

PRUEBA DE HABILIDADES CCNA.  
DIPLOMADO DE PROFUNDIZACIÓN CISCO.

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PROGRAMA: INGENIERÍA DE SISTEMAS.  
CEAD: VALLEDUPAR CÉSAR.  
2019.

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TRABAJO DE GRADO, PARA OPTAR AL TÍTULO DE INGENIERO DE  
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**NOTA DE ACEPTACIÓN.**

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Firma del Jurado.

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Firma del Jurado.

## **DEDICATORIA.**

A mi familia, y a mis amigos, quienes siempre me han apoyado, y han confiado en mis capacidades. Agradecer también a la universidad, por la oportunidad de formarme como un excelente profesional, y en una persona responsable, investigadora, y autónoma. Igualmente, a CISCO que me dio la oportunidad de conocer el mundo tan maravilloso conformado por las redes de telecomunicaciones, y solucionar problemas tan complejos haciendo uso de la tecnología.

## **AGRADECIMIENTOS**

A la universidad por permitirme darme la oportunidad de estudiar, de formarme como una persona responsable, madura, y honesta en mis deberes. A su vez, de posibilitarme ser un buen profesional, capaz de identificar problemáticas en un entorno en particular, y de poder dar las soluciones más adecuadas, beneficiando a la comunidad en general, y trayendo consigo mayores oportunidades, y progreso a la región.

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## **GLOSARIO.**

- **CONECTIVIDAD:** es la capacidad de un dispositivo, de poder ser conectado, y de poder comunicarse con otro.
- **CONFIGURACIÓN:** personalizar un sistema, para que cumpla los objetivos, por los que fue creado.
- **DISPOSITIVO:** aparato, computador, router, o switch, o mecanismos, que desarrollan determinadas acciones.
- **IP:** es un número que identifica un dispositivo en internet.
- **PUERTO:** es una interfaz a través de la cual se pueden enviar y recibir datos.
- **RED:** las redes permiten que los computadores se conecten entre sí, para intercambiar información, compartir hardware y software.
- **ROUTER:** es un dispositivo que proporciona conectividad a nivel de red (capa 3), y de dirigir el tráfico a una red remota.
- **SERVIDOR:** es un dispositivo que proporciona recursos a dispositivos clientes.
- **SWITCH:** es un dispositivo que se encarga de interconectar dispositivos en una misma red LAN.



## RESUMEN.

El objetivo de la actividad es demostrar los conocimientos adquiridos a lo largo del diplomado mediante el desarrollo de dos escenarios prácticos. En el escenario uno, una empresa posee sucursales en las ciudades de Bogotá y Medellín. En el escenario dos, una empresa de tecnología posee tres sucursales distribuidas en las ciudades de Miami, Bogotá, y Buenos Aires. En donde a cada escenario se debe configurar, e interconectar, entre sí cada uno de los dispositivos.

La conectividad se llevó a cabo mediante la configuración, e implementación de los protocolos de enrutamiento **OSPFv2** para el escenario 2, y **RIPv2** para el escenario 1, además de la configuración de rutas estáticas, puertos troncales, VLANs, la asignación del direccionamiento IP, y finalmente las pruebas de conectividad mediante la utilidad ping, y trazar rutas a un destino en específico con la utilidad tracert.

## **INTRODUCCIÓN.**

En este informe se presenta, el desarrollo de la prueba de habilidades CCNA, que consiste en realizar 2 escenarios prácticos, y tiene como objetivo identificar el grado de competencias, y habilidades, que fueron adquiridas a lo largo del diplomado. La actividad se desarrolló paso por paso, agregando sus respectivos códigos, y captures de pantallas, como evidencias a resultados de comandos como: ping (comprobar la conectividad), tracert route (cantidad de saltos), show ip route (tabla de enrutamiento de los dispositivos). Entre otros, y a configuraciones básicas de dispositivos, de enrutamiento, y de rutas tomadas por los mismos para dirigir el tráfico a la red interna o externa. Finalmente se utilizó la última versión de Packet tracer para el desarrollo de la actividad.

## DESARROLLO DE LOS ESCENARIOS.

### 1. ESCENARIO 1.

#### 1.1. DESCRIPCIÓN 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.

#### 1.2. CONFIGURACIÓN BÁSICA Y DE DIRECCIONAMIENTO DE LOS DISPOSITIVOS.

##### CONFIGURACIÓN BÁSICA Y DE DIRECCIONAMIENTO A ISP.

```
Hostname: ISP
Enable secret: itsaseret
Password Line Console 0: cisco
Password Line vty 0 15: cisco
Service password-encryption
Banner motd "Acceso solo al personal autorizado"
```

```
Interface s0/0/0
Ip address 209.17.220.1 255.255.255.252
Clock rate 4000000
No shutdown
```

```
Interface s0/0/1
Ip address 209.17.220.5 255.255.255.252
Clock rate 4000000
No shutdown
```

##### CONFIGURACIÓN BÁSICA Y DE DIRECCIONAMIENTO A MEDELLIN1.

```
Hostname MEDELLIN
Enable secret: itsasecret
Password Line Console 0: cisco
Password Line vty 0 15: cisco
Service password-encryption
Banner motd "Acceso solo al personal autorizado"
```

```
Interface s0/0/0
Ip address 209.17.220.2 255.255.255.252
No shutdown
```

```
Interface s0/0/1
Ip address 172.29.6.1 255.255.255.252
Clock rate 4000000
No shutdown
```

```
Interface s0/1/0
Ip address 172.29.6.9 255.255.255.252
Clock rate 4000000
No shutdown
```

```
Interface s0/1/1
Ip address 172.29.6.13 255.255.255.252
Clock rate 4000000
No shutdown
```

#### CONFIGURACIÓN BÁSICA Y DE DIRECCIONAMIENTO A MEDELLIN2.

```
Hostname MEDELLIN2
Enable secret: itsasecret
Password Line Console 0: cisco
Password Line vty 0 15: cisco
Service password-encryption
Banner motd "Acceso solo al personal autorizado"
```

```
Interface s0/0/0
Ip address 172.29.6.2 255.255.255.252
No shutdown
```

```
Interface s0/0/1
Ip address 172.29.6.5 255.255.255.252
Clock rate 4000000
No shutdown
```

```
Interface g0/0
Ip address 172.29.4.1 255.255.255.128
No shutdown
```

#### CONFIGURACIÓN BÁSICA Y DE DIRECCIONAMIENTO A MEDELLIN3.

```
Hostname MEDELLIN3
Enable secret: itsasecret
```

```
Password Line Console 0: cisco
Password Line vty 0 15: cisco
Service password-encryption
Banner motd "Acceso solo al personal autorizado"
```

```
Interface s0/0/0
Ip address 172.29.6.10 255.255.255.252
No shutdown
```

```
Interface s0/0/1
Ip address 172.29.6.14 255.255.255.252
No shutdown
```

```
Interface s0/1/0
Ip address 172.29.6.6 255.255.255.252
No shutdown
```

```
Interface g0/0
Ip address 172.29.4.129 255.255.255.128
No shutdown
```

## CONFIGURACIÓN BÁSICA Y DE DIRECCIONAMIENTO A BOGOTA1.

```
Hostname BOGOTA
Enable secret: itsasecret
Password Line Console 0: cisco
Password Line vty 0 15: cisco
Service password-encryption
Banner motd "Acceso solo al personal autorizado"
```

```
Interface s0/0/0
Ip address 209.17.220.6 255.255.255.252
No shutdown
```

```
Interface s0/0/1
Ip address 172.29.3.9 255.255.255.252
Clock rate 4000000
No shutdown
Interface s0/1/0
Ip address 172.29.3.1 255.255.255.252
Clock rate 4000000
No shutdown
```

```
Interface s0/1/1
Ip address 172.29.3.5 255.255.255.252
```

Clock rate 4000000  
No shutdown

## CONFIGURACIÓN BÁSICA Y DE DIRECCIONAMIENTO A BOGOTA2.

Hostname BOGOTA2  
Enable secret: itsasecret  
Password Line Console 0: cisco  
Password Line vty 0 15: cisco  
Service password-encryption  
Banner motd "Acceso solo al personal autorizado"

Interface s0/0/0  
Ip address 172.29.3.10 255.255.255.252  
No shutdown

Interface s0/0/1  
Ip address 172.29.3.13 255.255.255.252  
Clock rate 4000000  
No shutdown

Interface g0/0  
Ip address 172.29.1.1 255.255.255.0  
No shutdown

## CONFIGURACIÓN BÁSICA Y DE DIRECCIONAMIENTO A BOGOTA3.

Hostname BOGOTA3  
Enable secret: itsasecret  
Password Line Console 0: cisco  
Password Line vty 0 15: cisco  
Service password-encryption  
Banner motd "Acceso solo al personal autorizado"

Interface s0/0/0  
Ip address 172.29.3.2 255.255.255.252  
No shutdown

Interface s0/0/1  
Ip address 172.29.3.6 255.255.255.252  
No shutdown

Interface s0/1/0  
Ip address 172.29.3.14 255.255.255.252  
No shutdown

```
Interface g0/0
Ip address 172.29.0.1 255.255.255.0
No shutdown
```

### **1.3. CONFIGURACIÓN DEL PROTOCOLO RIPV2.**

#### **CONFIGURACIÓN RIPV2 EN MEDELLIN1.**

```
Router rip
Version 2
No auto-summary
Network 172.29.6.0
Network 172.29.6.8
Network 172.29.6.12
Passive-interface s0/0/0 (WAN A ISP).
```

#### **CONFIGURACIÓN RIPV2 EN MEDELLIN2.**

```
Router rip
Version 2
No auto-summary
Network 172.29.4.0
Network 172.29.6.0
Network 172.29.6.4
Passive-interface g0/0
```

#### **CONFIGURACIÓN RIPV2 EN MEDELLIN3.**

```
Router rip
Version 2
No auto-summary
Network 172.29.4.128
Network 172.29.6.4
Network 172.29.6.8
Network 172.29.6.12
Passive-interface g0/0
```

#### **CONFIGURACIÓN RIPV2 EN BOGOTA1.**

```
Router rip
Version 2
No auto-summary
Network 172.29.3.0
```

```
Network 172.29.3.4
Network 172.29.3.8
Passive-interface s0/0/0
```

#### CONFIGURACIÓN RIPV2 EN BOGOTA2.

```
Router rip
Version 2
No auto-summary
Network 172.29.1.0
Network 172.29.3.8
Network 172.29.3.12
Passive-interface g0/0
```

#### CONFIGURACIÓN RIPV2 EN BOGOTA3.

```
Router rip
Version 2
No auto-summary
Network 172.29.0.0
Network 172.29.3.0
Network 172.29.3.4
Network 172.29.3.12
Passive-interface g0/0
```

### **1.4. CONFIGURACIÓN DE RUTAS ESTÁTICAS.**

#### CONFIGURACIÓN DE RUTAS ESTÁTICAS DE MEDELLIN1 A ISP.

```
Configure terminal
Ip route 0.0.0.0 0.0.0.0 209.17.220.1
Router rip
Default-information originate
```

#### CONFIGURACIÓN DE RUTAS ESTÁTICAS DE BOGOTA1 A ISP.

```
Configure terminal
Ip route 0.0.0.0 0.0.0.0 209.17.220.5
Router rip
Default-information originate
```

#### CONFIGURACIÓN DE RUTAS ESTÁTICAS DE ISP.

```
Ip route 172.29.4.0 255.255.252.0 209.17.220.2
Ip route 172.29.0.0 255.255.252.0 209.17.220.6
```



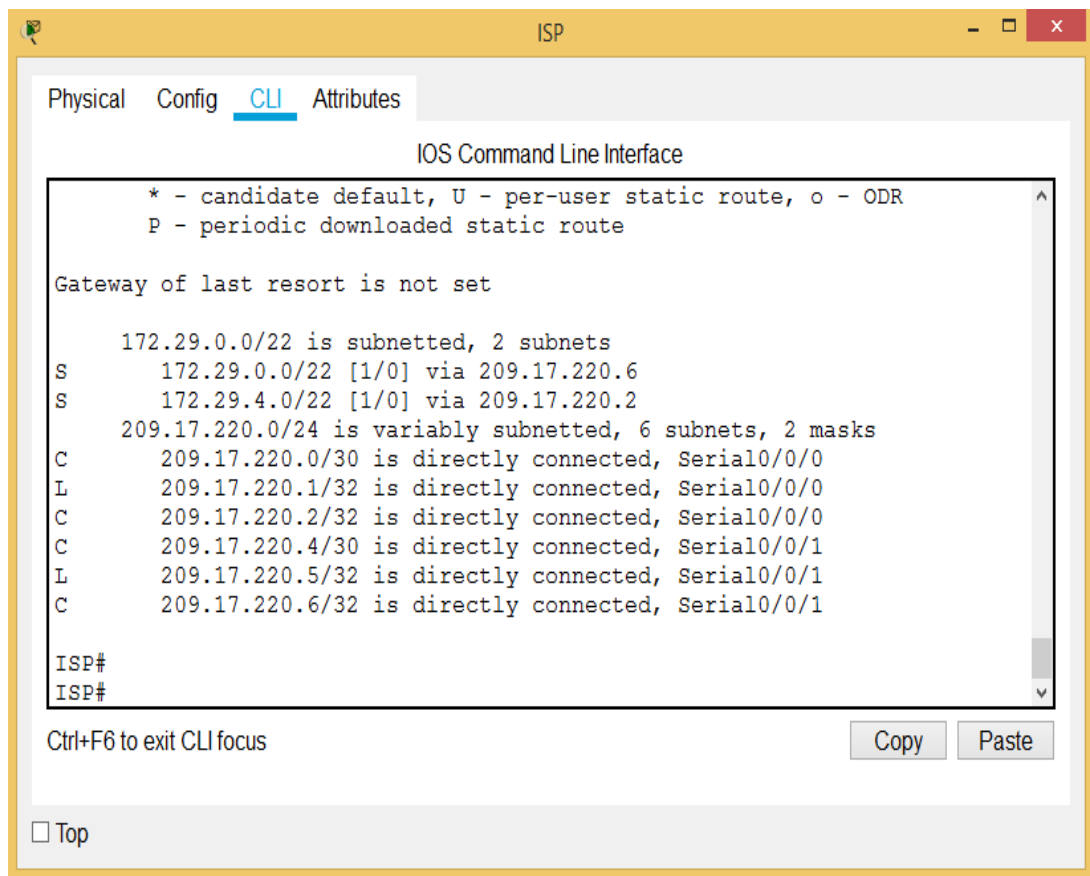
## 1.5. CONFIGURACIÓN DE RUTAS ESTÁTICAS DE ISP, DIRIGIDAS HACIA CADA RED INTERNA DE BOGOTA Y MEDELLIN.

Ip route 172.29.4.0 255.255.252.0 209.17.220.2 (Dirigida a Medellín).

Ip route 172.29.0.0 255.255.252.0 209.17.220.6 (Dirigida a Bogotá).

## 1.6. RUTAS CONECTADAS DIRECTAMENTE A CADA ROUTER.

RUTAS CONECTADAS DIRECTAMENTE A ISP.



```
IOS Command Line Interface
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

172.29.0.0/22 is subnetted, 2 subnets
S    172.29.0.0/22 [1/0] via 209.17.220.6
S    172.29.4.0/22 [1/0] via 209.17.220.2
209.17.220.0/24 is variably subnetted, 6 subnets, 2 masks
C    209.17.220.0/30 is directly connected, Serial0/0/0
L    209.17.220.1/32 is directly connected, Serial0/0/0
C    209.17.220.2/32 is directly connected, Serial0/0/0
C    209.17.220.4/30 is directly connected, Serial0/0/1
L    209.17.220.5/32 is directly connected, Serial0/0/1
C    209.17.220.6/32 is directly connected, Serial0/0/1

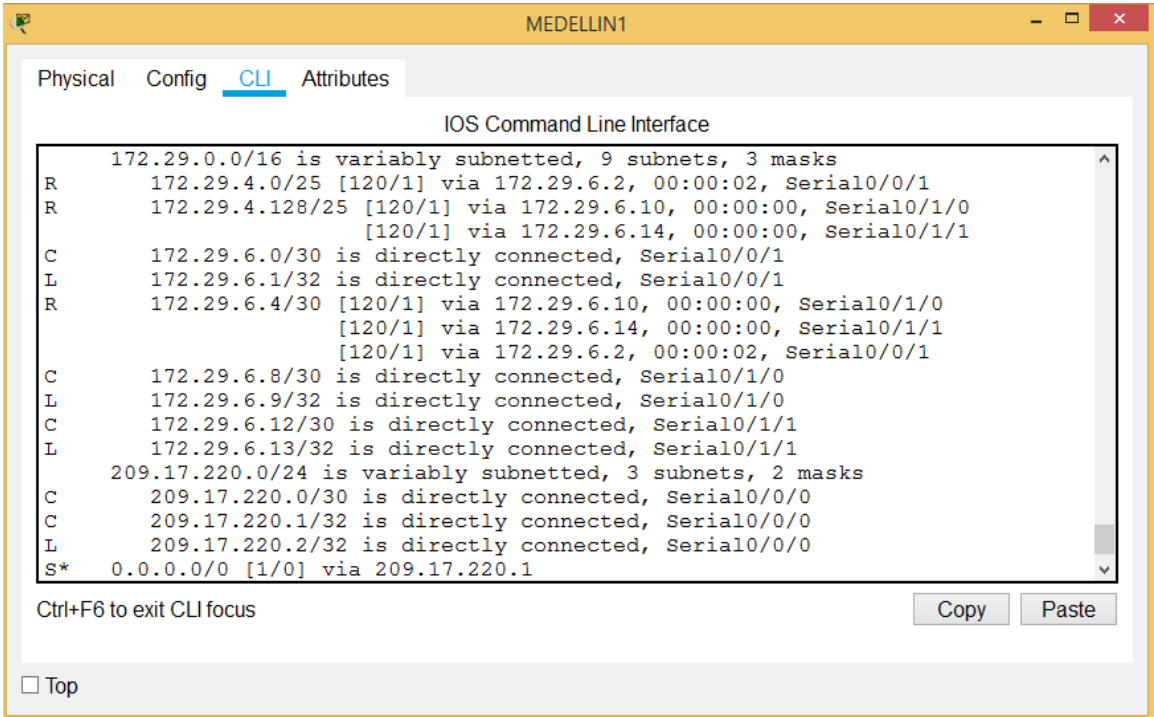
ISP#
ISP#
```

Ctrl+F6 to exit CLI focus

Copy Paste

Top

## RUTAS CONECTADAS DIRECTAMENTE A MEDELLIN1.

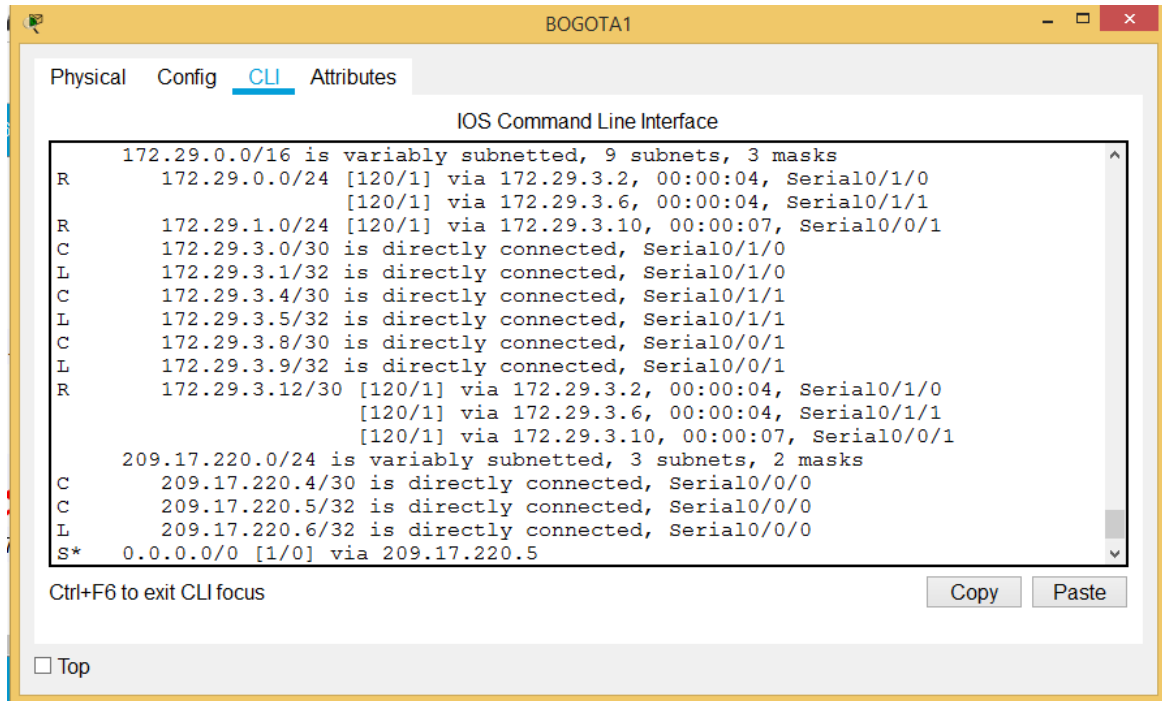


The screenshot shows the IOS Command Line Interface for a device named MEDELLIN1. The interface is in the CLI mode, and the routing table is displayed. The output shows various routes, including directly connected routes and routes learned via other interfaces. The routes are listed with their destination networks, masks, and the interfaces they are connected to.

```
MEDELLIN1
Physical Config CLI Attributes
IOS Command Line Interface
172.29.0.0/16 is variably subnetted, 9 subnets, 3 masks
R 172.29.4.0/25 [120/1] via 172.29.6.2, 00:00:02, Serial0/0/1
R 172.29.4.128/25 [120/1] via 172.29.6.10, 00:00:00, Serial0/1/0
  [120/1] via 172.29.6.14, 00:00:00, Serial0/1/1
C 172.29.6.0/30 is directly connected, Serial0/0/1
L 172.29.6.1/32 is directly connected, Serial0/0/1
R 172.29.6.4/30 [120/1] via 172.29.6.10, 00:00:00, Serial0/1/0
  [120/1] via 172.29.6.14, 00:00:00, Serial0/1/1
  [120/1] via 172.29.6.2, 00:00:02, Serial0/0/1
C 172.29.6.8/30 is directly connected, Serial0/1/0
L 172.29.6.9/32 is directly connected, Serial0/1/0
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, 3 subnets, 2 masks
C 209.17.220.0/30 is directly connected, Serial0/0/0
C 209.17.220.1/32 is directly connected, Serial0/0/0
L 209.17.220.2/32 is directly connected, Serial0/0/0
S* 0.0.0.0/0 [1/0] via 209.17.220.1

Ctrl+F6 to exit CLI focus
Copy Paste
Top
```

## RUTAS CONECTADAS DIRECTAMENTE a BOGOTA1.



The screenshot shows the IOS Command Line Interface for a device named BOGOTA1. The interface is in the CLI mode, and the routing table is displayed. The output shows various routes, including directly connected routes and routes learned via other interfaces. The routes are listed with their destination networks, masks, and the interfaces they are connected to.

```
BOGOTA1
Physical Config CLI Attributes
IOS Command Line Interface
172.29.0.0/16 is variably subnetted, 9 subnets, 3 masks
R 172.29.0.0/24 [120/1] via 172.29.3.2, 00:00:04, Serial0/1/0
  [120/1] via 172.29.3.6, 00:00:04, Serial0/1/1
R 172.29.1.0/24 [120/1] via 172.29.3.10, 00:00:07, Serial0/0/1
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, 00:00:04, Serial0/1/0
  [120/1] via 172.29.3.6, 00:00:04, Serial0/1/1
  [120/1] via 172.29.3.10, 00:00:07, Serial0/0/1
209.17.220.0/24 is variably subnetted, 3 subnets, 2 masks
C 209.17.220.4/30 is directly connected, Serial0/0/0
C 209.17.220.5/32 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

Ctrl+F6 to exit CLI focus
Copy Paste
Top
```

## **1.7. CONFIGURACIÓN DE AUTENTICACIÓN PAP.**

CONFIGURACIÓN BÁSICA ISP.

Hostname ISP

CONFIGURACIÓN BÁSICA MEDELLIN1.

Hostname MEDELLIN

CONFIGURACIÓN BÁSICA BOGOTA1.

Hostname BOGOTA

AUTENTICACIÓN PPP PAP EN ISP.

Username MEDELLIN password cisco

Interface s0/0/0

Encapsulation ppp

Ppp authentication pap

Ppp pap sent-username ISP password cisco

AUTENTICACIÓN PPP PAP EN MEDELLIN1.

Username ISP password cisco

Interface s0/0/0

Encapsulation ppp

Ppp authentication pap

Ppp pap sent-username MEDELLIN password cisco

## **1.8. CONFIGURACIÓN DE AUTENTICACIÓN CHAP.**

AUTENTICACIÓN PPP CHAP EN ISP.

Username BOGOTA password cisco

Interface s0/0/1

Encapsulation ppp

Ppp authentication chap

AUTENTICACIÓN PPP CHAP EN BOGOTA1.

Username ISP password cisco

Interface s0/0/0

Encapsulation ppp

Ppp authentication chap

## 1.9. CONFIGURACIÓN DEL SERVICIO DHCP.

### CONFIGURACIÓN DHCP EN MEDELLIN2.

```
Ip dhcp excluded-address 172.29.4.1 172.29.4.5  
Ip dhcp excluded-address 172.29.4.129 172.29.4.133
```

#### **Ip dhcp pool MED2**

```
Network 172.29.4.0 255.255.255.128  
Default-router 172.29.4.1  
Dns-server 8.8.8.8
```

#### **Ip dhcp pool MED3**

```
Network 172.29.4.128 255.255.255.128  
Default-router 172.29.4.129  
Dns-server 8.8.8.8
```

### CONFIGURACIÓN DHCP EN MEDELLIN3.

```
Configure terminal  
Interface g0/0  
Ip helper-address 172.29.6.5
```

### CONFIGURACIÓN DHCP EN BOGOTA2.

```
Ip dhcp excluded-address 172.29.1.1 172.29.1.5  
Ip dhcp excluded-address 172.29.0.1 172.29.0.5  
|
```

```
p dhcp pool BOG2  
Network 172.29.1.0 255.255.255.0  
Default-router 172.29.1.1  
Dns-server 8.8.8.8
```

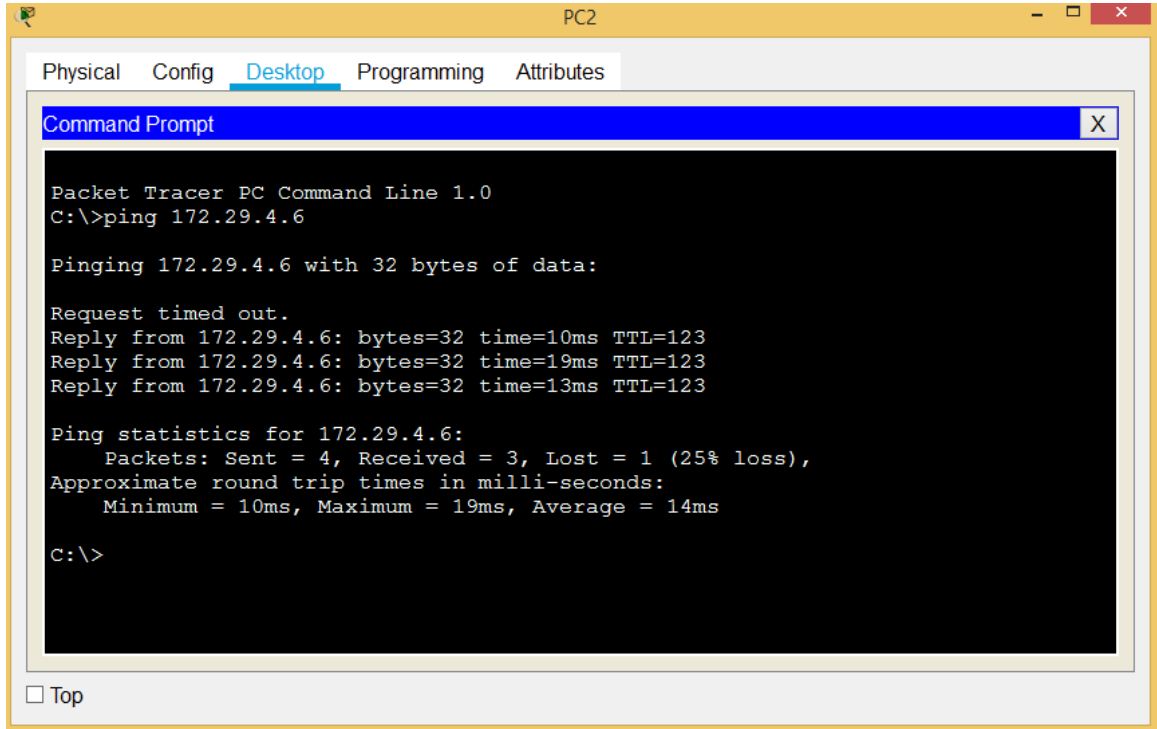
```
Ip dhcp pool BOG3  
Network 172.29.0.0 255.255.255.0  
Default-router 172.29.0.1  
Dns-server 8.8.8.8
```

### CONFIGURACIÓN DHCP EN BOGOTA3.

```
Configure terminal  
Interface g0/0  
Ip helper-address 172.29.3.13
```

## 1.10. PRUEBAS DE CONECTIVIDAD (EXTREMO A EXTREMO).

### PING DE PC2 A PC0.



```
Packet Tracer PC Command Line 1.0
C:\>ping 172.29.4.6

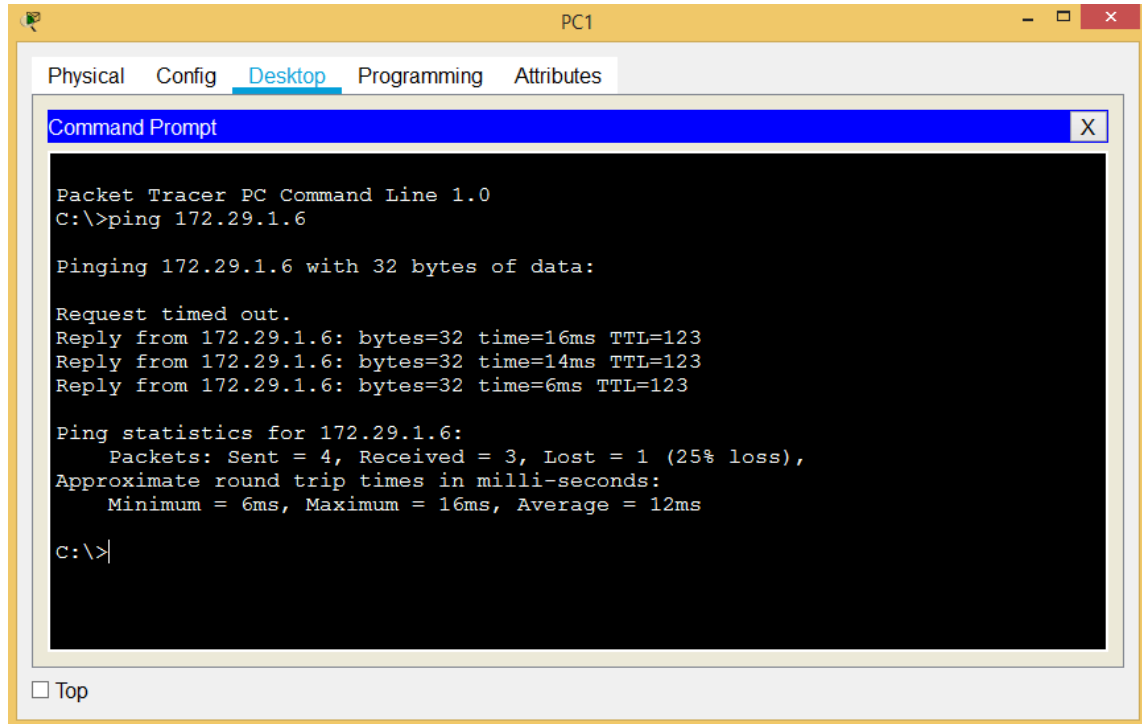
Pinging 172.29.4.6 with 32 bytes of data:

Request timed out.
Reply from 172.29.4.6: bytes=32 time=10ms TTL=123
Reply from 172.29.4.6: bytes=32 time=19ms TTL=123
Reply from 172.29.4.6: bytes=32 time=13ms TTL=123

Ping statistics for 172.29.4.6:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 10ms, Maximum = 19ms, Average = 14ms

C:\>
```

### PING DE PC1 A PC3.



```
Packet Tracer PC Command Line 1.0
C:\>ping 172.29.1.6

Pinging 172.29.1.6 with 32 bytes of data:

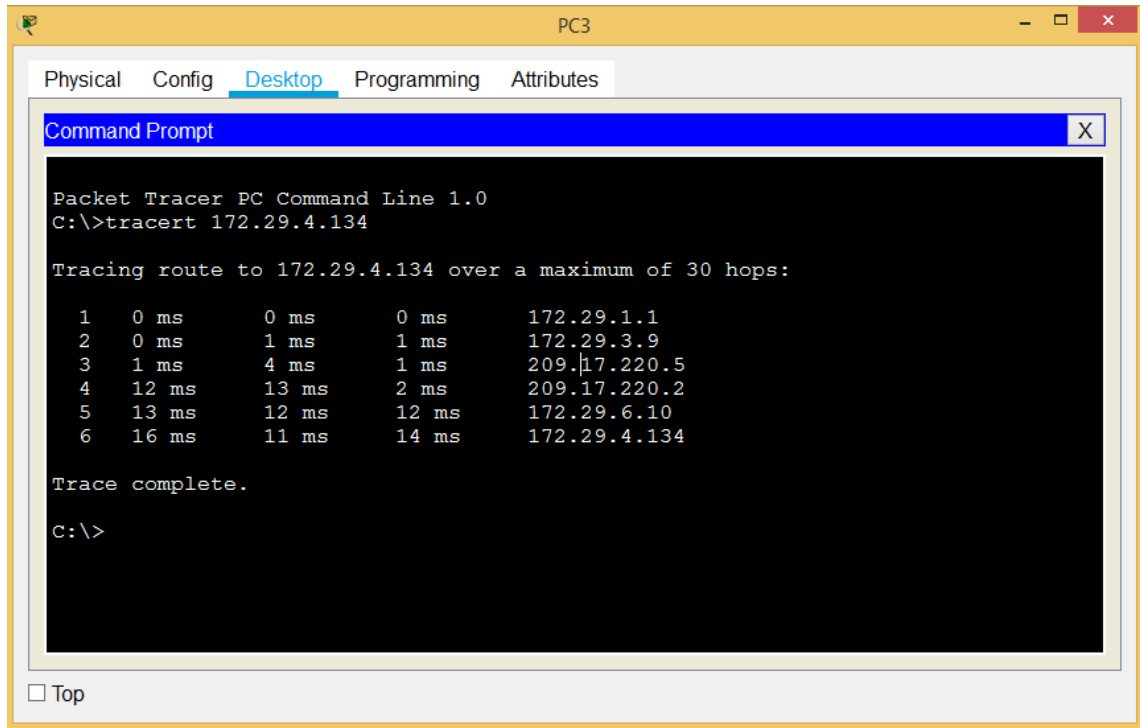
Request timed out.
Reply from 172.29.1.6: bytes=32 time=16ms TTL=123
Reply from 172.29.1.6: bytes=32 time=14ms TTL=123
Reply from 172.29.1.6: bytes=32 time=6ms TTL=123

Ping statistics for 172.29.1.6:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 6ms, Maximum = 16ms, Average = 12ms

c:\>
```

## 1.11. TRACERT ROUTE (PRUEBAS DE EXTREMO A EXTREMO).

TRACERT ROUTE DE PC3 A PC1.



The screenshot shows a Packet Tracer PC3 Command Prompt window. The title bar reads "PC3". The window has tabs for "Physical", "Config", "Desktop", "Programming", and "Attributes", with "Desktop" selected. The Command Prompt displays the following text:

```
Packet Tracer PC Command Line 1.0
C:\>tracert 172.29.4.134

Tracing route to 172.29.4.134 over a maximum of 30 hops:

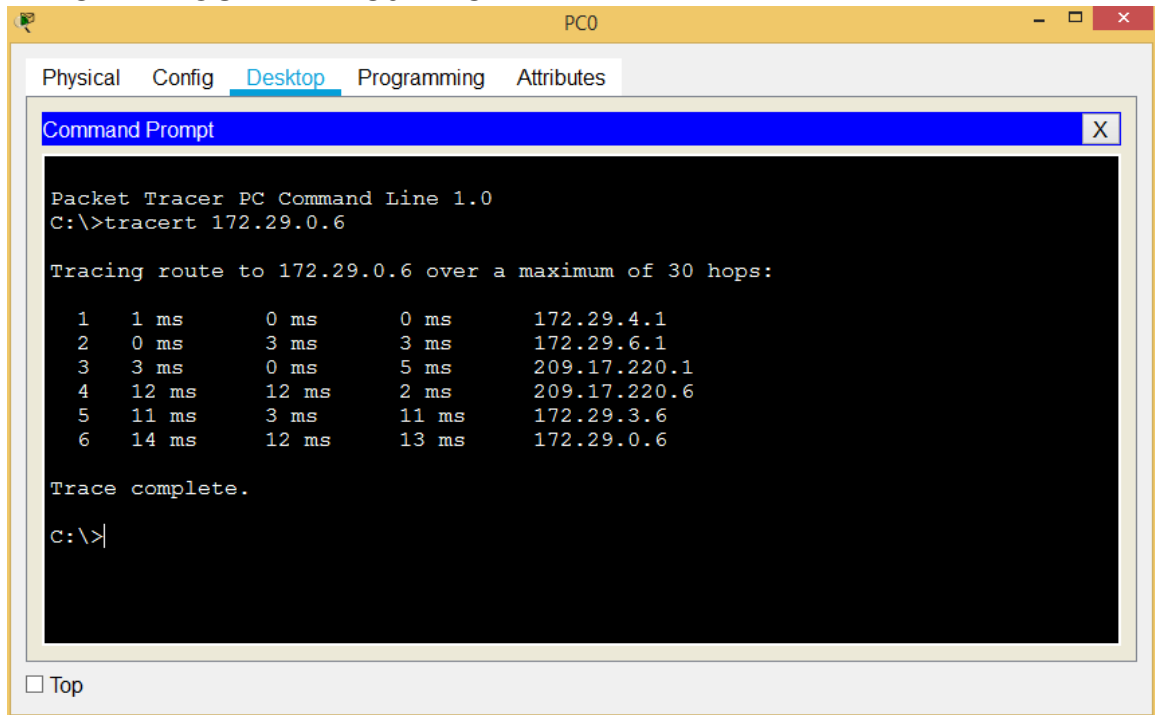
  1  0 ms    0 ms    0 ms    172.29.1.1
  2  0 ms    1 ms    1 ms    172.29.3.9
  3  1 ms    4 ms    1 ms    209.17.220.5
  4  12 ms   13 ms   2 ms    209.17.220.2
  5  13 ms   12 ms   12 ms   172.29.6.10
  6  16 ms   11 ms   14 ms   172.29.4.134

Trace complete.

C:\>
```

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

TRACERT ROUTE DE PC0 A PC2.



The screenshot shows a Packet Tracer PC0 Command Prompt window. The title bar reads "PC0". The window has tabs for "Physical", "Config", "Desktop", "Programming", and "Attributes", with "Desktop" selected. The Command Prompt displays the following text:

```
Packet Tracer PC Command Line 1.0
C:\>tracert 172.29.0.6

Tracing route to 172.29.0.6 over a maximum of 30 hops:

  1  1 ms    0 ms    0 ms    172.29.4.1
  2  0 ms    3 ms    3 ms    172.29.6.1
  3  3 ms    0 ms    5 ms    209.17.220.1
  4  12 ms   12 ms   2 ms    209.17.220.6
  5  11 ms   3 ms    11 ms   172.29.3.6
  6  14 ms   12 ms   13 ms   172.29.0.6

Trace complete.

C:\>
```

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

## 1.12. CONFIGURACIÓN DE NAT.

### NAT EN MEDELLIN1.

```
Configure terminal
Ip nat inside source list 1 interface s0/0/0 overload
Access-list 1 permit 172.29.4.0 0.0.3.255
Int s0/0/0
Ip nat outside
Int s0/01
Ip nat inside
Int s0/1/0
Ip nat inside
Int s0/1/1
Ip nat inside
```

### NAT EN BOGOTA1.

```
Configure terminal
Ip nat inside source list 1 interface s0/0/0 overload
Access-list 1 permit 172.29.0.0 0.0.3.255
Int s0/0/0
Ip nat outside
Int s0/0/1
Ip nat inside
Int s0/1/0
Ip nat inside
Int s0/1/1
Ip nat inside
```

## 2. ESCENARIO 2.

### 2.1. DESCRIPCIÓN ESCENARIO 2.

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

### 2.2. CONFIGURACIÓN BÁSICA DE DISPOSITIVOS Y DIRECCIONAMIENTO.

#### CONFIGURACIÓN BÁSICA Y DE DIRECCIONAMIENTO PARA EL ROUTER R1

```
Enable
Configure terminal
Hostname R1
Enable secret: cisco
Service password-encryption
Banner motd "Acceso solo al personal autorizado"
Password Línea de consola: cisco
Password Líneas VTY: cisco
```

```
Interface s0/0/0
Description Bogota
Ip address 172.31.21.0/30
Clock rate 128000
No shutdown
```

```
Interface F0/0.
Interface F0/0
Ip address 192.168.99.1 (esta red habilitará la LAN).
No shutdown
Ip route 0.0.0.0 0.0.0.0 s0/0/0/ (Ruta por defecto al Router Miami).
```

#### CONFIGURACIÓN BÁSICA Y DE DIRECCIONAMIENTO PARA EL ROUTER R2.

```
Enable
Configure terminal
Hostname R2
Enable secret: cisco
Service password-encryption
```



Banner motd "Acceso solo al personal autorizado"  
Password Línea de consola: cisco  
Password Líneas VTY: cisco

Interface fa0/0 (interface g0/0 – Internet).  
Description Internet  
Ip address 209.165.200.225 255.255.255.248  
Dúplex auto  
Speed auto  
No shutdown

Interface Lo0 (WEB SERVER).  
Configure terminal  
Interface f0/1 (interface g0/1-Web server).  
Ip address 10.10.10.1 255.255.255.0  
Description connection to Web Server.  
No shutdown.

Interface s0/0/0.  
Ip address 172.31.23.2 255.255.255.252  
Clock rate 128000  
No shutdown.

Interface s0/0/1.  
Ip address 172.31.21.2 255.255.255.252  
No shutdown

Ip route 0.0.0.0 0.0.0.0 s0/0/0 (Ruta por defecto al Router Buenos Aires).  
Ip route 0.0.0.0 0.0.0.0 s0/0/1 (Ruta por defecto al Router Bogotá).

### **CONFIGURACIÓN BÁSICA Y DE DIRECCIONAMIENTO PARA EL ROUTER R3.**

Enable  
Configure terminal  
Hostname R3  
Enable secret: cisco  
Service password-encryption  
Banner motd "Acceso solo al personal autorizado"  
Password Línea de consola: cisco  
Password Líneas VTY: cisco

Interface s0/0/1  
Ip address 172.31.23.1 255.255.255.252  
Ip route 0.0.0.0 0.0.0.0 s0/0/1 (Ruta por defecto al Router Miami).

```
Interface loopback4.  
Ip address 192.168.4.1 255.255.255.0  
Exit
```

```
Interface loopback5.  
Ip address 192.168.5.1 255.255.255.0  
Exit.
```

```
Interface loopback6.  
Ip address 192.168.6.1 255.255.255.0  
Exit
```

### **CONFIGURACIÓN BÁSICA SWITCH S1.**

```
Enable  
Configure terminal  
Hostname S1  
Enable secret: cisco  
Service password-encryption  
Banner motd "Acceso solo al personal autorizado"  
Password Línea de consola: cisco  
Password Líneas VTY: cisco
```

### **CONFIGURACIÓN BÁSICA SWITCH S3.**

```
Enable  
Configure terminal  
Hostname S3  
Enable secret: cisco  
Service password-encryption  
Banner motd "Acceso solo al personal autorizado"  
Password Línea de consola: cisco  
Password Líneas VTY: cisco
```

## **2.3. CONFIGURACIÓN DEL PROTOCOLO DE ENRUTAMIENTO OSPFV2.**

### **ROUTER R1.**

```
Configure terminal  
Router ospf 2  
Network 172.31.21.0 0.0.0.3 area 0  
Network 192.168.30.0 0.0.0.255 area 0
```

```
Network 192.168.40.0 0.0.0.255 area 0
Network 192.168.200.0 0.0.0.255 area 0
Router-id 1.1.1.1 – luego se recarga el dispositivo para que los cambios surjan
efectos.
```

#### CONFIGURACIÓN PASIVA DE LA LAN.

```
Configure terminal
Router ospf 2
Passive-interface g0/0
Passive-interface g0/0.30
Passive-interface g0/0.40
Passive-interface g0/0.200
```

#### ANCHO DE BANDA DE ENLACE SERIAL DE 256 KB/S.

```
Interface s0/0/0
Bandwidth 256
Interface s0/0/1
Bandwidth 256
```

#### COSTO DE LA MÉTRICA.

```
int s0/0/0
ip ospf cost 9500
```

### **ROUTER R2.**

```
Configure terminal
Router ospf2
Network 172.31.23.0 0.0.0.255 area 0
Network 172.31.21.0 0.0.0.255 area 0
Network 209.165.200.225 255.255.255.248 area 0
Network 10.10.10.0 0.0.0.255 area 0
Router-id 5.5.5.5
```

#### CONFIGURACIÓN PASIVA DE LA LAN.

```
Router ospf 2
Passive-interface g0/0
Passive-interface g0/1
```

#### ANCHO DE BANDA DE ENLACE SERIAL DE 256 KB/S.

```
Interface s0/0/0
Bandwidth 256
Interface s0/0/1
Bandwidth 256
```

## COSTO DE LA MÉTRICA.

```
Interface s0/0/0  
Ip ospf cost 9500
```

## ROUTER R3.

```
Configure terminal  
Router ospf2  
Network 172.31.23.0 0.0.0.3 area 0  
Network 192.168.4.0 255.255.255.0 area 0  
Network 192.168.5.0 255.255.255.0 area 0  
Network 192.168.6.0 255.255.255.0 area 0  
Router-id 8.8.8.8
```

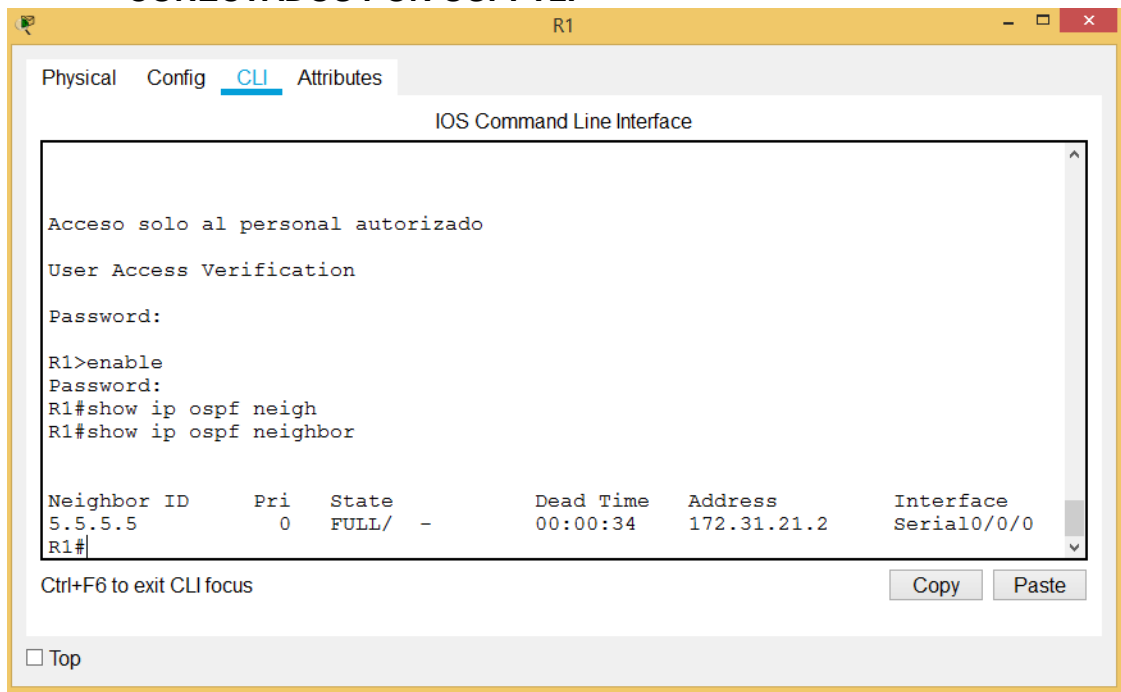
## CONFIGURACIÓN PASIVA DE LA LAN.

```
Router ospf 2  
Passive-interface g0/0  
Passive-interface g0/1
```

## ANCHO DE BANDA DE ENLACE SERIAL DE 256 KB/S.

```
Interface s0/0/0  
Bandwidth 256  
Interface s0/0/1  
Bandwidth 256
```

## 2.4. VISUALIZACIÓN DE TABLAS DE ENRUTAMIENTO Y ROUTERS CONECTADOS POR OSPFV2.



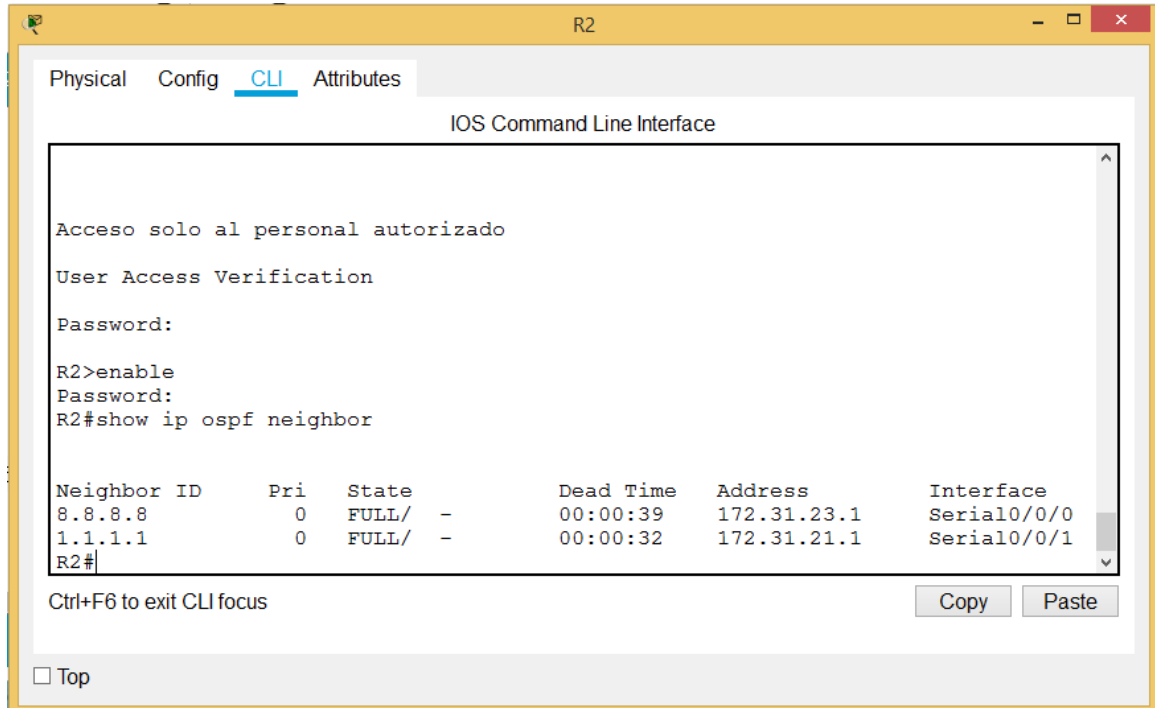
The screenshot shows a Cisco IOS CLI window titled "R1" with tabs for "Physical", "Config", "CLI", and "Attributes". The "CLI" tab is active, displaying the "IOS Command Line Interface". The output shows the following commands and their results:

```
Acceso solo al personal autorizado  
User Access Verification  
Password:  
R1>enable  
Password:  
R1#show ip ospf neigh  
R1#show ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
5.5.5.5	0	FULL/ -	00:00:34	172.31.21.2	Serial0/0/0

The window also includes a "Ctrl+F6 to exit CLI focus" message and "Copy" and "Paste" buttons at the bottom right.

En R2.



The screenshot shows the CLI of router R2. The interface displays the following text:

```
Acceso solo al personal autorizado
User Access Verification
Password:
R2>enable
Password:
R2#show ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
8.8.8.8	0	FULL/ -	00:00:39	172.31.23.1	Serial0/0/0
1.1.1.1	0	FULL/ -	00:00:32	172.31.21.1	Serial0/0/1

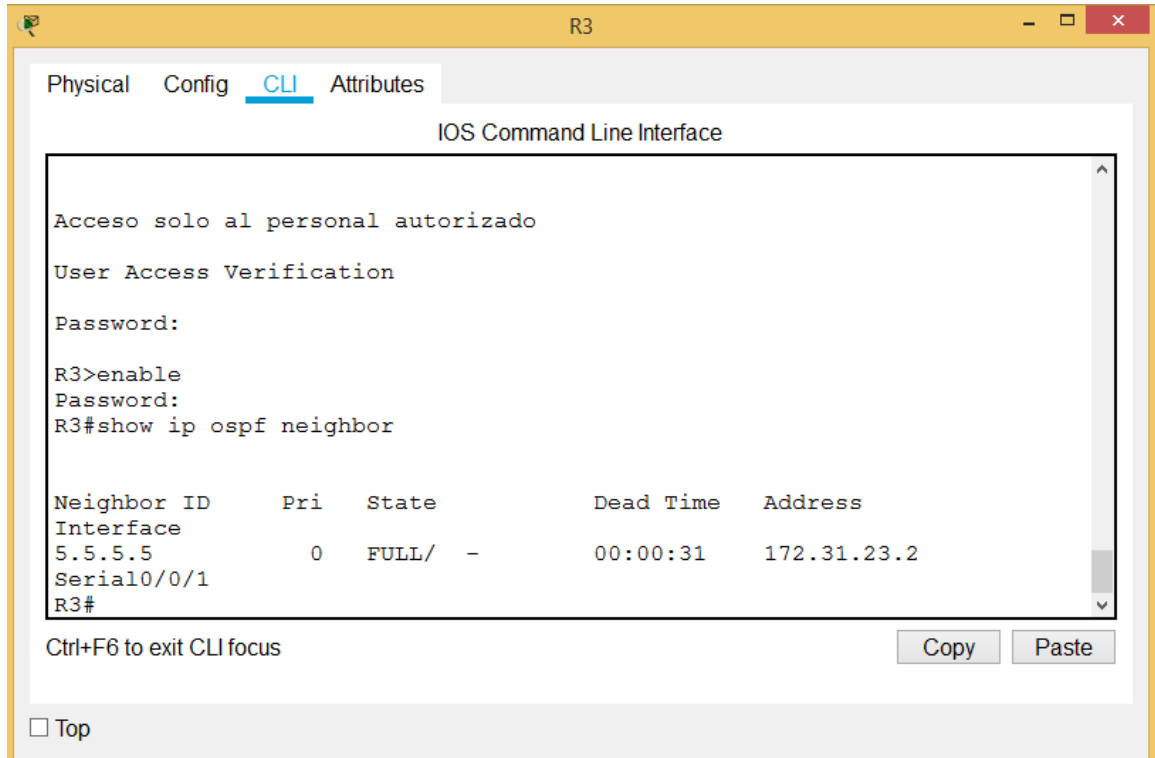
R2#

Ctrl+F6 to exit CLI focus

Copy Paste

Top

EN R3.



The screenshot shows the CLI of router R3. The interface displays the following text:

```
Acceso solo al personal autorizado
User Access Verification
Password:
R3>enable
Password:
R3#show ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address
Interface 5.5.5.5	0	FULL/ -	00:00:31	172.31.23.2

Serial0/0/1  
R3#

Ctrl+F6 to exit CLI focus

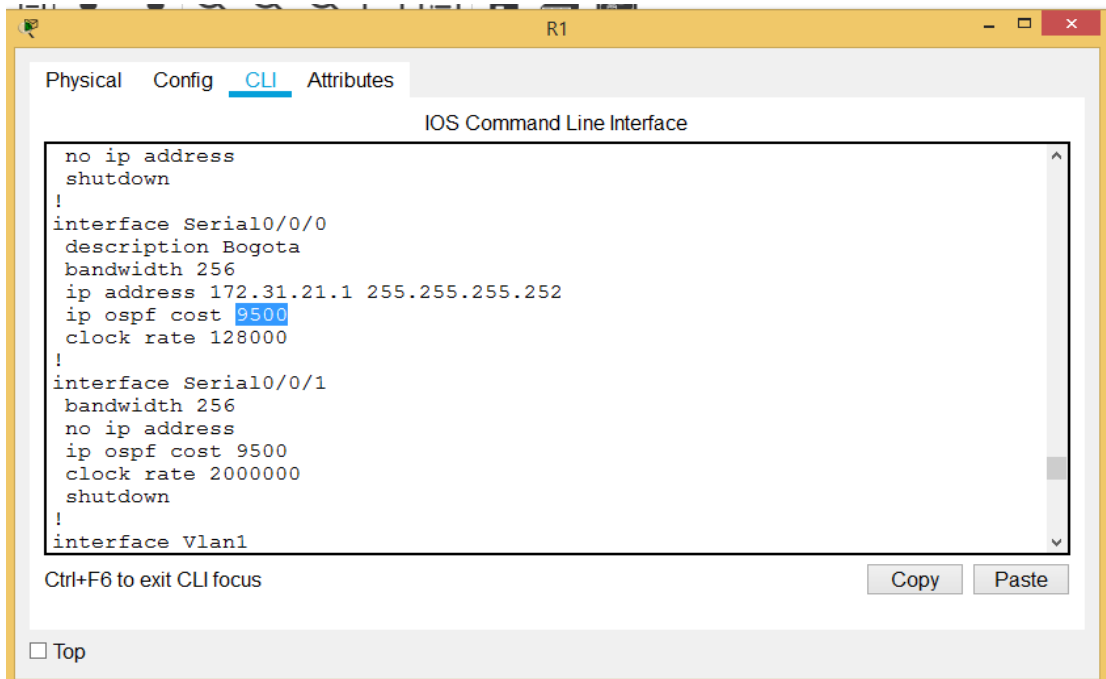
Copy Paste

Top

## 2.5. VISUALIZAR LISTA RESUMIDA DE INTERFACES POR OSPF EN DONDE SE ILUSTRE EL COSTO DE CADA INTERFACE.

El costo de las métricas fue aplicado a las interfaces s0/0/0 de cada router, como lo solicita la guía.

EN R1.

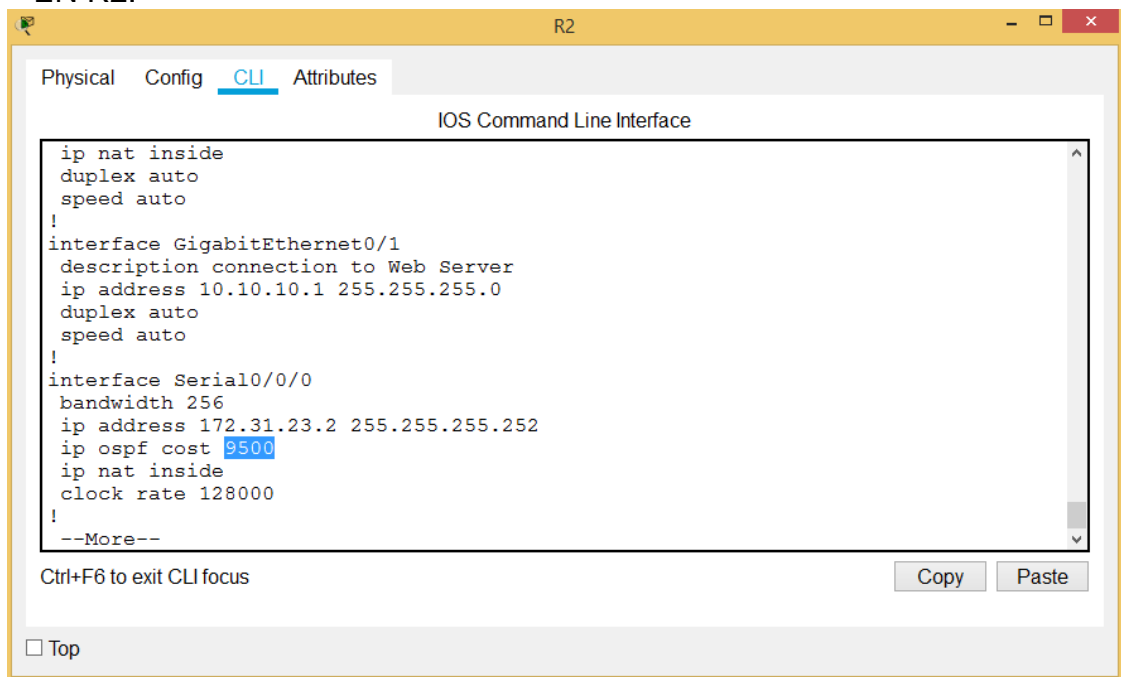


The screenshot shows the CLI interface of router R1. The configuration is as follows:

```
no ip address
shutdown
!
interface Serial10/0/0
description Bogota
bandwidth 256
ip address 172.31.21.1 255.255.255.252
ip ospf cost 9500
clock rate 128000
!
interface Serial10/0/1
bandwidth 256
no ip address
ip ospf cost 9500
clock rate 2000000
shutdown
!
interface Vlan1
```

Below the configuration window, there are buttons for 'Copy' and 'Paste', and a 'Top' button with a checkbox.

EN R2.

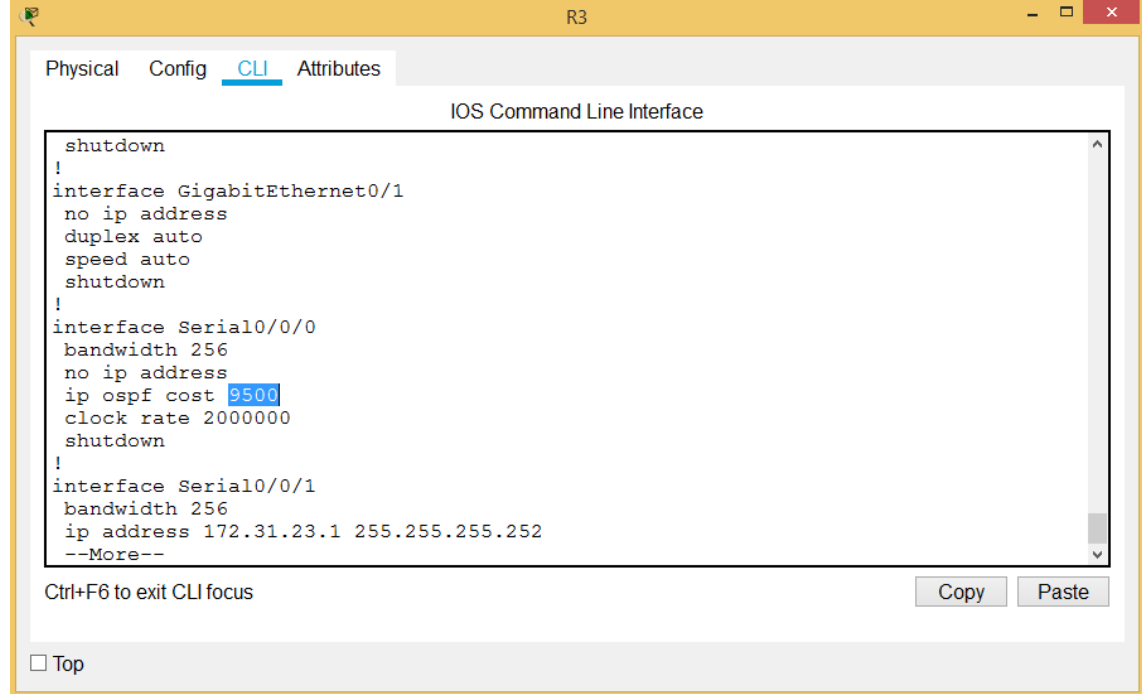


The screenshot shows the CLI interface of router R2. The configuration is as follows:

```
ip nat inside
duplex auto
speed auto
!
interface GigabitEthernet0/1
description connection to Web Server
ip address 10.10.10.1 255.255.255.0
duplex auto
speed auto
!
interface Serial10/0/0
bandwidth 256
ip address 172.31.23.2 255.255.255.252
ip ospf cost 9500
ip nat inside
clock rate 128000
!
--More--
```

Below the configuration window, there are buttons for 'Copy' and 'Paste', and a 'Top' button with a checkbox.

## EN R3.



```
shutdown
!
interface GigabitEthernet0/1
no ip address
duplex auto
speed auto
shutdown
!
interface Serial0/0/0
bandwidth 256
no ip address
ip ospf cost 9500
clock rate 2000000
shutdown
!
interface Serial0/0/1
bandwidth 256
ip address 172.31.23.1 255.255.255.252
--More--
```

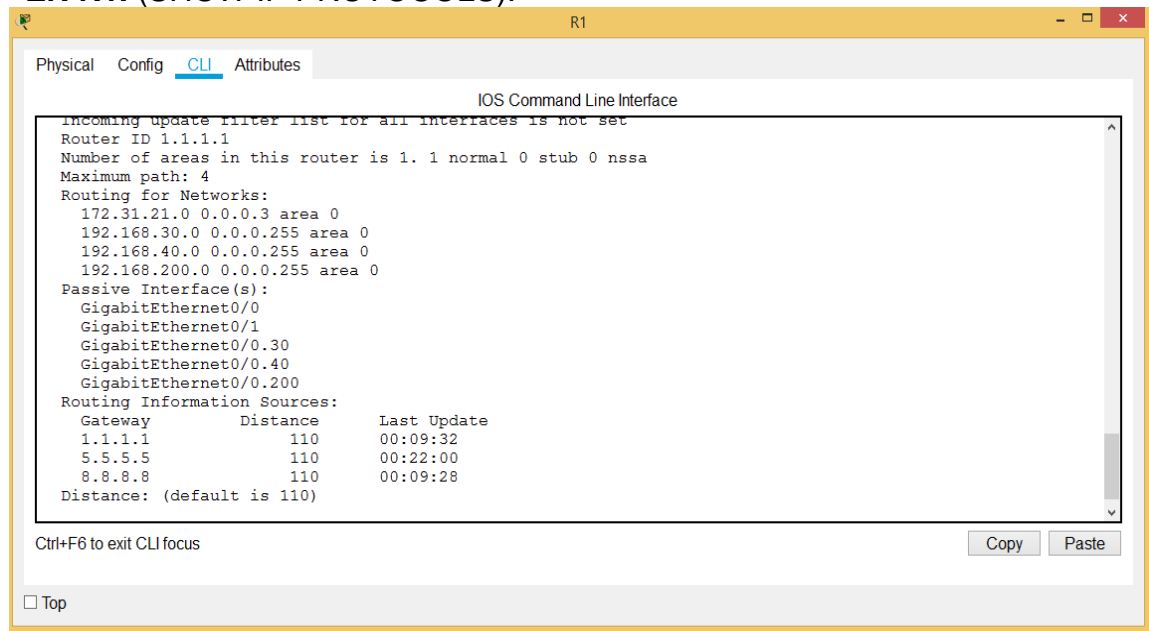
Ctrl+F6 to exit CLI focus

Copy Paste

Top

## 2.6. VISUALIZAR EL OSPF PROCESS ID, ROUTER ID, ADDRESS SUMMARIZATIONS, ROUTING NETWORKS, AND PASSIVE INTERFACES CONFIGURADAS EN CADA ROUTER.

## EN R1. (SHOW IP PROTOCOLS).



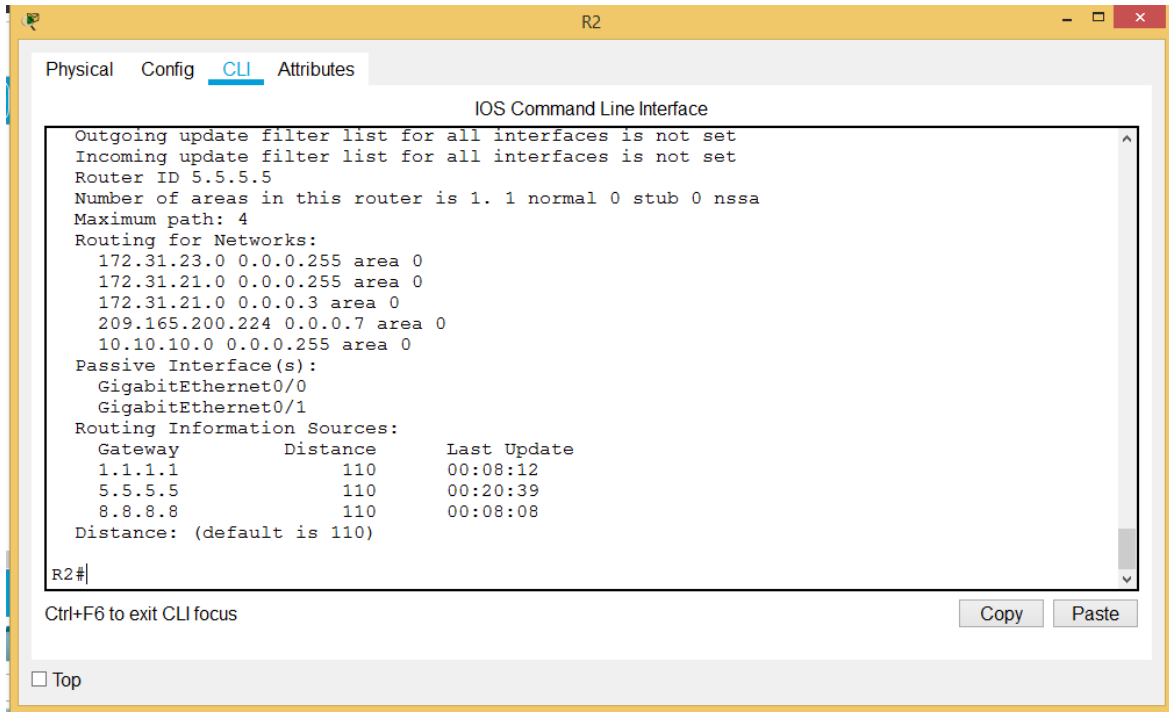
```
incoming update filter list for all interfaces is not set
Router ID 1.1.1.1
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
Maximum path: 4
Routing for Networks:
 172.31.21.0 0.0.0.3 area 0
 192.168.30.0 0.0.0.255 area 0
 192.168.40.0 0.0.0.255 area 0
 192.168.200.0 0.0.0.255 area 0
Passive interface(s):
GigabitEthernet0/0
GigabitEthernet0/1
GigabitEthernet0/0.30
GigabitEthernet0/0.40
GigabitEthernet0/0.200
Routing Information Sources:
Gateway          Distance    Last Update
1.1.1.1           110        00:09:32
5.5.5.5           110        00:22:00
8.8.8.8           110        00:09:28
Distance: (default is 110)
```

Ctrl+F6 to exit CLI focus

Copy Paste

Top

## EN R2. (SHOW IP PROTOCOLS).

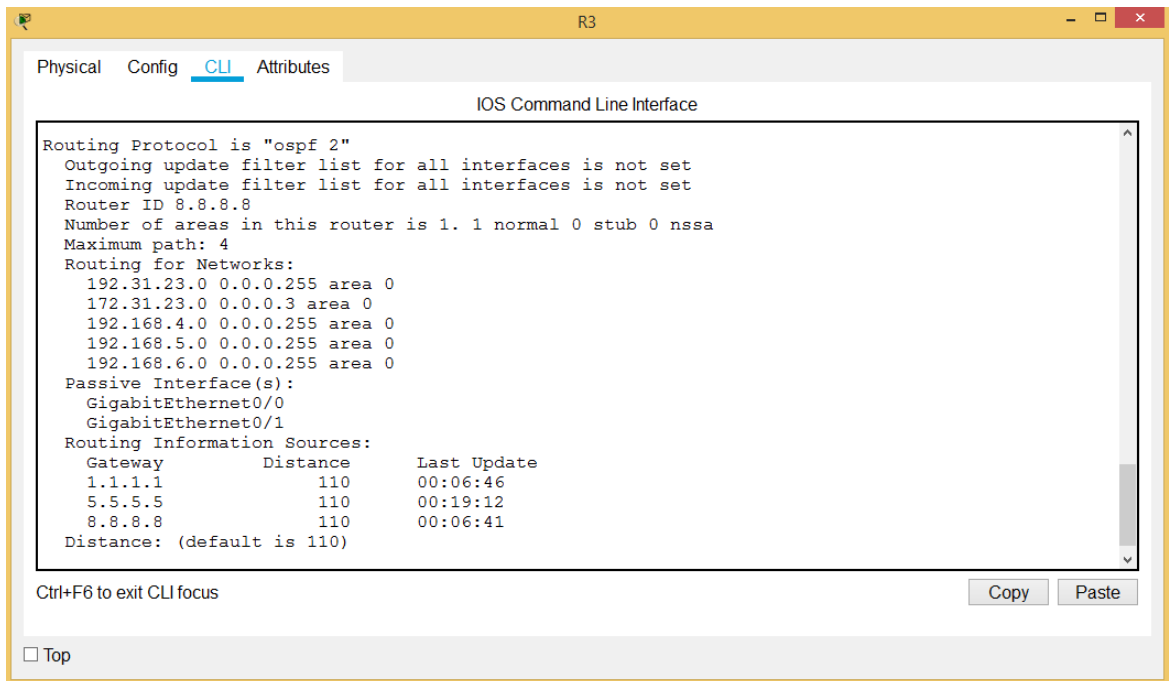


The screenshot shows the CLI of router R2. The output of the 'show ip protocols' command is as follows:

```
IOS Command Line Interface
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:
 172.31.23.0 0.0.0.255 area 0
 172.31.21.0 0.0.0.255 area 0
 172.31.21.0 0.0.0.3 area 0
 209.165.200.224 0.0.0.7 area 0
 10.10.10.0 0.0.0.255 area 0
Passive Interface(s):
 GigabitEthernet0/0
 GigabitEthernet0/1
Routing Information Sources:
 Gateway      Distance    Last Update
 1.1.1.1      110         00:08:12
 5.5.5.5      110         00:20:39
 8.8.8.8      110         00:08:08
Distance: (default is 110)
R2#
```

Below the terminal output, there are buttons for 'Copy' and 'Paste', and a 'Top' link.

## EN R3. (SHOW IP PROTOCOLS).



The screenshot shows the CLI of router R3. The output of the 'show ip protocols' command is as follows:

```
IOS Command Line Interface
Routing Protocol is "ospf 2"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Router ID 8.8.8.8
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
Maximum path: 4
Routing for Networks:
 192.31.23.0 0.0.0.255 area 0
 172.31.23.0 0.0.0.3 area 0
 192.168.4.0 0.0.0.255 area 0
 192.168.5.0 0.0.0.255 area 0
 192.168.6.0 0.0.0.255 area 0
Passive Interface(s):
 GigabitEthernet0/0
 GigabitEthernet0/1
Routing Information Sources:
 Gateway      Distance    Last Update
 1.1.1.1      110         00:06:46
 5.5.5.5      110         00:19:12
 8.8.8.8      110         00:06:41
Distance: (default is 110)
R3#
```

Below the terminal output, there are buttons for 'Copy' and 'Paste', and a 'Top' link.



## 2.7. CONFIGURACIÓN DE PUERTOS TRONCALES.

### SWITCH S3

**S3:** En el puerto fa 0/3 del S3, estableciendo un enlace troncal con el Switch S2.

```
Interface fa 0/3  
Switchport mode trunk  
Switchport trunk native vlan 1
```

### SWITCH S1

**S1:** En el puerto fa 0/3 del S1, estableciendo un enlace troncal con el Switch S3.

```
Interface fa 0/3  
Switchport mode trunk  
Switchport trunk native vlan 1
```

**S1:** En el puerto fa 0/24 del S1, estableciendo un enlace troncal con el Router R1.

```
Interface fa 0/24  
Switchport mode trunk  
Switchport trunk native vlan 1
```

## 2.8. CONFIGURACIÓN DE VLANS.

EN S1.

```
Configure terminal  
Vlan 30  
Name Administracion  
Exit  
Vlan 40  
Name Mercadeo  
Exit  
Vlan 200  
Name Mantenimiento  
Exit
```

```
Interface fa 0/1  
Switchport mode Access  
Switchport Access vlan 30  
Ip default-gateway 192.168.99.1
```

```
EN S3.  
Configure terminal  
Vlan 30  
Name Administracion  
Exit  
Vlan 40  
Name Mercadeo  
Exit  
Vlan 200  
Name Mantenimiento  
Exit
```

```
Interface fa 0/1  
Switchport mode Access  
Switchport Access vlan 40  
Ip default-gateway 192.168.99.1
```

```
EN R1.  
Configure terminal  
Interface fa 0/0.30  
Encapsulation dot1q 30  
Ip address 192.168.30.1 255.255.255.0
```

```
Interface fa 0/0.40  
Encapsulation dot1q 40  
Ip address 192.168.40.1 255.255.255.0
```

```
Interface fa 0/0.200  
Encapsulation dot1q 200  
Ip address 192.168.200.1 255.255.255.0
```

## **2.9. SEGURIDAD EN LOS SWITCHES.**

```
S1.  
Interface fa 0/1.  
Switchport mode Access  
Switchport port-security  
Switchport port-security máximo 3  
Switchport port-security violation shutdown  
Switchport port-security mac-address sticky
```

```
Interface fa 0/3.
```

```
Switchport mode Access
Switchport port-security
Switchport port-security máximo 3
Switchport port-security violation shutdown
Switchport port-security mac-address sticky
```

```
Interface fa 0/24.
Switchport mode Access
Switchport port-security
Switchport port-security máximo 3
Switchport port-security violation shutdown
Switchport port-security mac-address sticky
```

```
S3.
Interface fa 0/1.
Switchport mode Access
Switchport port-security
Switchport port-security máximo 3
Switchport port-security violation shutdown
Switchport port-security mac-address sticky
```

```
Interface fa 0/3.
Switchport mode Access
Switchport port-security
Switchport port-security máximo 3
Switchport port-security violation shutdown
Switchport port-security mac-address sticky
```

## **2.10. Deshabilitación DNS lookup en Switch3.**

```
Config t
No ip domain-lookup
```

## **2.11. Asignar direcciones IP a los switches acorde a los lineamientos.**

```
S1.
Interface vlan 1
Ip address 192.168.99.2 255.255.255.0
Ip default-gateway 192.168.99.1
```

S3.  
Interface vlan 1  
Ip address 192.168.99.3 255.255.255.0  
Ip default-gateway 192.168.99.1

## **2.12. DESACTIVAR TODAS LAS INTERFACES QUE NO SEAN UTILIZADAS EN EL ESQUEMA DE RED.**

S3.  
  
Interface ra fa 0/2  
Sh  
Interface ra fa 04/-24  
Sh

S1.  
  
Interface f0/2  
Sh  
Interface ra fa 04/-23  
Sh

## **2.13. CONFIGURAR R1 COMO SERVIDOR DHCP PARA LAS VLANS 30 Y 40.**

Ip dhcp excluded-address 192.168.30.1  
Ip dhcp excluded-address 192.168.40.1  
Ip dhcp pool Administracion  
Network 192.168.30.0 255.255.255.0  
default-router 192.168.30.1 255.255.255.0  
dns-server 10.10.10.11  
Ip dhcp pool Mercadeo  
Network 192.168.40.0 255.255.255.0  
default-router 192.168.40.1 255.255.255.0  
dns-server 10.10.10.11  
ip domain-name ccna-unad.com

## **2.14. RESERVAR LAS PRIMERAS 30 DIRECCIONES IP DE LAS VLANS 30 Y 40 PARA CONFIGURACIONES ESTATICAS.**

Ip dhcp excluded-address 192.168.30.1 192.168.30.30  
Ip dhcp excluded-address 192.168.40.1 192.168.40.30

## CONFIGURAR DHCP POOL PARA VLAN 30

```
Ip dhcp pool ADMINISTRACION
Network 192.168.30.0 255.255.255.0
dns-server 10.10.10.11
Domain-Name: ccna-unad.com
default-router 192.168.30.1
```

## CONFIGURAR DHCP POOL PARA VLAN 40

```
Ip dhcp pool MERCADEO
Network 192.168.40.0 255.255.255.0
dns-server 10.10.10.11
Domain-Name: ccna-unad.com
default-router 192.168.40.1
```

### **2.15. CONFIGURAR NAT EN R2 PARA PERMITIR QUE LOS HOSTS PUEDAN SALIR A INTERNET.**

```
Interface g0/0
Ip nat inside
```

```
Interface s0/0/0
Ip nat inside
```

```
Interface s0/0/1
Ip nat inside
```

```
Ip Access-list extended nat
Permit ip host 0.0.0.0 any
Ip nat inside source list NAT int g0/0 overload
```

### **2.16. 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 (Se permite el tráfico de las interfaces loopback 4 y 5, se niega el tráfico para la loopback 6).

```
Configure terminal
Access-list 1 permit 192.168.4.0 0.0.0.255
Access-list 1 permit 192.168.5.0 0.0.0.255
Access-list 1 deny 192.168.6.0 0.0.0.255
```

## 2.17. CONFIGURAR AL MENOS DOS LISTAS DE ACCESO DE TIPO EXTENDIDO A SU CRITERIO EN PARA RESTRINGIR O PERMITIR TRÁFICO DESDE R1 O R3 HACIA R2.

R2 (Se permiten las VLANs 30 y 40, y la interface g0/0 del R1).

Configure terminal

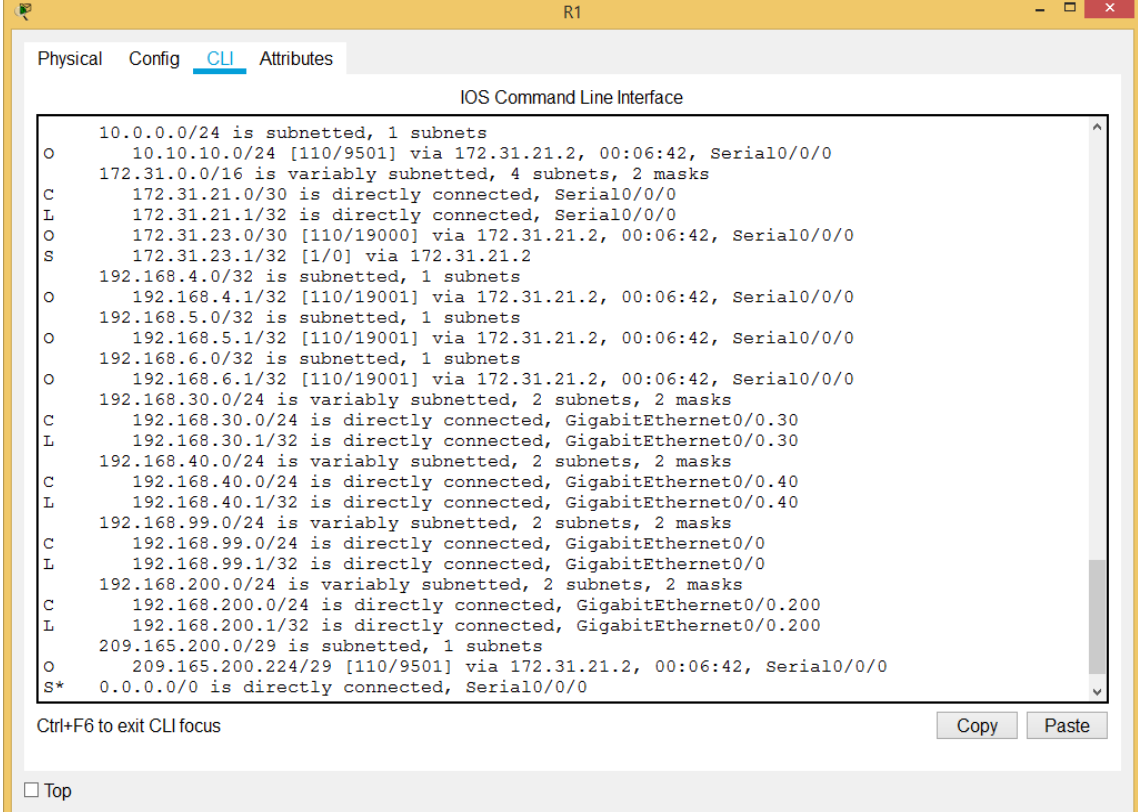
```
Access-list 1 permit 192.168.30.0 0.0.0.255
```

```
Access-list 1 permit 192.168.40.0 0.0.0.255
```

```
Access-list 1 permit 192.168.99.0 0.0.0.255
```

## 2.18. MOSTRAR RUTA IP.

R1.



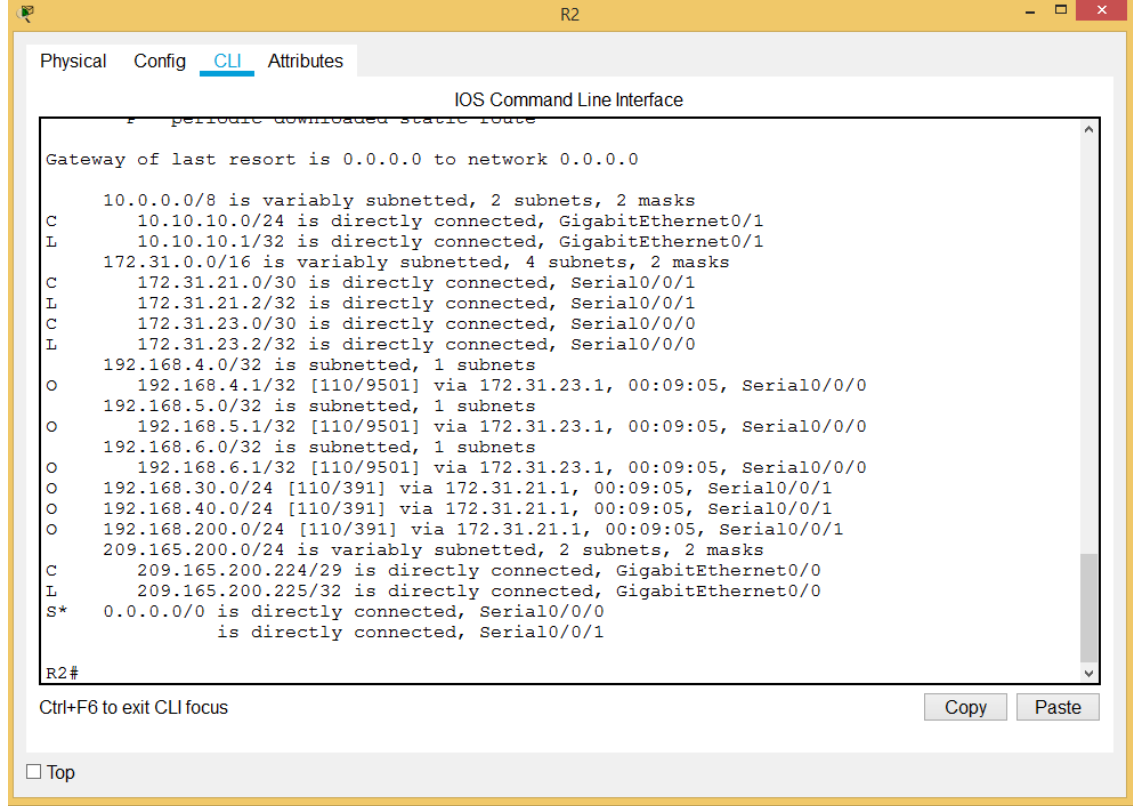
```
IOS Command Line Interface
10.0.0.0/24 is subnetted, 1 subnets
O   10.10.10.0/24 [110/9501] via 172.31.21.2, 00:06:42, Serial0/0/0
172.31.0.0/16 is variably subnetted, 4 subnets, 2 masks
C   172.31.21.0/30 is directly connected, Serial0/0/0
L   172.31.21.1/32 is directly connected, Serial0/0/0
O   172.31.23.0/30 [110/19000] via 172.31.21.2, 00:06:42, Serial0/0/0
S   172.31.23.1/32 [1/0] via 172.31.21.2
192.168.4.0/32 is subnetted, 1 subnets
O   192.168.4.1/32 [110/19001] via 172.31.21.2, 00:06:42, Serial0/0/0
192.168.5.0/32 is subnetted, 1 subnets
O   192.168.5.1/32 [110/19001] via 172.31.21.2, 00:06:42, Serial0/0/0
192.168.6.0/32 is subnetted, 1 subnets
O   192.168.6.1/32 [110/19001] via 172.31.21.2, 00:06:42, Serial0/0/0
192.168.30.0/24 is variably subnetted, 2 subnets, 2 masks
C   192.168.30.0/24 is directly connected, GigabitEthernet0/0.30
L   192.168.30.1/32 is directly connected, GigabitEthernet0/0.30
192.168.40.0/24 is variably subnetted, 2 subnets, 2 masks
C   192.168.40.0/24 is directly connected, GigabitEthernet0/0.40
L   192.168.40.1/32 is directly connected, GigabitEthernet0/0.40
192.168.99.0/24 is variably subnetted, 2 subnets, 2 masks
C   192.168.99.0/24 is directly connected, GigabitEthernet0/0
L   192.168.99.1/32 is directly connected, GigabitEthernet0/0
192.168.200.0/24 is variably subnetted, 2 subnets, 2 masks
C   192.168.200.0/24 is directly connected, GigabitEthernet0/0.200
L   192.168.200.1/32 is directly connected, GigabitEthernet0/0.200
209.165.200.0/29 is subnetted, 1 subnets
O   209.165.200.224/29 [110/9501] via 172.31.21.2, 00:06:42, Serial0/0/0
S*  0.0.0.0/0 is directly connected, Serial0/0/0
```

Ctrl+F6 to exit CLI focus

Copy Paste

Top

## R2.



The screenshot shows the CLI of router R2. The output displays the gateway of last resort as 0.0.0.0 to network 0.0.0.0. It lists various IP networks and their connections to interfaces like GigabitEthernet0/1 and Serial0/0/0. The output is as follows:

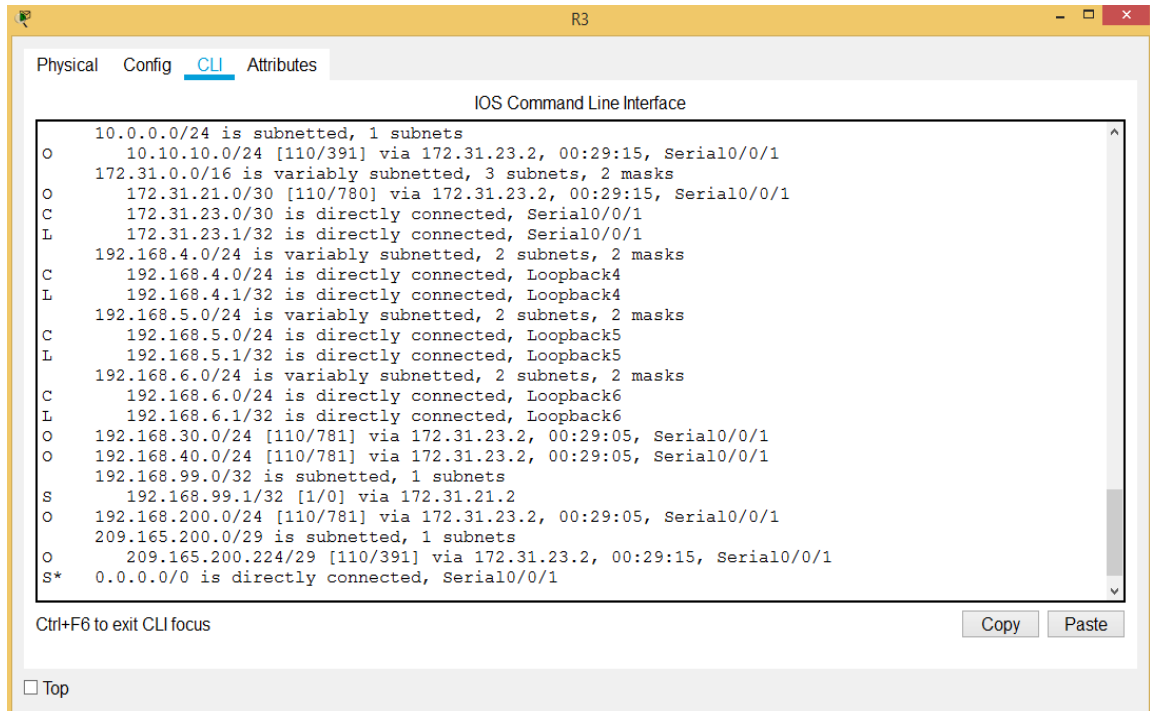
```
Gateway of last resort is 0.0.0.0 to network 0.0.0.0

 10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C   10.10.10.0/24 is directly connected, GigabitEthernet0/1
L   10.10.10.1/32 is directly connected, GigabitEthernet0/1
 172.31.0.0/16 is variably subnetted, 4 subnets, 2 masks
C   172.31.21.0/30 is directly connected, Serial0/0/1
L   172.31.21.2/32 is directly connected, Serial0/0/1
C   172.31.23.0/30 is directly connected, Serial0/0/0
L   172.31.23.2/32 is directly connected, Serial0/0/0
 192.168.4.0/32 is subnetted, 1 subnets
O   192.168.4.1/32 [110/9501] via 172.31.23.1, 00:09:05, Serial0/0/0
 192.168.5.0/32 is subnetted, 1 subnets
O   192.168.5.1/32 [110/9501] via 172.31.23.1, 00:09:05, Serial0/0/0
 192.168.6.0/32 is subnetted, 1 subnets
O   192.168.6.1/32 [110/9501] via 172.31.23.1, 00:09:05, Serial0/0/0
O   192.168.30.0/24 [110/391] via 172.31.21.1, 00:09:05, Serial0/0/1
O   192.168.40.0/24 [110/391] via 172.31.21.1, 00:09:05, Serial0/0/1
O   192.168.200.0/24 [110/391] via 172.31.21.1, 00:09:05, Serial0/0/1
 209.165.200.0/24 is variably subnetted, 2 subnets, 2 masks
C   209.165.200.224/29 is directly connected, GigabitEthernet0/0
L   209.165.200.225/32 is directly connected, GigabitEthernet0/0
S*  0.0.0.0/0 is directly connected, Serial0/0/0
    is directly connected, Serial0/0/1

R2#
```

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

## R3.



The screenshot shows the CLI of router R3. The output displays various IP networks and their connections to interfaces like Serial0/0/1 and Loopback4-6. The output is as follows:

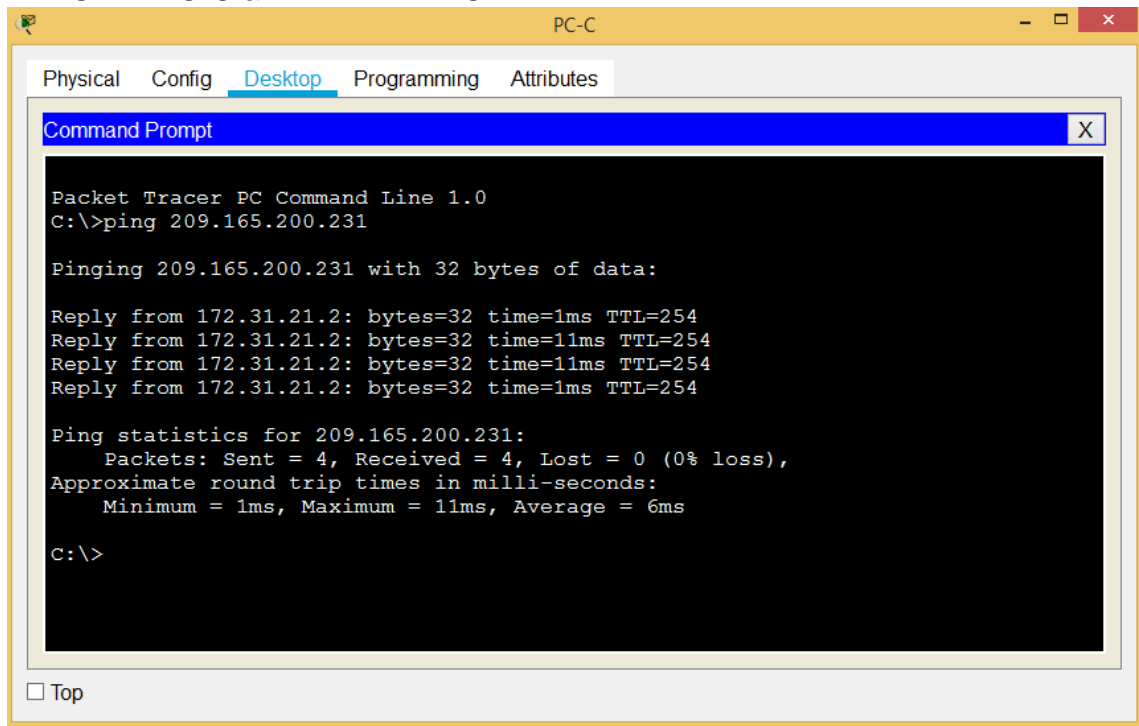
```
10.0.0.0/24 is subnetted, 1 subnets
O   10.10.10.0/24 [110/391] via 172.31.23.2, 00:29:15, Serial0/0/1
 172.31.0.0/16 is variably subnetted, 3 subnets, 2 masks
O   172.31.21.0/30 [110/780] via 172.31.23.2, 00:29:15, Serial0/0/1
C   172.31.23.0/30 is directly connected, Serial0/0/1
L   172.31.23.1/32 is directly connected, Serial0/0/1
 192.168.4.0/24 is variably subnetted, 2 subnets, 2 masks
C   192.168.4.0/24 is directly connected, Loopback4
L   192.168.4.1/32 is directly connected, Loopback4
 192.168.5.0/24 is variably subnetted, 2 subnets, 2 masks
C   192.168.5.0/24 is directly connected, Loopback5
L   192.168.5.1/32 is directly connected, Loopback5
 192.168.6.0/24 is variably subnetted, 2 subnets, 2 masks
C   192.168.6.0/24 is directly connected, Loopback6
L   192.168.6.1/32 is directly connected, Loopback6
O   192.168.30.0/24 [110/781] via 172.31.23.2, 00:29:05, Serial0/0/1
O   192.168.40.0/24 [110/781] via 172.31.23.2, 00:29:05, Serial0/0/1
 192.168.99.0/32 is subnetted, 1 subnets
S   192.168.99.1/32 [1/0] via 172.31.21.2
O   192.168.200.0/24 [110/781] via 172.31.23.2, 00:29:05, Serial0/0/1
 209.165.200.0/29 is subnetted, 1 subnets
O   209.165.200.224/29 [110/391] via 172.31.23.2, 00:29:15, Serial0/0/1
S*  0.0.0.0/0 is directly connected, Serial0/0/1

R3#
```

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

## 2.19. PRUEBAS DE CONECTIVIDAD (Extremo a Extremo).

### PING DE PC-C a INTERNET-PC



```
Packet Tracer PC Command Line 1.0
C:\>ping 209.165.200.231

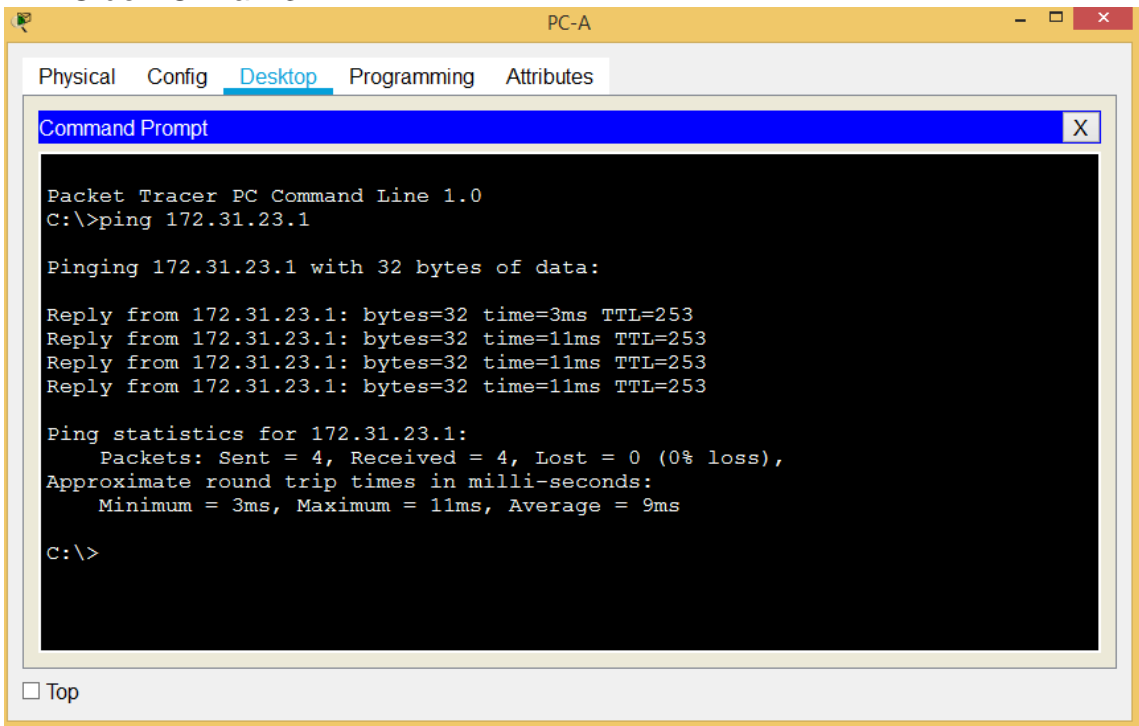
Pinging 209.165.200.231 with 32 bytes of data:

Reply from 172.31.21.2: bytes=32 time=1ms TTL=254
Reply from 172.31.21.2: bytes=32 time=11ms TTL=254
Reply from 172.31.21.2: bytes=32 time=11ms TTL=254
Reply from 172.31.21.2: bytes=32 time=1ms TTL=254

Ping statistics for 209.165.200.231:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 11ms, Average = 6ms

C:\>
```

### PING de PC-A a R3.



```
Packet Tracer PC Command Line 1.0
C:\>ping 172.31.23.1

Pinging 172.31.23.1 with 32 bytes of data:

Reply from 172.31.23.1: bytes=32 time=3ms TTL=253
Reply from 172.31.23.1: bytes=32 time=11ms TTL=253
Reply from 172.31.23.1: bytes=32 time=11ms TTL=253
Reply from 172.31.23.1: bytes=32 time=11ms TTL=253

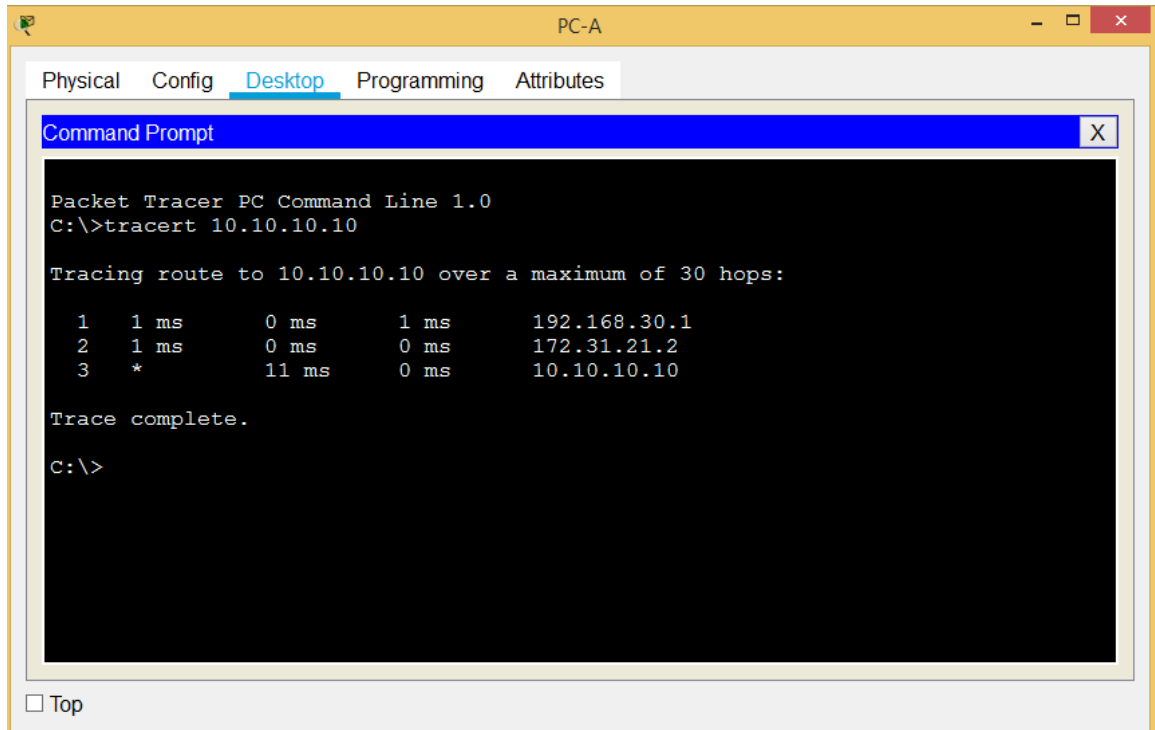
Ping statistics for 172.31.23.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 3ms, Maximum = 11ms, Average = 9ms

C:\>
```



## 2.20. TRACERT ROUTE (Extremo a Extremo).

TRACERT DE PC-A A WEB-SERVER.



The screenshot shows a Packet Tracer PC window for PC-A. The 'Desktop' tab is active, displaying a Command Prompt window. The command prompt shows the execution of the 'tracert 10.10.10.10' command. The output displays a three-hop route with the following details:

```
Packet Tracer PC Command Line 1.0
C:\>tracert 10.10.10.10

Tracing route to 10.10.10.10 over a maximum of 30 hops:

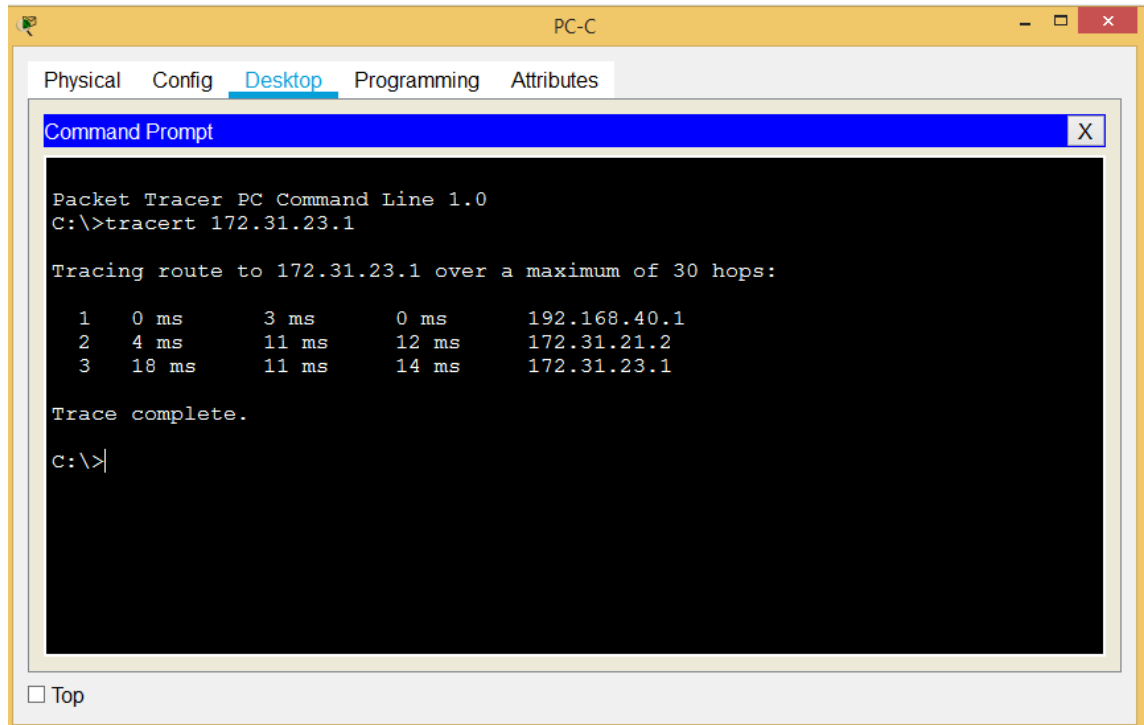
  1  1 ms      0 ms      1 ms      192.168.30.1
  2  1 ms      0 ms      0 ms      172.31.21.2
  3  *          11 ms     0 ms      10.10.10.10

Trace complete.

C:\>
```

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

TRACER DE PC-C A R3.



The screenshot shows a Packet Tracer PC window for PC-C. The 'Desktop' tab is active, displaying a Command Prompt window. The command prompt shows the execution of the 'tracert 172.31.23.1' command. The output displays a three-hop route with the following details:

```
Packet Tracer PC Command Line 1.0
C:\>tracert 172.31.23.1

Tracing route to 172.31.23.1 over a maximum of 30 hops:

  1  0 ms      3 ms      0 ms      192.168.40.1
  2  4 ms      11 ms     12 ms     172.31.21.2
  3  18 ms     11 ms     14 ms     172.31.23.1

Trace complete.

C:\>
```

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

## **CONCLUSIÓN.**

Se realizó completamente el desarrollo de los escenarios 1 y 2 paso por paso, se adjuntaron las capturas de pantalla como pruebas, para mostrar los resultados de las tablas de enrutamiento asociadas a los dispositivos, mostrar además los routers conectados por OSPFv2, verificar la conectividad de los dispositivos, y verificar la cantidad de saltos entre un origen y un destino en concreto. Asimismo, se expusieron los códigos utilizados para las configuraciones básicas, y configuraciones de red implementados en cada uno de los mismos.

De lo anterior se dio claridad en cada procedimiento de cada contexto, generando un óptimo funcionamiento en los mismos, a su vez con el desarrollo de esta práctica se ve reflejado el objetivo logrado, en cuanto a medir los conocimientos y habilidades adquiridas a lo largo del diplomado.

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