.255.255.248  
 Puerta de enlace por defecto 209.165.200.225



## Configuración inicial del Router 1

```

Router>
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#en
R1(config)#ena
R1(config)#enable secret cisco
R1(config)#servi
R1(config)#service pass
R1(config)#service password-encryption
R1(config)#bann

```



```
R1(config)#banner motd "solo acceso autorizado"
R1(config)#line console 0
R1(config-line)#pass
R1(config-line)#password cl
R1(config-line)#password class
R1(config-line)#login
R1(config-line)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console
```

```
R1#disable
R1>enable
Password:
Password:
Password:
% Bad secrets
```

```
R1>enable
Password:
Password:
R1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
```

```
R1(config)#line vty 0 15
R1(config-line)#password class
R1(config-line)#login
R1(config-line)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console
```

```
R1#disable
R1>enable
Password:
R1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#
R1#
```

### Configuración del direccionamiento:

```
R1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface s0/0/0
R1(config-if)#no shutdown
R1(config-if)#clock rate 12800
Unknown clock rate
R1(config-if)#clock rate ?
```

The screenshot shows a software interface titled 'PC3' with tabs for Physical, Config, Desktop, Programming, and Attributes. The 'Desktop' tab is selected, displaying a terminal window with the configuration history. The history includes commands for enabling the router, setting the hostname to R1, configuring a banner, defining password classes, and logging in. It also shows the configuration of a VTY line, including a password and login. The terminal window has a blue header bar with the text 'Terminal'.

```
Router>
Router>enable
Router>conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#en
R1(config)#ena
R1(config)#enable secret cisco
R1(config)#servi
R1(config)#service pass
R1(config)#service password-encryption
R1(config)#bann
R1(config)#banner motd "solo acceso autorizado"
R1(config)#line console 0
R1(config-line)#pass
R1(config-line)#password cl
R1(config-line)#password class
R1(config-line)#login
R1(config-line)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#disable
R1>enable
Password:
Password:
Password:
% Bad secrets

R1>enable
Password:
Password:
R1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#line vty 0 15
R1(config-line)#password class
R1(config-line)#login
R1(config-line)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console
```



Speed (bits per second)

1200

2400

4800

9600

19200

38400

56000

64000

72000

125000

128000

148000

250000

500000

800000

1000000

1300000

2000000

4000000

<300-4000000> Choose clockrate from list

above R1(config-if)#clock rate 128000

R1(config-if)#description Bogota

R1(config-if)#end

R1#

%SYS-5-CONFIG\_I: Configured from console by  
console

wr

Building configuration...

[OK]

The screenshot shows a Cisco IOS terminal window titled "PC3". The window has tabs at the top: Physical, Config, Desktop (which is selected), Programming, and Attributes. The main area is labeled "Terminal". The terminal session shows the following configuration commands:

```
R1#
R1#
R1#
R1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface s0/0/0
R1(config-if)#no shutdown
R1(config-if)#clock rate 12800
Unknown clock rate
R1(config-if)#clock rate ?
Speed (bits per second)
 1200
 2400
 4800
 9600
 19200
 38400
 56000
 64000
 72000
 125000
 128000
 148000
 250000
 500000
 800000
 1000000
 1300000
 2000000
 4000000
 <300-4000000> Choose clockrate from list above
R1(config-if)#clock rate 128000
R1(config-if)#description Bogota
R1(config-if)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
R1#
```

## Configuración del router 2

Router>

Router>enable

Router#configura terminal

^

% Invalid input detected at '^' marker.

Router#configure terminal

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

Router(config)#hostname R2

R2(config)#enable secret cisco

R2(config)#service password-encryption

R2(config)#banner motd "solo acceso autorizado"

R2(config)#line console 0

R2(config-line)#password class



```
R2(config-line)#login
R2(config-line)#exit
R2(config)#line vty 0 15
R2(config-line)#password class
R2(config-line)#login
R2(config-line)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
R2#
```

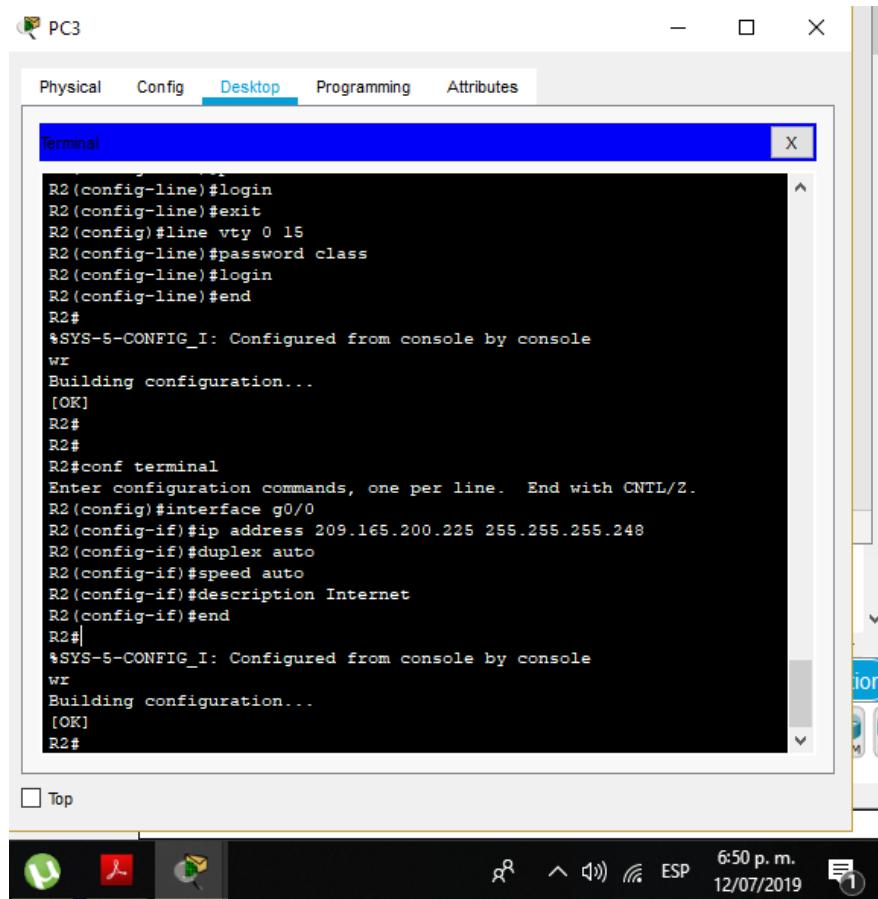
The screenshot shows a Windows desktop environment with a CCP application window titled "PC3". The CCP interface has tabs for Physical, Config, Desktop (which is selected), Programming, and Attributes. Inside the Desktop tab, there is a terminal window titled "Terminal". The terminal window displays the configuration commands entered on the router. A scroll bar is visible on the right side of the terminal window. At the bottom of the CCP window, there is a toolbar with icons and a status bar showing the date and time.

```
Router>
Router>enable
Router#configura terminal
^
% Invalid input detected at '^' marker.

Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R2(config)#enable secret cisco
R2(config)#service password-encryption
R2(config)#banner motd "solo acceso autorizado"
R2(config)#line console 0
R2(config-line)#password class
R2(config-line)#login
R2(config-line)#exit
R2(config)#line vty 0 15
R2(config-line)#password class
R2(config-line)#login
R2(config-line)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
R2#
```

## Configuración del direccionamiento:

```
R2#  
R2#conf terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
R2(config)#interface g0/0  
R2(config-if)#ip address 209.165.200.225 255.255.255.248  
R2(config-if)#duplex auto  
R2(config-if)#speed auto  
R2(config-if)#description Internet  
R2(config-if)#end  
R2#  
%SYS-5-CONFIG_I: Configured from console by console  
wr  
Building configuration...  
[OK]  
R2#
```



## Configuración del Web Server

R2#

R2#conf term

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

R2(config)#interface loopback 0

R2(config-if)#

%LINK-5-CHANGED: Interface Loopback0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up

R2(config-if)#ip address 10.10.10.10 255.255.255.255

R2(config-if)#description Conexion a Web Server

R2(config-if)#end

R2#

%SYS-5-CONFIG\_I: Configured from console by console

R2#wr

Building configuration...

[OK]

R2#

The screenshot shows a Windows desktop environment with a terminal window titled "PC3". The window has tabs for "Physical", "Config", "Desktop" (which is selected), "Programming", and "Attributes". The terminal window displays the following Cisco IOS configuration session:

```
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
R2#
R2#
R2#
R2#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#interface loopback 0

R2(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed
state to up

R2(config-if)#ip address 10.10.10.10 255.255.255.255
R2(config-if)#description Conexion a Web Server
R2(config-if)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console

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

The desktop taskbar at the bottom shows icons for File Explorer, Task View, and Start, along with system status indicators like battery level and network connection. The system tray shows the date and time as 6:54 p.m. on 12/07/2019.

## Configuración de la interface So/o/1

R2#conf term

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

R2(config)#interface s0/0/1

R2(config-if)#ip address 172.31.21.2 255.255.255.252

R2(config-if)#no shutdown

R2(config-if)#+

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

R2(config-if)#end

R2#

%SYS-5-CONFIG\_I: Configured from console by console

wr

Building configuration...

[OK]

R2#

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

R2#

The screenshot shows a Windows terminal window titled "PC3". The window has tabs at the top: Physical, Config, Desktop (which is selected), Programming, and Attributes. The main area of the window displays the following configuration session:

```

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

R2#wr
Building configuration...
[OK]
R2#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#interface s0/0/1
R2(config-if)#ip address 172.31.21.2 255.255.255.252
R2(config-if)#no shutdown

R2(config-if)#+
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

R2(config-if)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
R2#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed
state to up
|
R2#

```

The terminal window is set against a background of a file explorer window showing icons for various files and folders.

## Configuración de la interface So/o/o

R2#conf term

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

R2(config)#interface s0/0/0

R2(config-if)#ip address 172.31.23.2 255.255.255.252

R2(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down

R2(config-if)#end

R2#

%SYS-5-CONFIG\_I: Configured from console by console

wr

Building configuration...

[OK]

R2#

The screenshot shows a Windows desktop environment with a terminal window titled "Terminal". The window is part of a larger application with tabs for "Physical", "Config", "Desktop" (which is selected), "Programming", and "Attributes". The terminal window displays the following Cisco IOS configuration session:

```
R2(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

R2(config-if)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
R2#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed
state to up

R2#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#interface s0/0/0
R2(config-if)#ip address 172.31.23.2 255.255.255.252
R2(config-if)#no shutdown

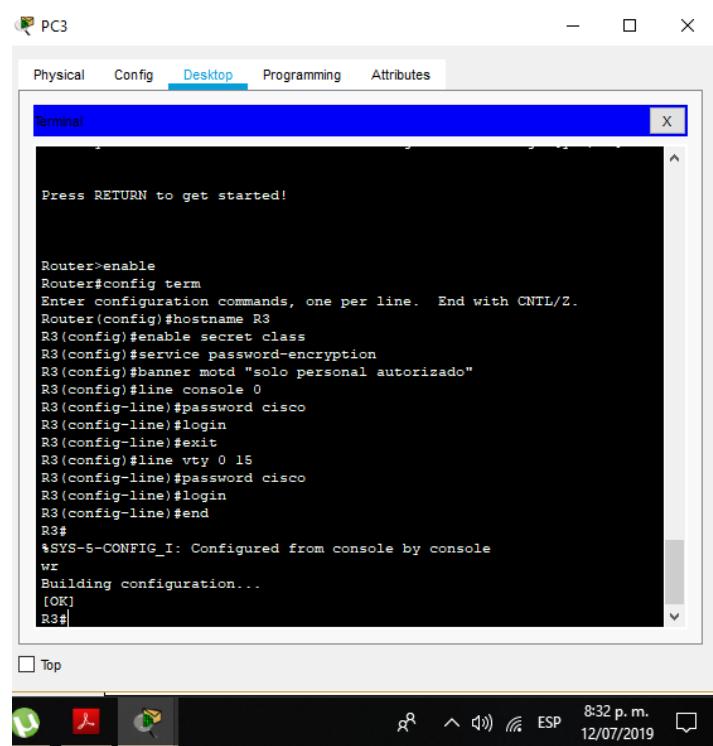
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R2(config-if)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
R2#
```

The taskbar at the bottom of the screen shows several icons, including a green circle with a white 'U', a red square with a white person icon, a grey square with a white gear icon, and a yellow square with a white speech bubble icon. The system tray shows the date and time as "12/07/2019 7:09 p.m.".

## Configuración del router 3

```

Router>enable
Router#config term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R3
R3(config)#enable secret class
R3(config)#service password-encryption
R3(config)#banner motd "solo personal autorizado"
R3(config)#line console 0
R3(config-line)#password cisco
R3(config-line)#login
R3(config-line)#exit
R3(config)#line vty 0 15
R3(config-line)#password cisco
R3(config-line)#login
R3(config-line)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
R3#
  
```



## Configuración del direccionamiento IP ROUTER 3

R3#conf terminal

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

R3(config)#interface s0/0/1

R3(config-if)#ip address 172.31.23.1 255.255.255.252

R3(config-if)#no shutdown

R3(config-if)#

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

R3(config-if)#end

R3#

%SYS-5-CONFIG\_I: Configured from console by console

R3#

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

R3#wr

Building configuration...

[OK]

R3#

The screenshot shows a Windows-style application window titled "PC3". Inside, a tab bar has "Desktop" selected. Below it is a terminal window titled "Terminal". The terminal displays the following configuration session:

```
wr
Building configuration...
[OK]
R3#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#interface s0/0/1
R3(config-if)#ip address 172.31.23.1 255.255.255.252
R3(config-if)#no shutdown

R3(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

R3(config-if)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed
state to up

R3#wr
Building configuration...
[OK]
R3#
```

## Configuración de las loopback:

R3#conf terminal

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

R3(config)#interface loopback4

R3(config-if)#

%LINK-5-CHANGED: Interface Loopback4, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback4, changed state to up

R3(config-if)#ip address 192.168.4.1 255.255.255.0

R3(config-if)#exit

R3(config)#interface loopback5

R3(config-if)#

%LINK-5-CHANGED: Interface Loopback5, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback5, changed state to up

R3(config-if)#ip address 192.168.5.1 255.255.255.0

R3(config-if)#exit

R3(config)#interface loopback6

R3(config-if)#

%LINK-5-CHANGED: Interface Loopback6, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback6, changed state to up

R3(config-if)#ip address 192.168.6.1 255.255.255.0

R3(config-if)#end

R3#

%SYS-5-CONFIG\_I: Configured from console by console

R3#wr

Building configuration...

[OK]

R3#



PC3

Physical Config Desktop Programming Attributes

Terminal X

```
% Unknown command or computer name, or unable to find computer address
R3#
R3#
R3#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#interface loopback4

R3(config-if)#
%LINK-5-CHANGED: Interface Loopback4, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback4, changed state to up

R3(config-if)#ip address 192.168.4.1 255.255.255.0
R3(config-if)#exit
R3(config)#interface loopback5

R3(config-if)#
%LINK-5-CHANGED: Interface Loopback5, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback5, changed state to up

R3(config-if)#ip address 192.168.5.1 255.255.255.0
R3(config-if)#exit
R3(config)#interface loopback6

R3(config-if)#
%LINK-5-CHANGED: Interface Loopback6, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback6, changed state to up

R3(config-if)#ip address 192.168.6.1 255.255.255.0
R3(config-if)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#wr
Building configuration...
[OK]
R3#
```

Top

9:41 p.m. 12/07/2019

**Guardamos todas las configuraciones despues de terminar los cambios realizados:**

```
R1#copy run startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R1#
```

```
R2#copy run startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R2#
```

```
R3#copy run startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R3#
```

The screenshot shows a Windows desktop environment with a terminal window titled "Terminal". The window is part of a larger application window titled "PC3" which has tabs for "Physical", "Config", "Desktop" (which is selected), "Programming", and "Attributes". The terminal window displays the following Cisco IOS command-line interface session:

```
R3(config-if)#
*LINK-5-CHANGED: Interface Loopback6, changed state to up

*LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback6, changed state to up

R3(config-if)#ip address 192.168.6.1 255.255.255.0
R3(config-if)#end
R3#
*SYS-5-CONFIG_I: Configured from console by console

R3#wr
Building configuration...
[OK]
R3#copy run startup-config
Destination filename [startup-config]? y
*Error copying nvram:y (Invalid argument)
R3#copy run startup-config
Destination filename [startup-config]? yes
*Error copying nvram:yes (Invalid argument)
R3#copy run startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R3#
R3#
```

At the bottom of the terminal window, there is a "Top" checkbox and a taskbar with various icons. The system tray shows the date and time as "12/07/2019 9:49 p.m."

**3.2.2. 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 So/o a	9500

**Configuración del protocolo de enrutamiento OSPF en Router 1:**

R1#config terminal

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

R1(config)#router ospf 1

R1(config-router)#network 172.31.21.0 0.0.0.3 area 0

R1(config-router)#router-id 1.1.1.1

R1(config-router)#Reload or use "clear ip ospf process" command, for this to take effect

end

R1#

%SYS-5-CONFIG\_I: Configured from console by console

R1#clear ip ospf ?

process Reset OSPF process

R1#clear ip ospf process

Reset ALL OSPF processes? [no]:

R1#conf term

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

R1(config)#router ospf 1

R1(config-router)#passive-interface g0/0

R1(config-router)#end

R1#

%SYS-5-CONFIG\_I: Configured from console by console

R1#



```
R1#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router ospf 1
R1(config-router)#network 172.31.21.0 0.0.0.3 area 0
R1(config-router)#router-id 1.1.1.1
R1(config-router)#reload or use "clear ip ospf process" command, for
this to take effect

end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#clear ip ospf ?
      process  Reset OSPF process
R1#clear ip ospf process
Reset ALL OSPF processes? [no]:  
[no]

R1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router ospf 1
R1(config-router)#passive-interface g0/0
R1(config-router)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#
```

### Configuración del protocolo de enrutamiento OSPF en Router 2:

R2#conf terminal

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

R2(config)#router ospf 1

R2(config-router)#network 172.31.21.0 0.0.0.255 area 0

R2(config-router)#

00:28:34: %OSPF-5-ADJCHG: Process 1, Nbr 172.31.21.1 on Serial0/0/1 from LOADING to FULL, Loading Done

R2(config-router)#network 172.31.23.0 0.0.0.255 area 0

R2(config-router)#router-id 5.5.5.5

R2(config-router)#Reload or use "clear ip ospf process" command, for this to take effect

R2(config-router)#end

R2#

%SYS-5-CONFIG\_I: Configured from console by console

R2#clear ip ospf process

Reset ALL OSPF processes? [no]:



```
R2#  
R2#conf terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
R2(config)#router ospf 1  
R2(config-router)#passive-interface g0/0  
R2(config-router)#end  
R2#  
%SYS-5-CONFIG_I: Configured from console by console
```

```
R2#copy ru  
R2#copy ?  
flash: Copy from flash: file system  
ftp: Copy from ftp: file system  
running-config Copy from current system configuration  
scp: Copy from scp: file system  
startup-config Copy from startup configuration  
tftp: Copy from tftp: file system  
R2#copy start running-config  
Destination filename [running-config]?
```

1071 bytes copied in 0.416 secs (2574 bytes/sec)

```
R2#  
%SYS-5-CONFIG_I: Configured from console by console  
R2#
```

```

PC3
Physical Config Desktop Programming Attributes
Terminal X
Password:
R2>enable
Password:
R2#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router ospf 1
R2(config-router)#network 172.31.21.0 0.0.0.255 area 0
R2(config-router)#
00:28:34: %OSPF-5-ADJCHG: Process 1, Nbr 172.31.21.1 on Serial0/0/1 from LOADING to
FULL, Loading Done

R2(config-router)#network 172.31.23.0 0.0.0.255 area 0
R2(config-router)#router-id 5.5.5.5
R2(config-router)#Reload or use "clear ip ospf process" command, for this to take
effect

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

R2#clear ip ospf process
Reset ALL OSPF processes? [no]?

R2#
R2#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router ospf 1
R2(config-router)#passive-interface g0/0
R2(config-router)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console
|
R2#copy ru
R2#copy ?
  flash:      Copy from flash: file system
  ftp:        Copy from ftp: file system
  running-config Copy from current system configuration
  scn:        Copy from scn: file system

```

Top

8:43 a.m. 13/07/2019

### Configuración del balance de cargas en el router 2:

R2#configure terminal

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

R2(config)#interface s0/0/0

R2(config-if)#bandwidth 256

R2(config-if)#ip ospf cost 9500

R2(config-if)#end

R2#

%SYS-5-CONFIG\_I: Configured from console by console

R2#copy start running-config

Destination filename [running-config]?

1071 bytes copied in 0.416 secs (2574 bytes/sec)

R2#

%SYS-5-CONFIG\_I: Configured from console by console

R2#

```

PC3

Physical Config Desktop Programming Attributes

Terminal
=====
  startup-config Copy from startup configuration
  tftp:          Copy from tftp: file system
R2#copy start running-config
Destination filename [running-config]?

1071 bytes copied in 0.416 secs (2574 bytes/sec)
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#interface s0/0/0
R2(config-if)#bandwidth 256
R2(config-if)#ip ospf cost 9500
R2(config-if)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#copy start running-config
Destination filename [running-config]?

1071 bytes copied in 0.416 secs (2574 bytes/sec)
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#

```

Top

8:53 a.m. 13/07/2019

### Configuración del protocolo de enrutamiento OSPF en Router 3:

R3#configure terminal

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

R3(config)#router ospf 1

R3(config-router)#network 172.31.23.0 0.0.0.255 area 0

R3(config-router)#route

01:41:59: %OSPF-5-ADJCHG: Process 1, Nbr 10.10.10.10 on Serial0/0/1 from LOADING to FULL, Loading

R3(config-router)#router-id 8.8.8.8

R3(config-router)#Reload or use "clear ip ospf process" command, for this to take effect

R3(config-router)#end

R3#

%SYS-5-CONFIG\_I: Configured from console by console

R3#clear ip ospf process



Reset ALL OSPF processes? [no]:

```
R3#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#passieve-interface g0/0
^
% Invalid input detected at '^' marker.
R3(config-router)#passive-interface g0/0
R3(config-router)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#copy run startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R3#
```



PC3

Physical Config Desktop Programming Attributes

Terminal

```
 Password:  
 Password:  
 R3#  
 R3#  
 R3#configure terminal  
 Enter configuration commands, one per line. End with CNTL/Z.  
 R3(config)#router ospf 1  
 R3(config-router)#network 172.31.23.0 0.0.0.255 area 0  
 R3(config-router)#route  
 01:41:59: %OSPF-5-ADJCHG: Process 1, Nbr 10.10.10.10 on Serial0/0/1 from LOADING to  
 FULL, Loading  
 R3(config-router)#router-id 8.8.8.8  
 R3(config-router)#Reload or use "clear ip ospf process" command, for this to take  
 effect  
  
 R3(config-router)#end  
 R3#  
 *SYS-5-CONFIG_I: Configured from console by console  
  
 R3#clear ip ospf process  
 Reset ALL OSPF processes? [no]:  
  
 R3#conf term  
 Enter configuration commands, one per line. End with CNTL/Z.  
 R3(config)#router ospf 1  
 R3(config-router)#passieve-interface g0/0  
 ^  
 * Invalid input detected at '^' marker.  
  
 R3(config-router)#passive-interface g0/0  
 R3(config-router)#end  
 R3#  
 *SYS-5-CONFIG_I: Configured from console by console  
  
 R3#copy run startup-config  
 Destination filename [startup-config]?  
 Building configuration...  
 [OK]  
 R3#
```

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File Edit View Insert Tools Window Help 9:55 a.m. 13/07/2019

## Verificar información de OSPF

3.2.2.A. Visualizar tablas de enrutamiento y routers conectados por OSPFv2

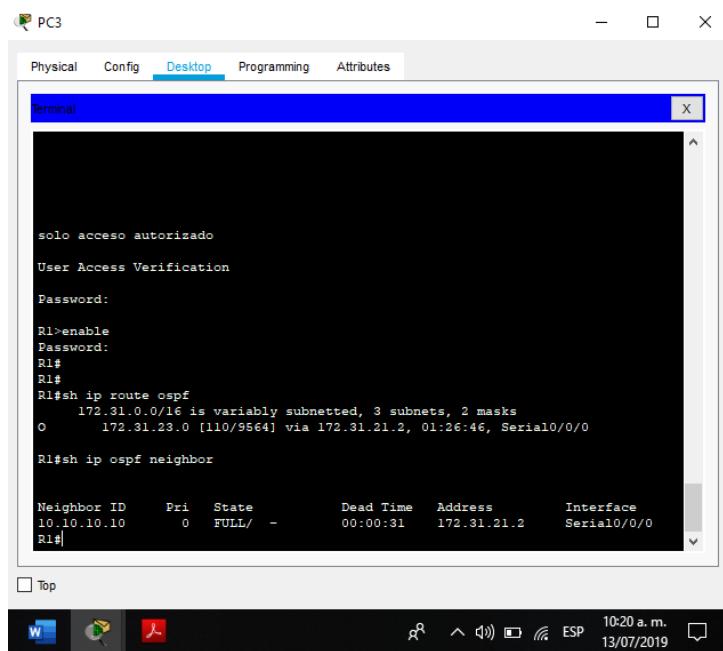
### Verificación en Router 1

R1#

```
R1#sh ip route ospf  
172.31.0.0/16 is variably subnetted, 3 subnets, 2 masks  
O 172.31.23.0 [110/9564] via 172.31.21.2, 01:26:46, Serial0/0/0
```

```
R1#sh ip ospf neighbor
```

```
Neighbor ID Pri State Dead Time Address Interface  
10.10.10.10 0 FULL/ - 00:00:31 172.31.21.2 Serial0/0/0  
R1#
```

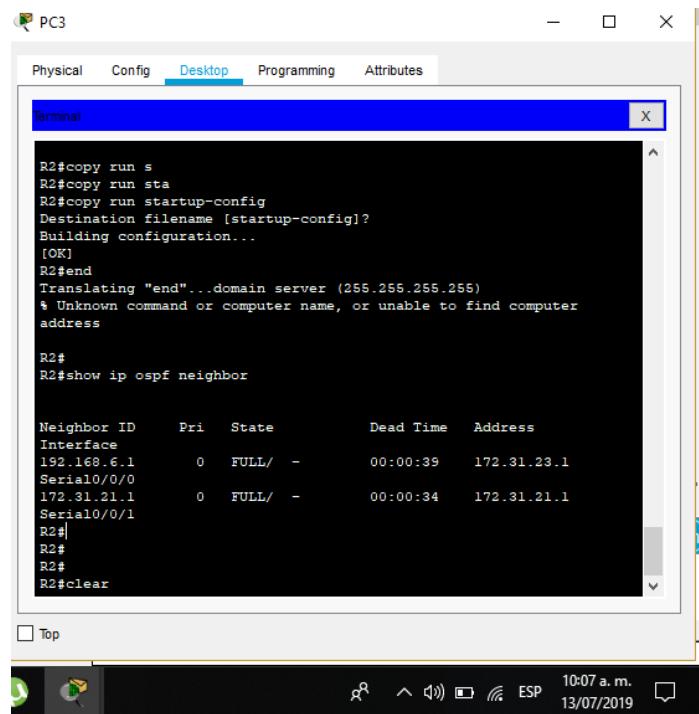


### Verificación en Router 2

R2#

```
R2#show ip ospf neighbor
```

```
Neighbor ID Pri State Dead Time Address Interface  
192.168.6.1 0 FULL/ - 00:00:39 172.31.23.1 Serial0/0/0  
172.31.21.1 0 FULL/ - 00:00:34 172.31.21.1 Serial0/0/1  
R2#
```



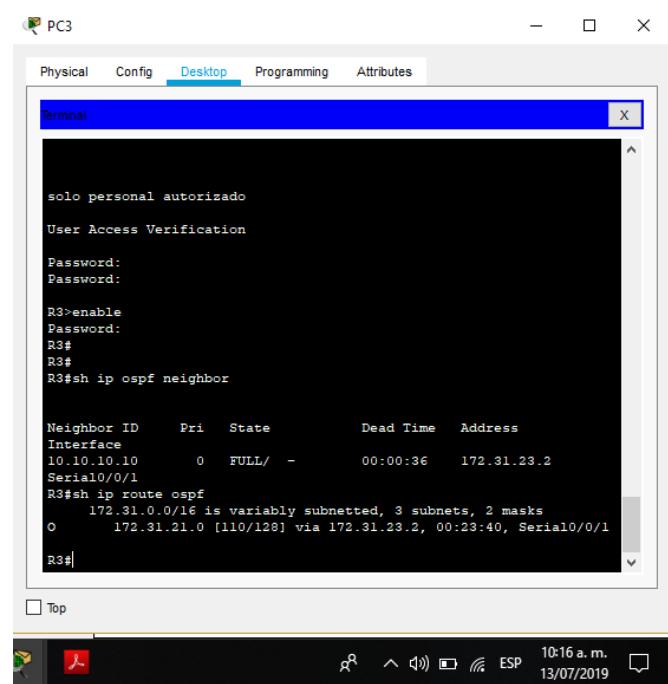
### Verificación en Router 3

```

R3#sh ip ospf neighbor
Neighbor ID Pri State Dead Time Address Interface
10.10.10.10 0 FULL/ - 00:00:36 172.31.23.2 Serial0/0/1
R3#sh ip route ospf
172.31.0.0/16 is variably subnetted, 3 subnets, 2 masks
O 172.31.21.0 [110/128] via 172.31.23.2, 00:23:40, Serial0/0/1

```

R3#



**3.2.2.B. Visualizar lista resumida de interfaces por OSPF en donde se ilustre el costo de cada interface**

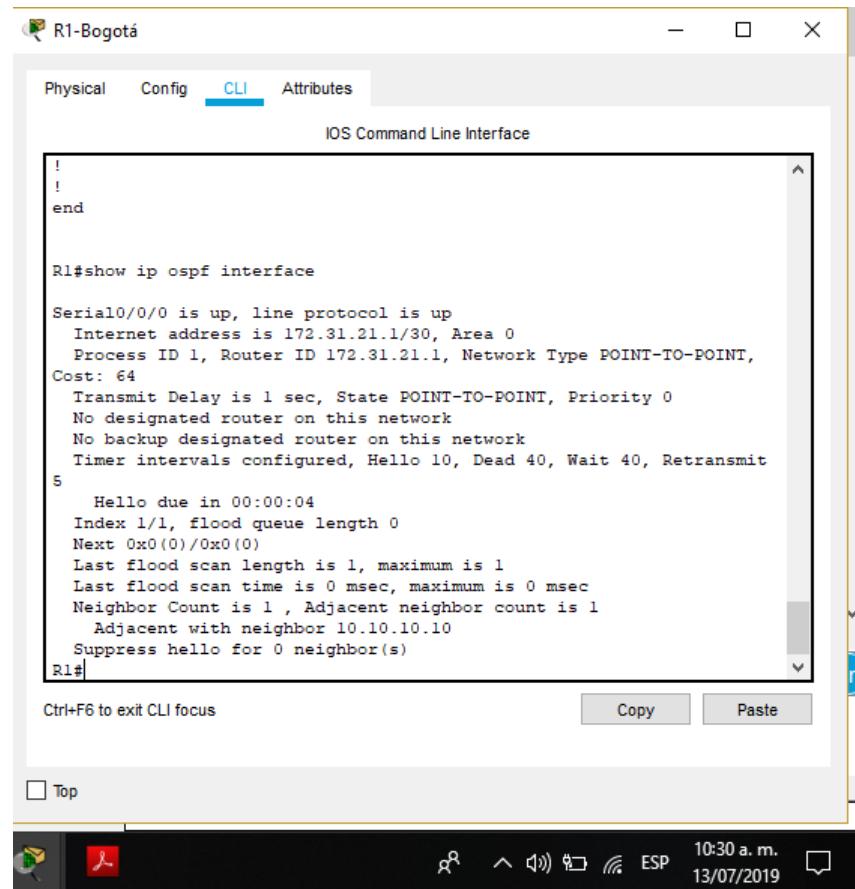
**Visualización del router 1**

R1#show ip ospf interface

```

Serial0/0/0 is up, line protocol is up
Internet address is 172.31.21.1/30, Area 0
Process ID 1, Router ID 172.31.21.1, 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 00:00:04
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 10.10.10.10
Suppress hello for 0 neighbor(s)
R1#

```



## Visualización del router 2

R2#

R2#show ip ospf interface

```

Serial0/0/1 is up, line protocol is up
Internet address is 172.31.21.2/30, Area 0
Process ID 1, Router ID 10.10.10.10, 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 00:00:05
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 172.31.21.1  
Suppress hello for 0 neighbor(s)  
Serial0/0/0 is up, line protocol is up  
Internet address is 172.31.23.2/30, Area 0  
Process ID 1, Router ID 10.10.10.10, Network Type POINT-TO-POINT, Cost: 9500  
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 00:00:04  
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 192.168.6.1  
Suppress hello for 0 neighbor(s)

The screenshot shows a network interface window titled "R2-Miami". The tab bar at the top includes "Physical", "Config", "CLI" (which is selected), and "Attributes". Below the tabs is a header "IOS Command Line Interface". The main area displays the output of the command "show ip ospf interface". The output details two OSPF interfaces: Serial0/0/1 and Serial0/0/0. Both interfaces are up, connected to Area 0 via Router ID 10.10.10.10. The transmit delay is 1 sec, and the priority is 0. There are no designated or backup routers. The timer intervals are Hello 10, Dead 40, Wait 40, and Retransmit 5. The last flood scan length is 1, and the neighbor count is 1, with one adjacent neighbor at 172.31.21.1. The Suppress hello command is set for 0 neighbors. The second interface, Serial0/0/0, has a different IP address (172.31.23.2/30) and a higher cost (9500). The bottom right corner of the interface window contains "Copy" and "Paste" buttons. At the very bottom of the screen, there is a taskbar with icons for File, Edit, Find, and Help, along with system status indicators like battery level, signal strength, and network connection.

```
password:  
R2>enable  
password:  
R2#  
R2#show ip ospf interface  
  
Serial0/0/1 is up, line protocol is up  
    Internet address is 172.31.21.2/30, Area 0  
    Process ID 1, Router ID 10.10.10.10, 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 00:00:05  
    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 172.31.21.1  
        Suppress hello for 0 neighbor(s)  
Serial0/0/0 is up, line protocol is up  
    Internet address is 172.31.23.2/30, Area 0  
    Process ID 1, Router ID 10.10.10.10, Network Type POINT-TO-POINT, Cost: 9500  
    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 00:00:04  
    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 192.168.6.1  
        Suppress hello for 0 neighbor(s)  
R2#
```

## Visualización del router 3

R3#show ip ospf interface

```

Serial0/0/1 is up, line protocol is up
Internet address is 172.31.23.1/30, Area 0
Process ID 1, Router ID 192.168.6.1, 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 00:00:03
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 10.10.10.10
Suppress hello for 0 neighbor(s)

```

R3#

```

R3-Buenos aires
Physical Config CLI Attributes
IOS Command Line Interface
Password:
R3>enable
Password:
R3#show ip ospf interface

Serial0/0/1 is up, line protocol is up
Internet address is 172.31.23.1/30, Area 0
Process ID 1, Router ID 192.168.6.1, 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 00:00:03
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 10.10.10.10
Suppress hello for 0 neighbor(s)
R3#

```

Ctrl+F6 to exit CLI focus     

Top

10:34 a.m. 13/07/2019

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

```

R2#sh ip protocols
Routing Protocol is "ospf 1"
  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 0.0.0.255 area 0
    172.31.23.0 0.0.0.255 area 0
  Passive Interface(s):
    GigabitEthernet0/0
  Routing Information Sources:
    Gateway          Distance      Last Update
    1.1.1.1          110          00:14:23
    5.5.5.5          110          00:11:24
    8.8.8.8          110          00:11:24
    10.10.10.10     110          00:17:47
    172.31.21.1     110          00:21:55
    192.168.6.1     110          00:14:33
  Distance: (default is 110)
R2#

```

### Verificando vecindades en los seriales Router 1

```

R1#show ip ospf interface
Serial0/0/0 is up, line protocol is up
Internet address is 172.31.21.1/30, Area 0
Process ID 1, Router ID 1.1.1.1, 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 00:00:01
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)
R1#

```

R1-Bogotá

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Suppress hello for 0 neighbor(s)
R1#
02:36:35: %OSPF-5-ADJCHG: Process 1, Nbr 5.5.5.5 on Serial0/0/0 from LOADING to
FULL, Loading Done

R1#
R1#
R1#show ip ospf interface

Serial0/0/0 is up, line protocol is up
    Internet address is 172.31.21.1/30, Area 0
    Process ID 1, Router ID 1.1.1.1, 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 00:00:01
        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)
R1#
```

Ctrl+F6 to exit CLI focus      **Copy**      **Paste**

Top

10:52 a.m.  
13/07/2019

## Verificando vecindades en los seriales Router 2

R2#show ip ospf interface

Serial0/0/1 is up, line protocol is up  
 Internet address is 172.31.21.2/30, Area 0  
 Process ID 1, 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 00:00:06  
 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 1.1.1.1  
 Suppress hello for 0 neighbor(s)  
 Serial0/0/0 is up, line protocol is up  
 Internet address is 172.31.23.2/30, Area 0



Process ID 1, Router ID 5.5.5.5, Network Type POINT-TO-POINT, Cost: 9500

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 00:00:06

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 8.8.8.8

Suppress hello for 0 neighbor(s)

R2#

```
R2#
02:39:35: %OSPF-5-ADJCHG: Process 1, Nbr 8.8.8.8 on Serial0/0/0 from LOADING to FULL,
Loading Done

R2#
R2#show ip ospf interface

Serial0/0/1 is up, line protocol is up
  Internet address is 172.31.21.2/30, Area 0
  Process ID 1, 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 00:00:06
  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 1.1.1.1
    Suppress hello for 0 neighbor(s)

Serial0/0/0 is up, line protocol is up
  Internet address is 172.31.23.2/30, Area 0
  Process ID 1, Router ID 5.5.5.5, Network Type POINT-TO-POINT, Cost: 9500
  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 00:00:06
  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 8.8.8.8
    Suppress hello for 0 neighbor(s)

R2#
Ctrl+F6 to exit CLI focus
```

Top

10:53 a.m. 13/07/2019



## Verificando vecindades en los seriales Router 3

R3#show ip ospf interface

```
Serial0/0/1 is up, line protocol is up
Internet address is 172.31.23.1/30, Area 0
Process ID 1, Router ID 8.8.8.8, 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 00:00:07
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)
```

R3#

```
IOS Command Line Interface
Neighbor Count is 1 , Adjacent neighbor count is 1
Adjacent with neighbor 5.5.5.5
Suppress hello for 0 neighbor(s)
R3#
R3#
R3#show ip ospf interface

Serial0/0/1 is up, line protocol is up
Internet address is 172.31.23.1/30, Area 0
Process ID 1, Router ID 8.8.8.8, 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 00:00:07
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)
R3#
```

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

**3.2.4. Asignar direcciones IP a los Switches acorde a los lineamientos.**

**Switch 1**

```
Switch#CONF TERMINAL
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S1
S1(config)#
S1(config)#
S1(config)#
S1(config)#
S1(config)#
S1(config)#no ip domain-lookup
S1(config)#vlan 30
S1(config-vlan)#name Administracion
S1(config-vlan)#vlan 40
S1(config-vlan)#name Mercadeo
S1(config-vlan)#vlan 200
S1(config-vlan)#name Mantenimiento
S1(config-vlan)#end
S1#
%SYS-5-CONFIG_I: Configured from console by console
```

```
S1#wr
Building configuration...
[OK]
S1#
```

```

Switch#hostname ?
% Unrecognized command
Switch#CONF TERMINAL
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S1
S1(config)#
S1(config)#
S1(config)#
S1(config)#
S1(config)#no ip domain-lookup
S1(config)#vlan 30
S1(config-vlan)#name Administracion
S1(config-vlan)#vlan 40
S1(config-vlan)#name Mercadeo
S1(config-vlan)#vlan 200
S1(config-vlan)#name Mantenimiento
S1(config-vlan)#end
S1#
%SYS-5-CONFIG_I: Configured from console by console

S1#wr
Building configuration...
[OK]
S1#

```

Ctrl+F6 to exit CLI focus      Copy      Paste

Top      Console

13/07/2019 11:08 a.m.

### Switch 3

```

Switch>enable
Switch#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname
% Incomplete command.
Switch(config)#hostname S3
S3(config)#no ip domain-lookup
S3(config)#vlan 30
S3(config-vlan)#name Administracion
S3(config-vlan)#vlan 40
S3(config-vlan)#name Mercadeo
S3(config-vlan)#vlan 200
S3(config-vlan)#name Mantenimiento
S3(config-vlan)#end
S3#
%SYS-5-CONFIG_I: Configured from console by console

```



S3#wr

Building configuration...

[OK]

S3#

The screenshot shows a Cisco IOS CLI window titled "S3". The window has tabs for "Physical", "Config", "CLI" (which is selected), and "Attributes". The main area displays the following configuration commands:

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

Switch>enable
Switch#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname
% Incomplete command.
Switch(config)#hostname S3
S3(config)#no ip domain-lookup
S3(config)#vlan 30
S3(config-vlan)#name Administracion
S3(config-vlan)#vlan 40
S3(config-vlan)#name Mercadeo
S3(config-vlan)#vlan 200
S3(config-vlan)#name Mantenimiento
S3(config-vlan)#end
S3#
*SYS-5-CONFIG_I: Configured from console by console

S3#wr
Building configuration...
[OK]
S3#
```

At the bottom of the window, there are "Copy" and "Paste" buttons. A status bar at the bottom right shows the time as "11:09 a.m." and the date as "13/07/2019".

### 3.2.5. En el Switch 3 deshabilitar DNS lookup

```
S3(config)#no ip domain-lookup
```

```

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

Switch>enable
Switch#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname
% Incomplete command.
Switch(config)#hostname S3
S3(config)#no ip domain-lookup
S3(config)#vlan 30
S3(config-vlan)#name Administracion
S3(config-vlan)#vlan 40
S3(config-vlan)#name Mercadeo
S3(config-vlan)#vlan 200
S3(config-vlan)#name Mantenimiento
S3(config-vlan)#end
S3#
%SYS-5-CONFIG_I: Configured from console by console

S3#wr
Building configuration...
[OK]
S3#

```

Ctrl+F6 to exit CLI focus     

Top

11:09 a.m. 13/07/2019

```
S1#conf terminal
```

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

```
S1(config)#enable secret cisco
```

```
S1(config)#service password-encryption
```

```
S1(config)#banner motd "solo acceso autorizado"
```

```
S1(config)#line console 0
```

```
S1(config-line)#password class
```

```
S1(config-line)#login
```

```
S1(config-line)#end
```

```
S1#
```

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

```
S1#wr
```

Building configuration...

```
[OK]
```

```
S1#
```



```
Pruning VLANs Enabled: 2-1001
Capture Mode Disabled
Capture VLANs Allowed: ALL
Protected: false
Unknown unicast blocked: disabled
Unknown multicast blocked: disabled
Appliance trust: none

S1#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#enable secret cisco
S1(config)#service password-encryption
S1(config)#banner motd "solo acceso autorizado"
S1(config)#line console 0
S1(config-line)#password class
S1(config-line)#login
S1(config-line)#end
S1#
%SYS-5-CONFIG_I: Configured from console by console

S1#wr
Building configuration...
[OK]
S1#
```

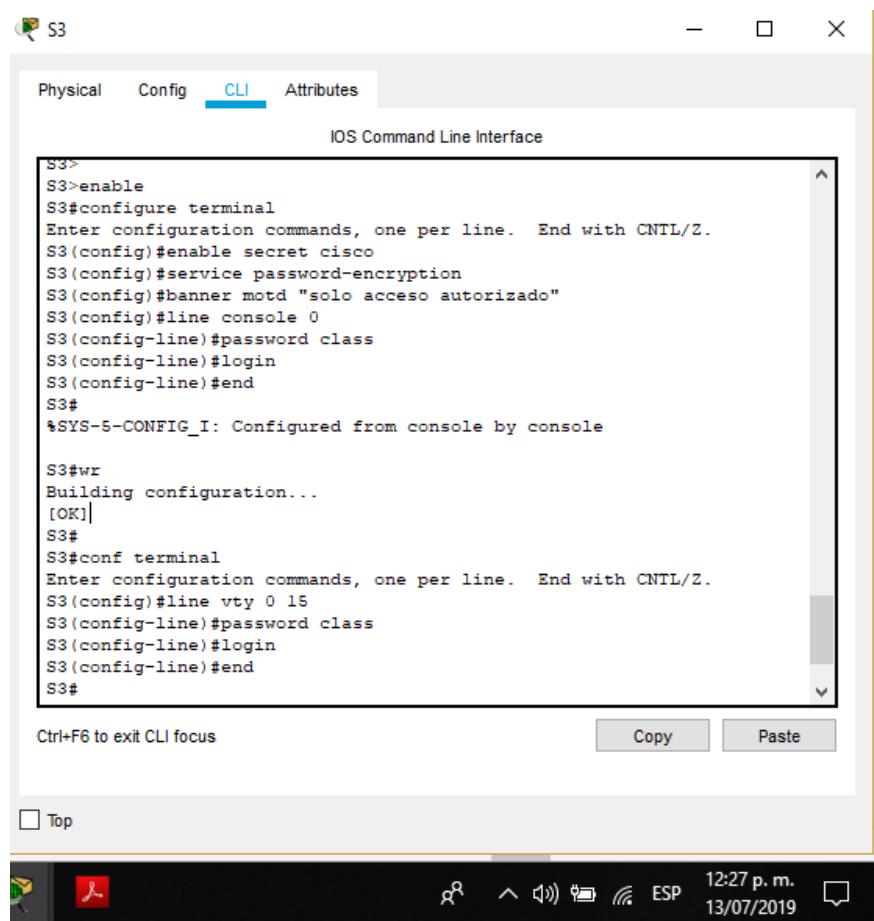
```
S3>
S3>enable
S3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#enable secret cisco
S3(config)#service password-encryption
S3(config)#banner motd "solo acceso autorizado"
S3(config)#line console 0
S3(config-line)#password class
S3(config-line)#login
S3(config-line)#end
S3#
%SYS-5-CONFIG_I: Configured from console by console
```

```
S3#wr
Building configuration...
[OK]
S3#
S3#conf terminal
```



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

```
S3(config)#line vty 0 15
S3(config-line)#password class
S3(config-line)#login
S3(config-line)#end
S3#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
S3#
```



```
S3#conf term
```

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

```
S3(config)#no ip domain-lookup
```

^

% Invalid input detected at '^' marker.

```
S3(config)#no ip domain-lookup
```

```
S3(config)#interface f0/3
```



```
S3(config-if)#switchport mode trunk native vlan 1
^
% Invalid input detected at '^' marker.
S3(config-if)#switchport mode trunk

S3(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up

S3(config-if)#switchport trunk native vlan 1
S3(config-if)#exit
S3(config)#interface f0/1
S3(config-if)#switchport access vlan 40
S3(config-if)#exit
S3#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#interface vlan 30
S3(config-if)#ip address 192.168.99.3 255.255.255.0
S3(config-if)#exit
S3(config)#interface vlan 40
S3(config-if)#ip address 192.168.99.3 255.255.255.0
S3(config-if)#exit
S3(config)#interface vlan 200
S3(config-if)#ip address 192.168.99.3 255.255.255.0
S3(config-if)#end
S3#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
S3#
```



```
S3
Physical Config CLI Attributes
IOS Command Line Interface
% Unknown command or computer name, or unable to find computer address
S3%SYS-5-CONFIG_I: Configured from console by console
^
% Invalid input detected at '^' marker.

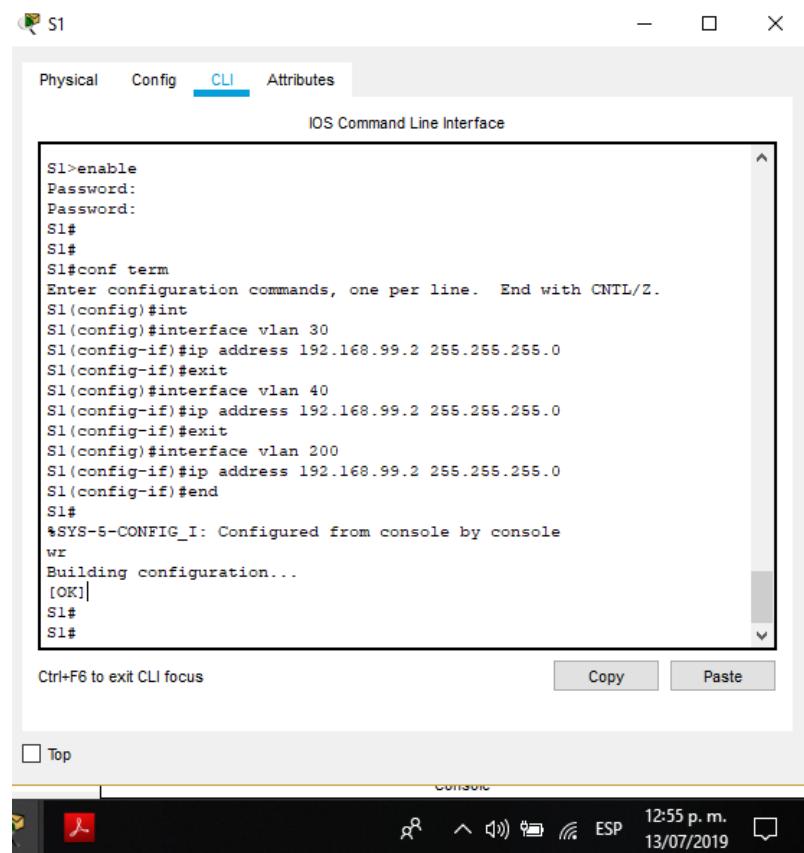
S3#wr
Building configuration...
[OK]
S3#Building configuration...
^
% Invalid input detected at '^' marker.

S3#[OK]
Translating "[OK]"
% Unknown command or computer name, or unable to find computer address

S3#S1#
Translating "S1#"
% Unknown command or computer name, or unable to find computer address

S3#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#interface vlan 30
S3(config-if)#ip address 192.168.99.3 255.255.255.0
S3(config-if)#exit
S3(config)#interface vlan 40
S3(config-if)#ip address 192.168.99.3 255.255.255.0
S3(config-if)#exit
S3(config)#interface vlan 200
S3(config-if)#ip address 192.168.99.3 255.255.255.0
S3(config-if)#end
S3#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
S3#
Ctrl+F6 to exit CLI focus
Copy Paste
□ Top
R 12:54 p.m.
ESP 13/07/2019
```

S1#conf term  
Enter configuration commands, one per line. End with CNTL/Z.  
S1(config)#int  
S1(config)#interface vlan 30  
S1(config-if)#ip address 192.168.99.2 255.255.255.0  
S1(config-if)#exit  
S1(config)#interface vlan 40  
S1(config-if)#ip address 192.168.99.2 255.255.255.0  
S1(config-if)#exit  
S1(config)#interface vlan 200  
S1(config-if)#ip address 192.168.99.2 255.255.255.0  
S1(config-if)#end  
S1#  
%SYS-5-CONFIG\_I: Configured from console by console  
wr  
Building configuration...  
[OK]  
S1#  
S1#



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

S1#conf term

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

S1(config)#interface f0/2

S1(config-if)#shutdown

%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to administratively down

S1(config-if)#exit

S1(config)#interface range f0/4-23

S1(config-if-range)#shutdown

%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to administratively down

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

%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to administratively down



```
%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/12, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/13, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/14, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/15, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/16, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/17, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/18, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/19, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/20, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/21, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/22, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/23, changed state to administratively down
S1(config-if-range)#
```



The screenshot shows a Windows application window titled "S1" containing the Cisco IOS Command Line Interface. The window has tabs at the top: Physical, Config, **CLI**, and Attributes. The main area displays a list of log messages from the router's perspective:

```
*LINK-5-CHANGED: Interface FastEthernet0/5, changed state to administratively down
*LINK-5-CHANGED: Interface FastEthernet0/6, changed state to administratively down
*LINK-5-CHANGED: Interface FastEthernet0/7, changed state to administratively down
*LINK-5-CHANGED: Interface FastEthernet0/8, changed state to administratively down
*LINK-5-CHANGED: Interface FastEthernet0/9, changed state to administratively down
*LINK-5-CHANGED: Interface FastEthernet0/10, changed state to administratively down
*LINK-5-CHANGED: Interface FastEthernet0/11, changed state to administratively down
*LINK-5-CHANGED: Interface FastEthernet0/12, changed state to administratively down
*LINK-5-CHANGED: Interface FastEthernet0/13, changed state to administratively down
*LINK-5-CHANGED: Interface FastEthernet0/14, changed state to administratively down
*LINK-5-CHANGED: Interface FastEthernet0/15, changed state to administratively down
*LINK-5-CHANGED: Interface FastEthernet0/16, changed state to administratively down
*LINK-5-CHANGED: Interface FastEthernet0/17, changed state to administratively down
*LINK-5-CHANGED: Interface FastEthernet0/18, changed state to administratively down
*LINK-5-CHANGED: Interface FastEthernet0/19, changed state to administratively down
*LINK-5-CHANGED: Interface FastEthernet0/20, changed state to administratively down
*LINK-5-CHANGED: Interface FastEthernet0/21, changed state to administratively down
*LINK-5-CHANGED: Interface FastEthernet0/22, changed state to administratively down
*LINK-5-CHANGED: Interface FastEthernet0/23, changed state to administratively down
S1(config-if-range)#

```

At the bottom of the window, there is a status bar with the text "Ctrl+F6 to exit CLI focus" and two buttons: "Copy" and "Paste". Below the status bar, there is a toolbar with icons for various applications like File Explorer, Word, and Excel. To the right of the toolbar, system status information is displayed: "1:04 p.m.", "13/07/2019", and a battery icon.



```
%LINK-5-CHANGED: Interface FastEthernet0/21, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/22, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/23, changed state to administratively down
S1(config-if-range)#exit
S1(config)#interface range g0/1-2
S1(config-if-range)#shutdown

%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to administratively down
%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to administratively down
S1(config-if-range)#end
S1#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
S1#
```

S3#conf term

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

S3(config)#interface g0/1-2

^

% Invalid input detected at '^' marker.

S3(config)#interface range g0/1-2

S3(config-if-range)#shutdown

%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to administratively down

%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to administratively down

S3(config-if-range)#exit

S3(config)#interface f0/2

S3(config-if)#shutdown

%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to administratively down

S3(config-if)#exit

S3(config)#interface range f0/4-24

S3(config-if-range)#shutdown



%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to administratively down  
%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to administratively down  
%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to administratively down  
%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to administratively down  
%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to administratively down  
%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to administratively down  
%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to administratively down  
%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to administratively down  
%LINK-5-CHANGED: Interface FastEthernet0/12, changed state to administratively down  
%LINK-5-CHANGED: Interface FastEthernet0/13, changed state to administratively down  
%LINK-5-CHANGED: Interface FastEthernet0/14, changed state to administratively down  
%LINK-5-CHANGED: Interface FastEthernet0/15, changed state to administratively down  
%LINK-5-CHANGED: Interface FastEthernet0/16, changed state to administratively down  
%LINK-5-CHANGED: Interface FastEthernet0/17, changed state to administratively down  
%LINK-5-CHANGED: Interface FastEthernet0/18, changed state to administratively down  
%LINK-5-CHANGED: Interface FastEthernet0/19, changed state to administratively down  
%LINK-5-CHANGED: Interface FastEthernet0/20, changed state to administratively down  
%LINK-5-CHANGED: Interface FastEthernet0/21, changed state to administratively down  
%LINK-5-CHANGED: Interface FastEthernet0/22, changed state to administratively down  
%LINK-5-CHANGED: Interface FastEthernet0/23, changed state to administratively down  
%LINK-5-CHANGED: Interface FastEthernet0/24, changed state to administratively down  
S3(config-if-range)#End



The screenshot shows a Windows desktop environment with a Cisco IOS Command Line Interface (CLI) window open. The window title is "S3". The tab bar at the top includes "Physical", "Config", "CLI" (which is selected), and "Attributes". The main pane displays the CLI output:

```
S3#conf term
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#interface g0/1-2
^
% Invalid input detected at '^' marker.

S3(config)#interface range g0/1-2
S3(config-if-range)#shutdown

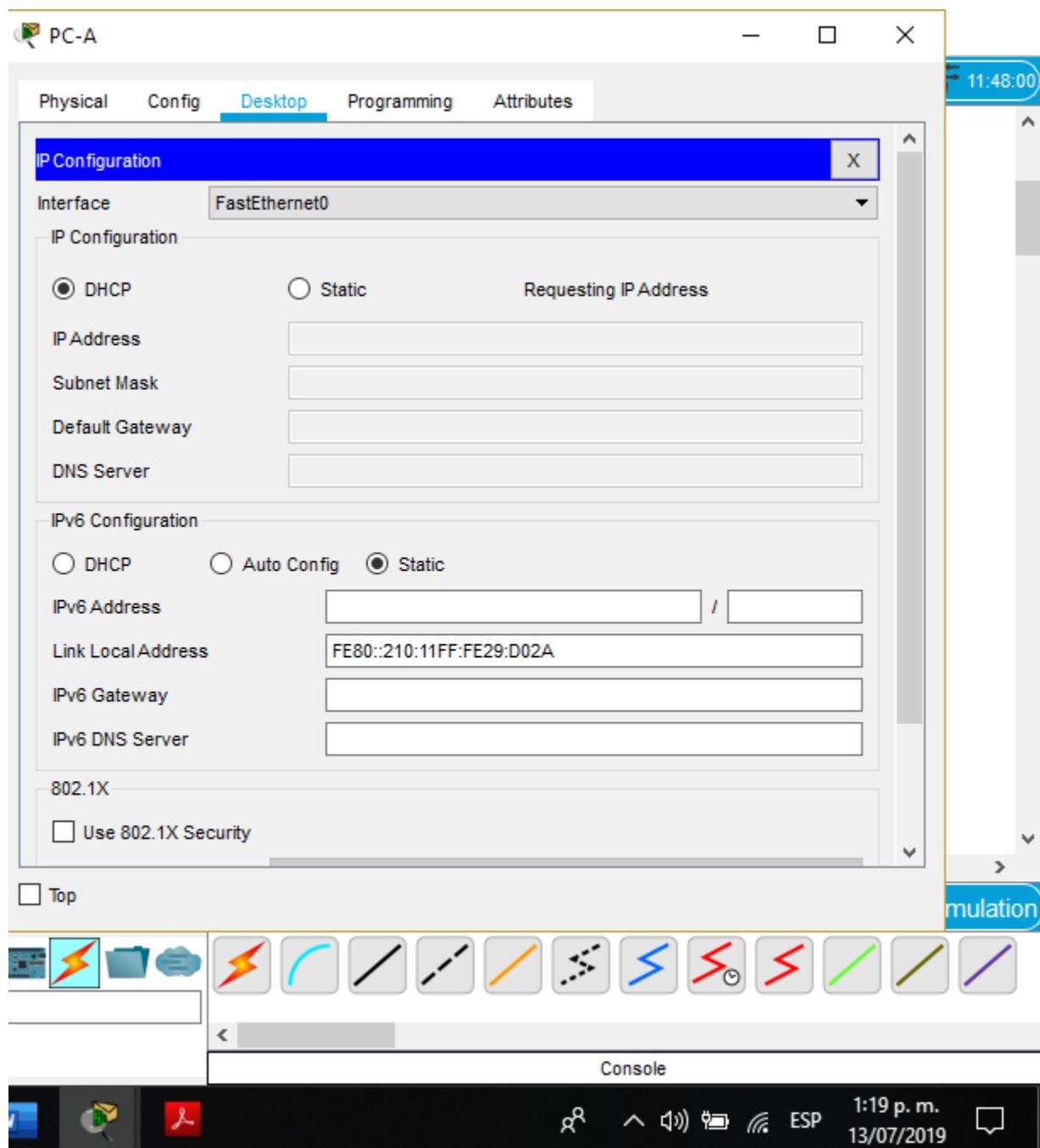
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to administratively down
%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to administratively down
S3(config-if-range)#exit
S3(config)#interface f0/2
S3(config-if)#shutdown

%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to administratively down
S3(config-if)#exit
S3(config)#interface range f0/4-24
S3(config-if-range)#shutdown

%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/12, changed state to administratively down
```

At the bottom of the CLI window, there is a status message: "Ctrl+F6 to exit CLI focus". To the right of the message are "Copy" and "Paste" buttons. Below the window, the taskbar shows icons for File Explorer, Word, and Task View. The system tray displays the date and time: "13/07/2019 1:12 p.m.". The status bar at the bottom of the screen also shows the date and time.

### **3.2.7. Implement DHCP and NAT for IPv4**





PC-C

Physical Config Desktop Programming Attributes

DHCP  Static Requesting IP Address

IP Address  
Subnet Mask  
Default Gateway  
DNS Server

IPv6 Configuration

DHCP  Auto Config  Static

IPv6 Address  
Link Local Address FE80::260:47FF:FE5E:B211  
IPv6 Gateway  
IPv6 DNS Server

802.1X

Use 802.1X Security  
Authentication MD5  
Username  
Password

Top

Console

1:21 p.m.  
13/07/2019

**3.2.8. Reservar las primeras 30 direcciones IP de las VLAN 30 y 40 para configuraciones estáticas. Así mismo Configurar R1 como servidor DHCP para las VLANs 30 y 40.**

## R1#conf term

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

```
R1(config)#ip dhcp exclude-address 192.168.30.1 192.168.30.30
```

8

% Invalid input detected at '^' marker.

```
R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30
```

```
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.30
```

R1(config)#

R1-Bogotá

Physical Config CLI Attributes

IOS Command Line Interface

```
R1#
R1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp exclude-address 192.168.30.1 192.168.30.30
^
* Invalid input detected at '^' marker.

R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.30
R1(config)#
```

Ctrl+F6 to exit CLI focus

Copy Paste

Top

Console

1:49 p.m.  
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Configurar DHCP pool para VLAN 30	Name: ADMINISTRACION DNS-Server: 10.10.10.11 Domain-Name: ccna-unad.com Establecer default gateway.
-----------------------------------	--

R1#conf term

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

R1(config)#ip dhcp exclude-address 192.168.30.1 192.168.30.30

^

% Invalid input detected at '^' marker.

R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30

R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.30

R1(config)#end

R1#

%SYS-5-CONFIG\_I: Configured from console by console

R1#

R1#conf term

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

R1(config)#ip dhcp pool Administracion

R1(dhcp-config)#dns-server 10.10.10.11

R1(dhcp-config)#domain-name ccna-unad.com

R1(dhcp-config)#ip domain-name ccna-unad.com

R1(config)#ip default-router 192.168.30.1

^

% Invalid input detected at '^' marker.

R1(config)#default-router 192.168.30.1

^

% Invalid input detected at '^' marker.

R1(config)#end

R1#

%SYS-5-CONFIG\_I: Configured from console by console

R1#conf terminal

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

R1(config)#ip dhcp pool Administracion

R1(dhcp-config)#default-router 192.168.30.1

R1(dhcp-config)#+

R1#

%SYS-5-CONFIG\_I: Configured from console by console



R1-Bogotá

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp exclude-address 192.168.30.1 192.168.30.30
^
* Invalid input detected at '^' marker.

R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.30
R1(config)#end
R1#
*SYS-5-CONFIG_I: Configured from console by console

R1#
R1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp pool Administracion
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#domain-name ccna-unad.com
R1(dhcp-config)#ip domain-name ccna-unad.com
R1(config)#ip default-router 192.168.30.1
^
* Invalid input detected at '^' marker.

R1(config)#default-router 192.168.30.1
^
* Invalid input detected at '^' marker.

R1(config)#end
R1#
*SYS-5-CONFIG_I: Configured from console by console

R1#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp pool Administracion
R1(dhcp-config)#default-router 192.168.30.1
R1(dhcp-config)#
R1#
*SYS-5-CONFIG_I: Configured |from console by console
```

Ctrl+F6 to exit CLI focus

Copy Paste

Top

R 2:01 p.m. 13/07/2019



Configurar DHCP pool para VLAN 40

Name: MERCADERO  
DNS-Server: 10.10.10.11  
Domain-Name: ccna-unad.com  
Establecer default gateway.

R1#config term

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

R1(config)#ip dhcp pool Mercadero

R1(dhcp-config)#dns-server 10.10.10.11

R1(dhcp-config)#ip domain-name ccna-unad.com

R1(config)#ip dhcp pool Mercadero

R1(dhcp-config)#default-router 192.168.40.1

R1(dhcp-config)#network 192.168.40.0 255.255.255.0

R1(dhcp-config)#{/pre}

The screenshot shows the Cisco IOS Command Line Interface (CLI) running on a device named R1-Bogotá. The window title is "R1-Bogotá". The tab bar at the top includes "Physical", "Config", "CLI" (which is selected), and "Attributes". Below the tabs, it says "IOS Command Line Interface". The main pane displays the following configuration commands:

```
R1#
R1#config term
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp pool Mercadero
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#ip domain-name ccna-unad.com
R1(config)#ip dhcp pool Mercadero
R1(dhcp-config)#default-router 192.168.40.1
R1(dhcp-config)#network 192.168.40.0 255.255.255.0
R1(dhcp-config)#{/pre}
```

At the bottom of the CLI window, there are buttons for "Copy" and "Paste". A status bar at the bottom indicates "Ctrl+F6 to exit CLI focus", "Console", the date and time "2:06 p.m. 13/07/2019", and various system icons.

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

R2#conf term

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

R2(config)#ip nat inside source static 10.10.10.10 209.165.200.224

R2(config)#interface g0/0

R2(config-if)#ip nat outside

R2(config-if)#int g0/1

R2(config-if)#ip nat inside

R2(config-if)#exit

R2(config)#exit

R2#

%SYS-5-CONFIG\_I: Configured from console by console

R2#sh ip nat translations

Pro Inside global Inside local Outside local Outside global

--- 209.165.200.224 10.10.10.10 --- ---

R2#

```

R2-Miami
Physical Config CLI Attributes
IOS Command Line Interface

Password: 
Password: 

R2>enable
Password: 
R2#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip nat inside source static 10.10.10.10 209.165.200.224
R2(config)#interface g0/0
R2(config-if)#ip nat outside
R2(config-if)#int g0/1
R2(config-if)#ip nat inside
R2(config-if)#exit
R2(config)#exit
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#sh ip nat translations
Pro Inside global     Inside local      Outside local      Outside
global
--- 209.165.200.224  10.10.10.10      ---             ---
R2#

```

Ctrl+F6 to exit CLI focus     

Top

Console 2:21 p.m. 13/07/2019

**3.2.10.     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.**

R2#conf term

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

R2(config)#access-list 1 permit 192.168.30.0 0.0.0.255

R2(config)#access-list 1 permit 192.168.40.0 0.0.0.255

R2(config)#access-list 1 permit 192.168.200.0 0.0.0.255

R2(config)#

```

R2-Miami
Physical Config CLI Attributes
IOS Command Line Interface
Password:
R2#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip nat inside source static 10.10.10.10 209.165.200.224
R2(config)#interface g0/0
R2(config-if)#ip nat outside
R2(config-if)#int g0/1
R2(config-if)#ip nat inside
R2(config-if)#exit
R2(config)#exit
R2#
*SYS-5-CONFIG_I: Configured from console by console

R2#sh ip nat translations
Pro Inside global      Inside local        Outside local      Outside
global
--- 209.165.200.224   10.10.10.10       ---               ---
R2#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#access-list 1 permit 192.168.30.0 0.0.0.255
R2(config)#access-list 1 permit 192.168.40.0 0.0.0.255
R2(config)#access-list 1 permit 192.168.200.0 0.0.0.255
R2(config)#

```

Ctrl+F6 to exit CLI focus     

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2:27 p.m. 13/07/2019

### 3.2.11. 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.

```
R1#sh acces
R1#sh access-lists
R1#sh access-lists ?
<1-199> ACL number
WORD ACL name
| Output Modifiers
<cr>
R1#sh access-list
R1#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#access-list 1 permit 192.168.30.33
R1(config)#access-list 7 permit tcp any host 192.168.40.44 eq domain
^
% Invalid input detected at '^' marker.
R1(config)#access-list 7 permit tcp any host 192.168.40.44 eq smtp
^
% Invalid input detected at '^' marker.
R1(config)#access-list 7 permit ?
A.B.C.D Address to match
any Any source host
host A single host address
R1(config)#access-list 7 permit any host 192.168.40.44 eq domain
^
% Invalid input detected at '^' marker.
R1(config)#access-list 7 deny 192.168.40.44
R1(config)#access-list 120 permit udp any host 192.168.40.60 eq domain
R1(config)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#wr
Building configuration...
[OK]
R1#
R1#sh access-list
Standard IP access list 1
10 permit host 192.168.30.33
Standard IP access list 7
10 deny host 192.168.40.44
```



Extended IP access list 120

10 permit udp any host 192.168.40.60 eq domain

R1#

R1-Bogotá

Physical Config **CLI** Attributes

IOS Command Line Interface

```
R1#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#access-list 1 permit 192.168.30.33
R1(config)#access-list 7 permit tcp any host 192.168.40.44 eq domain
^
% Invalid input detected at '^' marker.

R1(config)#access-list 7 permit tcp any host 192.168.40.44 eq smtp
^
% Invalid input detected at '^' marker.

R1(config)#access-list 7 permit ?
  A.B.C.D  Address to match
  any      Any source host
  host     A single host address
R1(config)#access-list 7 permit any host 192.168.40.44 eq domain
^
% Invalid input detected at '^' marker.

R1(config)#access-list 7 deny 192.168.40.44
R1(config)#access-list 120 permit udp any host 192.168.40.60 eq domain
R1(config)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#wr
Building configuration...
[OK]
R1#
R1#sh access-list
Standard IP access list 1
  10 permit host 192.168.30.33
Standard IP access list 7
  10 deny host 192.168.40.44
Extended IP access list 120
  10 permit udp any host 192.168.40.60 eq domain

R1#
```

Ctrl+F6 to exit CLI focus

Top

Copy Paste

2:41 p.m. 13/07/2019

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

#### Ping y traceroute de R1 a R2

```
*SYS-5-CONFIG_1: Configured from console by console
R1#wr
Building configuration...
[OK]
R1#
R1#sh access-list
Standard IP access list 1
  10 permit host 192.168.30.33
Standard IP access list 7
  10 deny host 192.168.40.44
Extended IP access list 120
  10 permit udp any host 192.168.40.60 eq domain

R1#
R1#
R1#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 = 1/2/3 ms
R1#
```

Ctrl+F6 to exit CLI focus

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Copy Paste

2:44 p.m.  
13/07/2019

## Ping y traceroute de R2 a R3

R2-Miami

Physical Config **CLI** Attributes

IOS Command Line Interface

```
soy acceso autorizado

User Access Verification

Password:
Password:

R2>enable
Password:
R2#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 = 6/6/8 ms

R2#
```

Ctrl+F6 to exit CLI focus

Top

Console

3:14 p.m.  
13/07/2019

## Ping y traceroute de Internet PC a interfaces de R2

The screenshot shows a desktop window titled "Internet PC" with a tab bar at the top: Physical, Config, Desktop (which is selected), Programming, and Attributes. A Command Prompt window is open, showing the following output:

```
Pinging 172.31.23.2 with 32 bytes of data:  
Reply from 172.31.23.2: bytes=32 time<1ms TTL=255  
  
Ping statistics for 172.31.23.2:  
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
    Approximate round trip times in milli-seconds:  
        Minimum = 0ms, Maximum = 0ms, Average = 0ms  
  
C:\>ping 172.31.21.2  
  
Pinging 172.31.21.2 with 32 bytes of data:  
  
Reply from 172.31.21.2: bytes=32 time=1ms TTL=255  
  
Ping statistics for 172.31.21.2:  
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
    Approximate round trip times in milli-seconds:  
        Minimum = 0ms, Maximum = 1ms, Average = 0ms  
  
C:\>
```

The taskbar at the bottom shows icons for File Explorer, Task View, Taskbar settings, and a search bar. The system tray displays network status, battery level (ESP), and the date and time (3:23 p.m., 13/07/2019).

## 4. CONCLUSIONES

Se logra emular con éxito el manejo de una red en Packet Tracer, aplicando las diversas configuraciones de routers y switches CISCO que comercialmente se maneja. De esta forma se puede evidenciar el manejo de cada instrucción acueroado a la necesidad a implementar. La configuración de cada router y switch se maneja como un todo ya que los dispositivos deben de comprender los protocolos y permisos que el ingeniero de redes implementa.

## 5. REFERENCIAS BIBLIOGRÁFICAS

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- **Temática: Capa de Transporte**

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