PRUEBA DE HABILIDADES PRÁCTICAS CCNA

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UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA

ESCUELA DE CIENCIAS BÁSICAS, TECNOLOGÍA E INGENIERÍA

INGENIERIA DE SISTEMAS

BOGOTA

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DIPLOMADO DE PROFUNDIZACIÓN CISCO (DISEÑO E IMPLEMENTACIÓN DE SOLUCIONES INTEGRADAS LAN / WAN)

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2019

Nota de Aceptación

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Jurado

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Jurado

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GLOSARIO

CISCO: Es una empresa global dedicada a la fabricación, venta, mantenimiento y consultoría de equipos de telecomunicaciones, proveedora de soluciones de red y fabricante de dispositivos de interconexión de redes de área local (LAN) y redes de área extensa (WAN)

OSPF: El protocolo Open Shortest Path First (OSPF), es un Internal Gateway Protocol (IGP) que se usa para distribuir la información de ruteo dentro de un solo sistema autónomo.

ROUTER: También llamado enrutador es un elemento hardware que permite la interconexión entre computadores en una red, es el encargado destinar las rutas para los paquetes de datos.

SWITCH: Dispositivo hardware que conecta varios dispositivos dentro de una red permite optimizar el rendimiento de una red por medio del ancho de banda.

TOPOLOGÍA DE RED: Descripción de la red por medio de mapa físico o lógico permite diseñar la red.

ISP: Se refiere al proveedor de servicios de Internet, es la empresa que brinda conexión a Internet a sus clientes.

RESUMEN

Por medio del desarrollo de la “Prueba de habilidades prácticas” del Diplomado de Profundización CCNA se coloca en práctica las competencias y habilidades que fueron adquiridas a lo largo del diplomado con el fin de medir la capacidad de comprensión y de solución a casos que se presentan en las estructuras de redes, por medio del desarrollo de dos escenarios propuestos por la guía se ejecuta paso a paso la configuración e interconexión de los dispositivos con el fin de realizar pruebas y generar un correcto funcionamiento de las redes planteadas.

INTRODUCCIÓN

Después de cursar el diplomado de cisco el estudiante debe estar en la capacidad de administrar, estructurar, configurar, gestionar, interconectar una red de manera adecuada, es por este motivo que en el presente trabajo se presentan dos casos en los cuales se pone aprueba el conocimiento acerca de lo aprendido en el diplomado para configurar una red de manera adecuada. En el primer escenario se configura RIP, rutas por defecto redistribuidas, encapsulamiento PPP y su autenticación, el DHCP, entre otras características. En el segundo escenario se configura la interconexión de los dispositivos, lineamientos del direccionamiento IP, protocolos de enrutamiento y demás aspectos que forman parte de la topología de red.

OBJETIVOS

OBJETIVO GENERAL

Desarrollar los escenarios propuestos por medio del conocimiento adquirido durante el diplomado.

OBJETIVOS ESPECÍFICOS

Simular situaciones de la vida real con el fin de dar solución a problemáticas que se pueden presentar en el momento de configurar una red

Implementar de manera correcta una estructura de red y garantizar su correcto funcionamiento de acuerdo a los requerimientos de cada escenario propuesto.

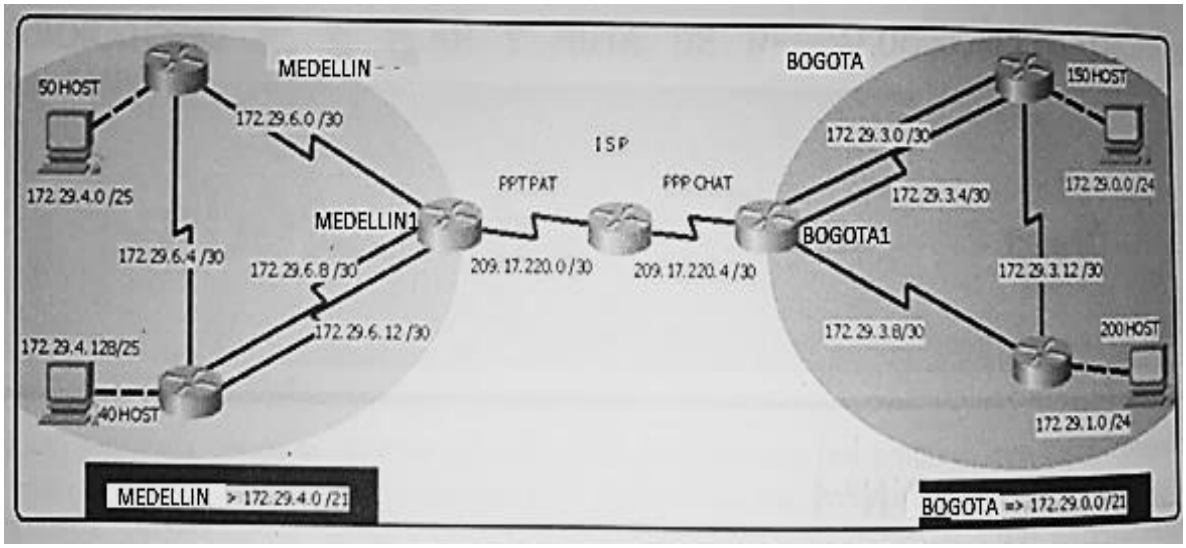
DESARROLLO DE LOS DOS ESCENARIOS

Descripción de escenarios propuestos para la prueba de habilidades

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.

Imagen 1: Topología de red



Fuente: Prueba de habilidades prácticas CCNA

Este escenario plantea el uso de RIP como protocolo de enrutamiento, considerando que se tendran 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.

- **Realizar las rutinas de diagnóstico y dejar los equipos listos para su configuración (asignar nombres de equipos, asignar claves de seguridad, etc).**

BOGOTA1

```
BOGOTA>en
BOGOTA#config t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#no ip domain-lookup
BOGOTA(config)#service password-encryption
BOGOTA(config)#enable secret class
BOGOTA(config)#banner motd %acceso restringiodo%
BOGOTA(config)#ip domain-name cisco.com
BOGOTA(config)#line console 0
BOGOTA(config-line)#password cisco
BOGOTA(config-line)#login
BOGOTA(config-line)#line vty 0 15
BOGOTA(config-line)#password class
BOGOTA(config-line)#login
```

BOGOTA 2

```
Router>EN
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup
Router(config)#service password-encryption
Router(config)#enable secret class
Router(config)#banner motd %acceso restringiodo%
Router(config)#ip domain-name cisco.com
Router(config)#line console 0
Router(config-line)#password cisco
Router(config-line)#login
Router(config-line)#line vty 0 15
Router(config-line)#password class
Router(config-line)#login
Router(config-line)#hostname BOGOTA2
```

BOGOTA 3

```
Router>EN
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup
Router(config)#service password-encryption
Router(config)#enable secret class
Router(config)#banner motd %acceso restringiodo%
Router(config)#ip domain-name cisco.com
Router(config)#line console 0
Router(config-line)#password cisco
Router(config-line)#login
Router(config-line)#line vty 0 15
Router(config-line)#password class
Router(config-line)#login
Router(config-line)#hostname BOGOTA3
```

MEDELLIN1

```
MEDELLIN>
MEDELLIN>ENAB
MEDELLIN#config t
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN(config)#no ip domain-lookup
MEDELLIN(config)#service password-encryption
MEDELLIN(config)#enable secret class
MEDELLIN(config)#banner motd %acceso restringiodo%
MEDELLIN(config)#ip domain-name cisco.com
MEDELLIN(config)#line console 0
MEDELLIN(config-line)#password cisco
MEDELLIN(config-line)#login
MEDELLIN(config-line)#line vty 0 15
MEDELLIN(config-line)#password class
MEDELLIN(config-line)#login
MEDELLIN(config-line)#end
```

MEDELLIN 2

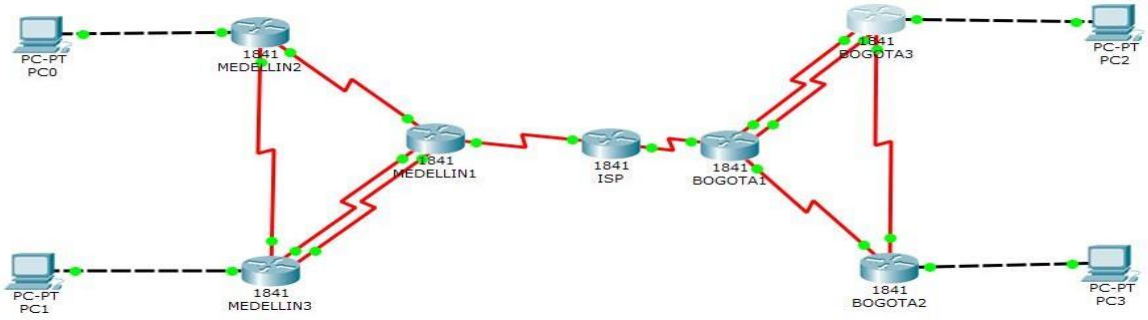
```
Router>EN
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup
Router(config)#service password-encryption
Router(config)#enable secret class
Router(config)#banner motd %acceso restringiodo%
Router(config)#ip domain-name cisco.com
Router(config)#line console 0
Router(config-line)#password cisco
Router(config-line)#login
Router(config-line)#line vty 0 15
Router(config-line)#password class
Router(config-line)#login
Router(config-line)#exit
Router(config)#hostname MEDELLIN2
```

MEDELLIN 3

```
Router>EN
Router#CONFIG
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup
Router(config)#service password-encryption
Router(config)#enable secret class
Router(config)#banner motd %acceso restringiodo%
Router(config)#ip domain-name cisco.com
Router(config)#line console 0
Router(config-line)#password cisco
Router(config-line)#login
Router(config-line)#line vty 0 15
Router(config-line)#password class
Router(config-line)#login
Router(config-line)#exit
Router(config)#hostname MEDELLIN3
```

- **Realizar la conexión física de los equipos con base en la topología de red**

Imagen 2: la topología de red escenario 1



Fuente: Estudiante.

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

Parte 1: Configuración del enrutamiento

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

MEDELLIN 1

```
Router>EN
Router#CONFIG T
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#route rip
Router(config-router)#version 2
Router(config-router)#no auto-summary
Router(config-router)#do show ip route connected
C 172.29.6.0/30 is directly connected, Serial0/0/1
C 172.29.6.8/30 is directly connected, Serial0/1/0
C 172.29.6.12/30 is directly connected, Serial0/1/1
C 209.17.220.0/30 is directly connected, Serial0/0/0
Router(config-router)#network 172.29.6.0
Router(config-router)#network 172.29.6.8
Router(config-router)#network 172.29.6.12
Router(config-router)#passive-interface s0/0/0
Router(config-router)#
```

MEDELLIN 2

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#route rip
Router(config-router)#version 2
Router(config-router)#no auto summary
Router(config-router)#do show ip route connected
C 172.29.4.0/25 is directly connected, FastEthernet0/0
C 172.29.6.0/30 is directly connected, Serial0/0/0
C 172.29.6.4/30 is directly connected, Serial0/0/1
Router(config-router)#network 172.29.4.0
Router(config-router)#network 172.29.6.0
Router(config-router)#network 172.29.6.4
Router(config-router)#passive-interface f0/0
```

MEDELLIN 3

```
Router#enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#route rip
Router(config-router)#version 2
Router(config-router)#no auto-summary
Router(config-router)#do show ip route connected
C 172.29.4.128/25 is directly connected, FastEthernet0/0
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
Router(config-router)#network 172.29.4.128
Router(config-router)#network 172.29.6.4
Router(config-router)#network 172.29.6.8
Router(config-router)#network 172.29.6.12
Router(config-router)#passive-interface f0/0
```

BOGOTA 1

```
Router>EN
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#route rip
Router(config-router)#version 2
Router(config-router)#no auto summary
Router(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
Router(config-router)#network 172.29.3.0
Router(config-router)#network 172.29.3.4
Router(config-router)#network 172.29.3.8
Router(config-router)#passive-interface s0/0/0
Router(config-router)#
```

BOGOTA 2

```
Router#en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#route rip
Router(config-router)#version 2
Router(config-router)#no auto-summary
Router(config-router)#do show ip route connected
C 172.29.1.0/24 is directly connected, FastEthernet0/0
C 172.29.3.8/30 is directly connected, Serial0/0/0
C 172.29.3.12/30 is directly connected, Serial0/0/1
Router(config-router)#network 172.29.1.0
Router(config-router)#network 172.29.3.8
Router(config-router)#network 172.29.3.12
Router(config-router)#passive-interface f0/0
```

BOGOTA 3

```
Router(config-if)#route rip
Router(config-router)#version 2
Router(config-router)#no auto-summary
Router(config-router)#do show ip route connected
C 172.29.0.0/24 is directly connected, FastEthernet0/0
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
Router(config-router)#network 172.29.0.0
Router(config-router)#network 172.29.3.4
Router(config-router)#passive-interface f0/0
```

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.

MEDELLIN1

```
Router>ENABLE
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#ip route 0.0.0.0 0.0.0.0 209.17.220.1
Router(config)#router rip
Router(config-router)#default-information originate
Router(config-router)#
```

- Se verifica en medellin 2

```
R* 0.0.0.0/0 [120/1] via 172.29.6.1, 00:00:16, Serial0/0/0
```

BOGOTA 1

```
Router>ENABLE
Router#CONFIG T
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 0.0.0.0 0.0.0.0 209.17.220.5
Router(config)#router rip
Router(config-router)#default-information originate
Router(config-router)#
```

- Se verifica en Bogota 2

R* 0.0.0.0/0 [120/1] via 172.29.3.9, 00:00:07, Serial0/0/0

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.

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 172.29.4.0 255.255.252.0 209.17.220.2
Router(config)#ip route 172.29.0.0 255.255.252.0 209.17.220.6
Router(config)#
```

- Se verifica con un ping de Bogotá a Medellin2

Imagen 3: ping de Bogotá a Medellin2

```
BOGOTA#ping 172.29.6.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.29.6.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 3/15/34 ms

BOGOTA#
```

Fuente: Estudiante

Parte 2: Tabla de Enrutamiento.

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

ISP

```
Router>en
Router#config terminal
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)#
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 shut down
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to up
```

MEDELLIN 1

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 209.17.220.2 255.255.255.252
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to up
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.6.1 255.255.255.252
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 s0/1/0
Router(config-if)#ip address 172.29.6.9 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
Router(config-if)#int s0/1/1
Router(config-if)#ip address 172.29.6.13 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed
state to up
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed
state to up
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed
state to up
```

MEDELLIN 2

```
Router>en
Router#config t
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)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to up
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)#int f0/0
Router(config-if)#ip address 172.29.4.1 255.255.255.128
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed
state to up
```

MEDELLIN 3

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 172.29.6.10 255.255.255.252
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to up
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.6.14 255.255.255.252
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed
state to up

Router(config-if)#int s0/1/0
Router(config-if)#ip address 172.29.6.6 255.255.255.252
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed
state to up
Router(config-if)#int f0/0
Router(config-if)#ip address 172.29.4.129 255.255.255.128
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up
```

BOGOTA1

```
Router>enable
Router#config t
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)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
Router(config-if)#int s0
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to up
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.3.9 255.255.255.252
Router(config-if)#clock rate
% Incomplete command.
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 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 shutdown
%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 shutdown
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed
state to up
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed
state to up
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to up
```

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

BOGOTA 2

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 172.29.3.10 255.255.255.252
Router(config-if)#no sh
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
Router(config-if)#int s0/0/
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.3.13 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no sh
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
Router(config-if)#int f0/0
Router(config-if)#ip address 172.29.1.1 255.255.255.0
Router(config-if)#no sh
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
```

BOGOTA 3

```
Router>
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 172.29.3.2 255.255.255.252
Router(config-if)#no sh
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to up
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.3.6 255.255.255.252
Router(config-if)#no sh
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed
state to up
Router(config-if)#int s0/1/0
Router(config-if)#ip address 172.29.3.14 255.255.255.252
Router(config-if)#no sh
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed
state to up
Router(config-if)#int f0/0
Router(config-if)#ip address 172.29.0.1 255.255.255.0
Router(config-if)#no sh
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up
```

b. Verificar el balanceo de carga que presentan los routers.

R* 0.0.0.0/0 is possibly down, routing via 172.29.3.1, Serial0/0/0
is possibly down, routing via 172.29.3.5, Serial0/0/1

c. Obsérvese 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.

MEDELLIN 1

```
Router>EN
Router#CONFIG T
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#route rip
Router(config-router)#version 2
Router(config-router)#no auto-summary
Router(config-router)#do show ip route connected
C 172.29.6.0/30 is directly connected, Serial0/0/1
C 172.29.6.8/30 is directly connected, Serial0/1/0
C 172.29.6.12/30 is directly connected, Serial0/1/1
C 209.17.220.0/30 is directly connected, Serial0/0/0
Router(config-router)#network 172.29.6.0
Router(config-router)#network 172.29.6.8
Router(config-router)#network 172.29.6.12
Router(config-router)#passive-interface s0/0/0
Router(config-router)#
```

BOGOTA1

```
Router>EN
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#route rip
Router(config-router)#version 2
Router(config-router)#no auto summary
Router(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
Router(config-router)#network 172.29.3.0
Router(config-router)#network 172.29.3.4
Router(config-router)#network 172.29.3.8
Router(config-router)#passive-interface s0/0/0
Router(config-router)#
Router#
```

DIRECCIONAMIENTO

MEDELLIN 1

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 209.17.220.2 255.255.255.252
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to up
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.6.1 255.255.255.252
```

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 s0/1/0
Router(config-if)#ip address 172.29.6.9 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
Router(config-if)#int s0/1/1
Router(config-if)#ip address 172.29.6.13 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed state to up

BOGOTA1

Router>enable
Router#config t
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)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
Router(config-if)#int s0
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.3.9 255.255.255.252

```
Router(config-if)#clock rate
% Incomplete command.
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 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 shutdown
%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 shutdown
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed
state to up
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed
state to up
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed
state to up
```

d. Los routers Medellín2 y Bogotá2 también presentan redes conectadas directamente y recibidas mediante RIP

.

MEDELLIN 2

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#route rip
Router(config-router)#version 2
Router(config-router)#no auto summary
Router(config-router)#do show ip route connected
C 172.29.4.0/25 is directly connected, FastEthernet0/0
C 172.29.6.0/30 is directly connected, Serial0/0/0
C 172.29.6.4/30 is directly connected, Serial0/0/1
Router(config-router)#network 172.29.4.0
Router(config-router)#network 172.29.6.0
Router(config-router)#network 172.29.6.4
Router(config-router)#passive-interface f0/0
Router(config-router)#
```

BOGOTA 2

```
Router#en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#route rip
Router(config-router)#version 2
Router(config-router)#no auto-summary
Router(config-router)#do show ip route connected
C 172.29.1.0/24 is directly connected, FastEthernet0/0
C 172.29.3.8/30 is directly connected, Serial0/0/0
C 172.29.3.12/30 is directly connected, Serial0/0/1
Router(config-router)#network 172.29.1.0
Router(config-router)#network 172.29.3.8
Router(config-router)#network 172.29.3.12
Router(config-router)#passive-interface f0/0
```

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

El balanceo de cargas son rutas redundantes, cuando hay mas de un camino

R* 0.0.0.0/0 is possibly down, routing via 172.29.3.1, Serial0/0/0
is possibly down, routing via 172.29.3.5, Serial0/0/1

f. El router ISP solo debe indicar sus rutas estáticas adicionales a las directamente conectadas.

Router(config)#ip route 172.29.4.0 255.255.252.0 209.17.220.2
Router(config)#ip route 172.29.0.0 255.255.252.0 209.17.220.6

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.

Tabla 1: interfaces

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

Fuente: Prueba de hablilidades CNNA

MEDELLIN 1

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 209.17.220.2 255.255.255.252
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to up
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.6.1 255.255.255.252
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 s0/1/0
Router(config-if)#ip address 172.29.6.9 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
Router(config-if)#int s0/1/1
Router(config-if)#ip address 172.29.6.13 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed
state to up
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed
state to up
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed
state to up
```

MEDELLIN 2

```
Router>en
Router#config t
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)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to up
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
%Invalid interface type and number
Router(config)#int f0/0
Router(config-if)#ip address 172.29.4.1 255.255.255.128
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed
state to up
```

MEDELLIN 3

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 172.29.6.10 255.255.255.252
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to up
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.6.14 255.255.255.252
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed
state to up
Router(config-if)#int s0/1/0
Router(config-if)#ip address 172.29.6.6 255.255.255.252
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed
state to up
Router(config-if)#int f0/0
Router(config-if)#ip address 172.29.4.129 255.255.255.128
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up
```

BOGOTA1

```
Router>enable
Router#config t
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)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
Router(config-if)#int s0
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to up
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.3.9 255.255.255.252
Router(config-if)#clock rate
% Incomplete command.
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 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 shutdown
%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 shutdown
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed
state to up
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed
state to up
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to up
```

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

BOGOTA 2

Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 172.29.3.10 255.255.255.252
Router(config-if)#no sh
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
Router(config-if)#int s0/0/
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.3.13 255.255.255.252
Router(config-if)#clock rate 4000000
Router(config-if)#no sh
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
Router(config-if)#int f0/0
Router(config-if)#ip address 172.29.1.1 255.255.255.0
Router(config-if)#no sh
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

BOGOTA 3

```
Router>
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 172.29.3.2 255.255.255.252
Router(config-if)#no sh
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to up
Router(config-if)#int s0/0/1
Router(config-if)#ip address 172.29.3.6 255.255.255.252
Router(config-if)#no sh
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed
state to up
Router(config-if)#int s0/1/0
Router(config-if)#ip address 172.29.3.14 255.255.255.252
Router(config-if)#no sh
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed
state to up
Router(config-if)#int f0/0
Router(config-if)#ip address 172.29.0.1 255.255.255.0
Router(config-if)#no sh
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up
```

Parte 4: Verificación del protocolo RIP.

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.**

MEDELLIN 1

```
Router(config-router)#passive-interface s0/0/0
Router(config)#route rip
Router(config-router)#version 2
```

MEDELLIN 2

```
Router(config-router)#passive-interface f0/0
Router(config)#route rip
Router(config-router)#version 2
```

MEDELLIN 3

```
Router(config-router)#passive-interface f0/0
Router(config)#route rip
Router(config-router)#version 2
```

BOGOTA 1

```
Router(config-router)#passive-interface s0/0/0
Router(config)#route rip
Router(config-router)#version 2
```

BOGOTA 2

```
Router(config-router)#passive-interface f0/0
Router(config)#route rip
Router(config-router)#version 2
```

BOGOTA 3

```
Router(config-router)#passive-interface f0/0
Router(config)#route rip
Router(config-router)#version 2
```

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.

MEDELLIN 1

```
Router>enable
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is 209.17.220.1 to network 0.0.0.0

172.29.0.0/16 is variably subnetted, 6 subnets, 2 masks
R 172.29.4.0/25 [120/1] via 172.29.6.2, 00:00:19, Serial0/0/1
R 172.29.4.128/25 [120/1] via 172.29.6.14, 00:00:14, Serial0/1/1
[120/1] via 172.29.6.10, 00:00:14, Serial0/1/0
C 172.29.6.0/30 is directly connected, Serial0/0/1
R 172.29.6.4/30 [120/1] via 172.29.6.14, 00:00:14, Serial0/1/1
[120/1] via 172.29.6.10, 00:00:14, Serial0/1/0
[120/1] via 172.29.6.2, 00:00:19, Serial0/0/1
C 172.29.6.8/30 is directly connected, Serial0/1/0
C 172.29.6.12/30 is directly connected, Serial0/1/1
209.17.220.0/30 is subnetted, 1 subnets
C 209.17.220.0 is directly connected, Serial0/0/0
S* 0.0.0.0/0 [1/0] via 209.17.220.1
```

MEDELLIN 2

```
Router>enable
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

172.29.0.0/16 is variably subnetted, 6 subnets, 2 masks
C 172.29.4.0/25 is directly connected, FastEthernet0/0
R 172.29.4.128/25 [120/1] via 172.29.6.6, 00:00:04, Serial0/0/1
C 172.29.6.0/30 is directly connected, Serial0/0/0
C 172.29.6.4/30 is directly connected, Serial0/0/1
R 172.29.6.8/30 [120/1] via 172.29.6.6, 00:00:04, Serial0/0/1
[120/1] via 172.29.6.1, 00:00:26, Serial0/0/0
R 172.29.6.12/30 [120/1] via 172.29.6.1, 00:00:26, Serial0/0/0
[120/1] via 172.29.6.6, 00:00:04, Serial0/0/1
```

MEDELLIN 3

```
Router>enable
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route
```

Gateway of last resort is not set

172.29.0.0/16 is variably subnetted, 6 subnets, 2 masks
R 172.29.4.0/25 [120/1] via 172.29.6.5, 00:00:07, Serial0/1/0
C 172.29.4.128/25 is directly connected, FastEthernet0/0
R 172.29.6.0/30 [120/1] via 172.29.6.5, 00:00:07, Serial0/1/0
[120/1] via 172.29.6.13, 00:00:24, Serial0/0/1
[120/1] via 172.29.6.9, 00:00:24, Serial0/0/0
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

BOGOTA 1

Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is 209.17.220.5 to network 0.0.0.0

172.29.0.0/16 is variably subnetted, 6 subnets, 2 masks
R 172.29.0.0/24 [120/1] via 172.29.3.2, 00:00:03, 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, 00:00:09, Serial0/0/1
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
R 172.29.3.12/30 [120/1] via 172.29.3.6, 00:00:04, Serial0/1/1
[120/1] via 172.29.3.10, 00:00:09, Serial0/0/1
[120/1] via 172.29.3.2, 00:00:03, Serial0/1/0
209.17.220.0/30 is subnetted, 1 subnets
C 209.17.220.4 is directly connected, Serial0/0/0
S* 0.0.0.0/0 [1/0] via 209.17.220.5

BOGOTA 2

```
Router>enable
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

172.29.0.0/16 is variably subnetted, 6 subnets, 2 masks
R 172.29.0.0/24 [120/1] via 172.29.3.14, 00:00:14, Serial0/0/1
C 172.429.1.0/24 is directly connected, FastEthernet0/0
R 172.29.3.0/30 [120/1] via 172.29.3.14, 00:00:14, Serial0/0/1
[120/1] via 172.29.3.9, 00:00:21, Serial0/0/0
R 172.29.3.4/30 [120/1] via 172.29.3.14, 00:00:14, Serial0/0/1
[120/1] via 172.29.3.9, 00:00:21, Serial0/0/0
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 3

```
Router>
Router>enable
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set
```

172.29.0.0/16 is variably subnetted, 6 subnets, 2 masks
C 172.29.0.0/24 is directly connected, FastEthernet0/0
R 172.29.1.0/24 [120/1] via 172.29.3.13, 00:00:25, Serial0/1/0
C 172.29.3.0/30 is directly connected, Serial0/0/0
C 172.29.3.4/30 is directly connected, Serial0/0/1
R 172.29.3.8/30 [120/1] via 172.29.3.5, 00:00:22, Serial0/0/1
[120/1] via 172.29.3.13, 00:00:25, Serial0/1/0
[120/1] via 172.29.3.1, 00:00:22, Serial0/0/0
C 172.29.3.12/30 is directly connected, Serial0/1/0

Parte 5: Configurar encapsulamiento y autenticación PPP.

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

Se configura en el ISP la serial 0/0/0 se cambia la encapsulación a PPP luego se autentica PAP

ISP

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname ISP
ISP(config)#username MEDELLIN password acceso
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

ISP(config-if)#ppp authentication pap
ISP(config-if)#ppp pap ?

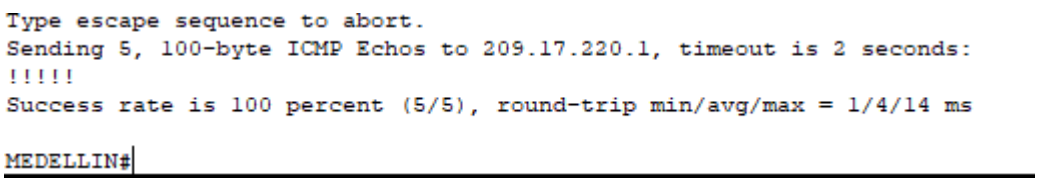
sent-username Set outbound PAP username
ISP(config-if)#ppp pap sent-username ISP password acceso
ISP(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

- De igual forma en MEDELLIN

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname MEDELLIN
MEDELLIN(config)#username ISP password acceso
MEDELLIN(config)#int s0/0/0
MEDELLIN(config-if)#encapsulation ppp
MEDELLIN(config-if)#ppp authentication pap
MEDELLIN(config-if)#ppp pap sent-username MEDELLIN password acceso
MEDELLIN(config-if)#end
MEDELLIN#
%SYS-5-CONFIG_I: Configured from console by console
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

Se verifica por medio de ping de MEDELLIN a ISP

Imagen 3: ping de MEDELLIN a ISP



Fuente:Estudiante

b. El enlace Bogotá1 con ISP se debe configurar con autenticación CHAT.

ISP

```
ISP>ENABLE
ISP#config t
Enter configuration commands, one per line. End with CNTL/Z.
ISP(config)#username BOGOTA password acceso
ISP(config)#int s0/0/1
ISP(config-if)#encapsulation ppp
ISP(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed
state to down
ISP(config-if)#ppp authentication chap
ISP(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed
state to up
```

BOGOTA 1

```
Router> EN
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname BOGOTA
BOGOTA(config)#username ISP password acceso
BOGOTA(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to down
BOGOTA(config)#int s0/0/0
BOGOTA(config-if)#encapsulation ppp
```

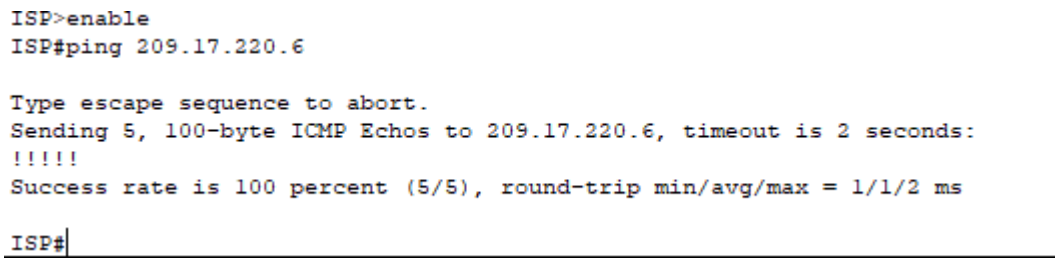
BOGOTA(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

BOGOTA(config-if)#ppp authentication chap
BOGOTA(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to down

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

- Se verifica con ping desde ISP a BOGOTA

Imagen 4: ISP a BOGOTA



Fuente: estudiante

Parte 6: Configuración de PAT.

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.**

MEDELLIN 1

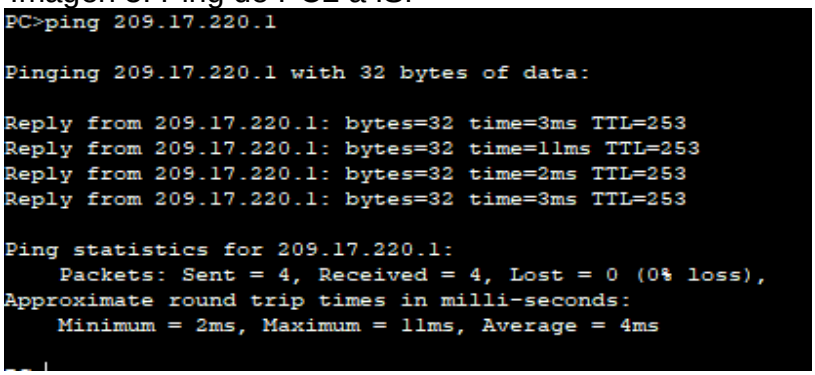
```
MEDELLIN>
MEDELLIN>EN
MEDELLIN#config t
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN(config)#ip nat inside source list 1 interface s0/0/0 overload
MEDELLIN(config)#access-list 1 permit 172.29.4.0 0.0.3.255
MEDELLIN(config)#int s0/0/0
MEDELLIN(config-if)#ip nat outside
MEDELLIN(config-if)#int s0/0/1
MEDELLIN(config-if)#ip nat inside
MEDELLIN(config-if)#int s0/1/0
MEDELLIN(config-if)#ip nat inside
MEDELLIN(config-if)#int s0/1/1
MEDELLIN(config-if)#ip nat inside
MEDELLIN(config-if)#
```

BOGOTA1

```
BOGOTA>en
BOGOTA#config t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#ip nat inside source list 1 interface s0/0/0 overload
BOGOTA(config)#access-list 1 permit 172.29.0.0 0.0.3.255
BOGOTA(config)#int s0/0/0
BOGOTA(config-if)#ip nat outside
BOGOTA(config-if)#int s0/0/1
BOGOTA(config-if)#ip nat inside
BOGOTA(config-if)#int s0/1/0
BOGOTA(config-if)#ip nat inside
BOGOTA(config-if)#int s0/1/1
BOGOTA(config-if)#ip nat inside
```

- Ping de PC2 a ISP

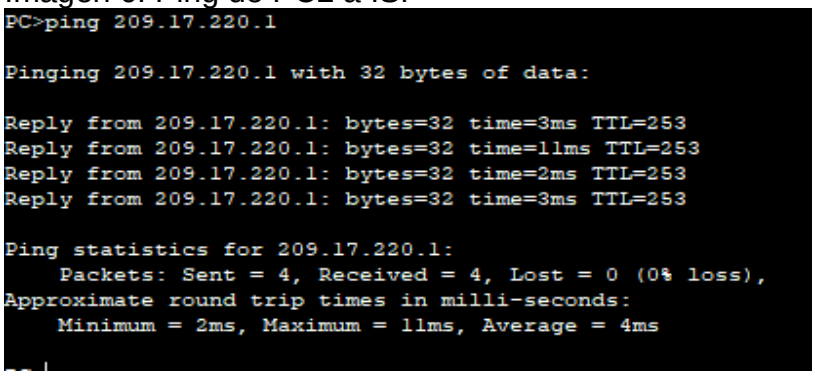
Imagen 5: Ping de PC2 a ISP



Fuente: Estudiante

b. Después 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 0/1/0 del router Medellín1, cómo diferente puerto.

Imagen 6: Ping de PC2 a ISP



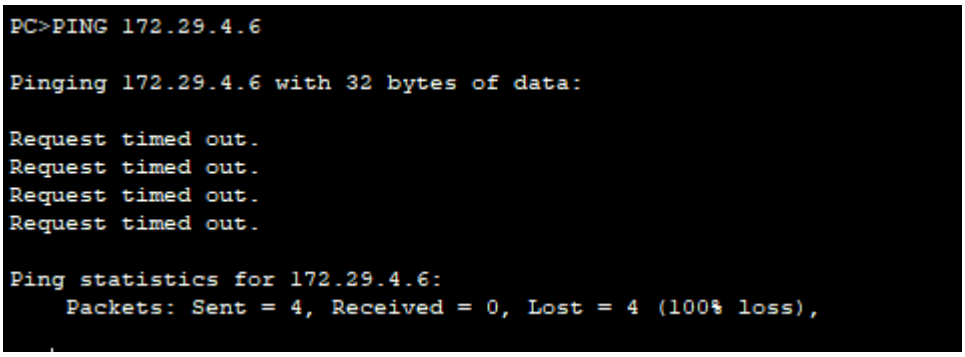
Fuente: Estudiante

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 0/1/0 del router Bogotá1, cómo diferente puerto.**

Ping de PC2 a PC0

Este ping falla debido a que se bloquea la traducción

Imagen 7: Ping de PC2 a PC0



Fuente: Estudiante

Parte 7: Configuración del servicio DHCP.

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

MEDELLIN 2

```
Router>ENABLE
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip dhcp excluded-address 172.29.4.1 172.29.4.5
Router(config)#ip dhcp excluded-address 172.29.4.129 172.29.4.133
Router(config)#ip dhcp pool MEDELLIN2
Router(dhcp-config)#network 172.29.4.0 255.255.255.128
Router(dhcp-config)#default-router 172.29.4.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#exit
Router(config)#ip dhcp pool MEDELLIN3
Router(dhcp-config)#network 172.29.4.128 255.255.255.128
Router(dhcp-config)#default-router 172.19.4.129
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#exit
```

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

- Se configura medellin 3 para que el PC1 pueda conectarse con DHCP

```
Router>EN
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int f0/0
Router(config-if)#ip helper-address 172.29.6.5
Router(config-if)#
Router#
```

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

BOGOTA 2

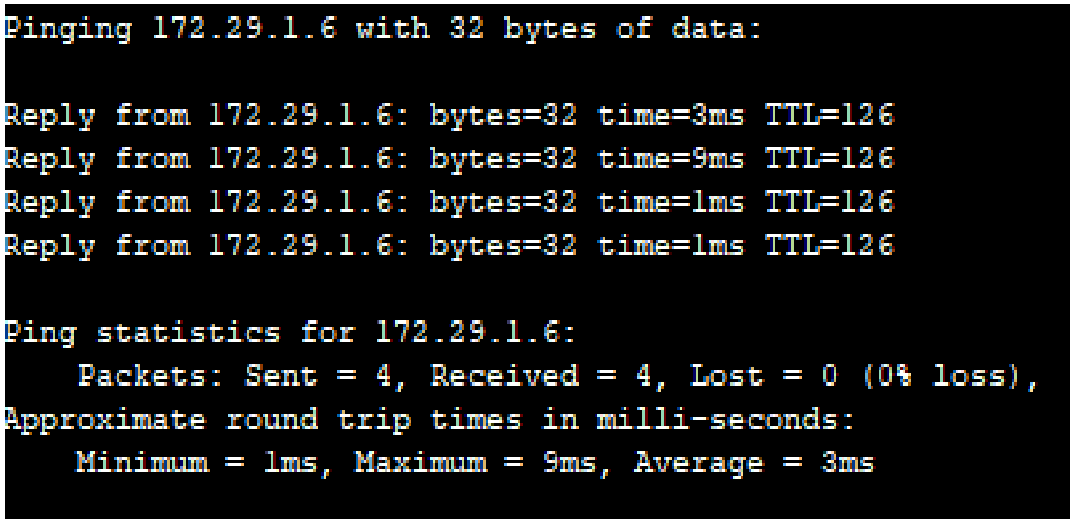
```
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip dhcp excluded-address 172.29.1.1 172.29.1.5
Router(config)#ip dhcp excluded-address 172.29.0.1 172.29.0.5
Router(config)#ip dhcp pool BOGOTA2
Router(dhcp-config)#network 172.29.1.0 255.255.255.0
Router(dhcp-config)#default-router 172.29.1.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#ip dhcp pool BOGOTA3
Router(dhcp-config)#network 172.29.0.0 255.255.255.0
Router(dhcp-config)#default-router 172.29.0.1
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#
```

BOGOTA3

```
Router>EN
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int f0/0
Router(config-if)#ip helper-address 172.29.3.13
Router(config-if)#
Router#
```

Se activa dhcp en PC2 y ene PC3 se verifica conectividad

Imagen 8: verificar conectividad



Fuente:estudiante

- De PC2 a PC0

  PC>PING 172.29.4.6
  Pinging 172.29.4.6 with 32 bytes of data:

  Reply from 172.29.4.6: bytes=32 time=19ms TTL=123
  Reply from 172.29.4.6: bytes=32 time=13ms TTL=123
  Reply from 172.29.4.6: bytes=32 time=12ms TTL=123
  Reply from 172.29.4.6: bytes=32 time=12ms TTL=123

  Ping statistics for 172.29.4.6:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
  Approximate round trip times in milli-seconds:
  Minimum = 12ms, Maximum = 19ms, Average = 14ms

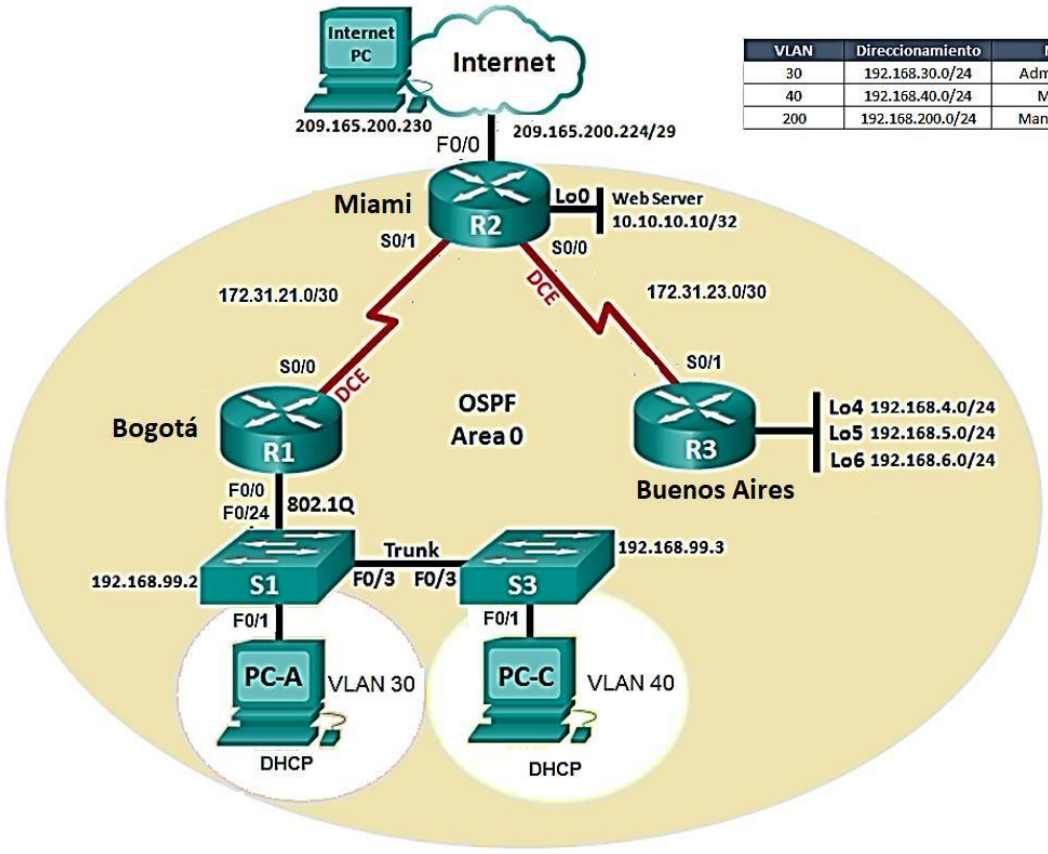
- De PC2 a PC0

```
PC> ping 172.29.4.134
Pinging 172.29.4.134 with 32 bytes of data:

Reply from 172.29.4.134: bytes=32 time=11ms TTL=123
Reply from 172.29.4.134: bytes=32 time=12ms TTL=123
Reply from 172.29.4.134: bytes=32 time=13ms TTL=123
Reply from 172.29.4.134: bytes=32 time=13ms TTL=123

Ping statistics for 172.29.4.134:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 11ms, Maximum = 13ms, Average = 12ms
```

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.

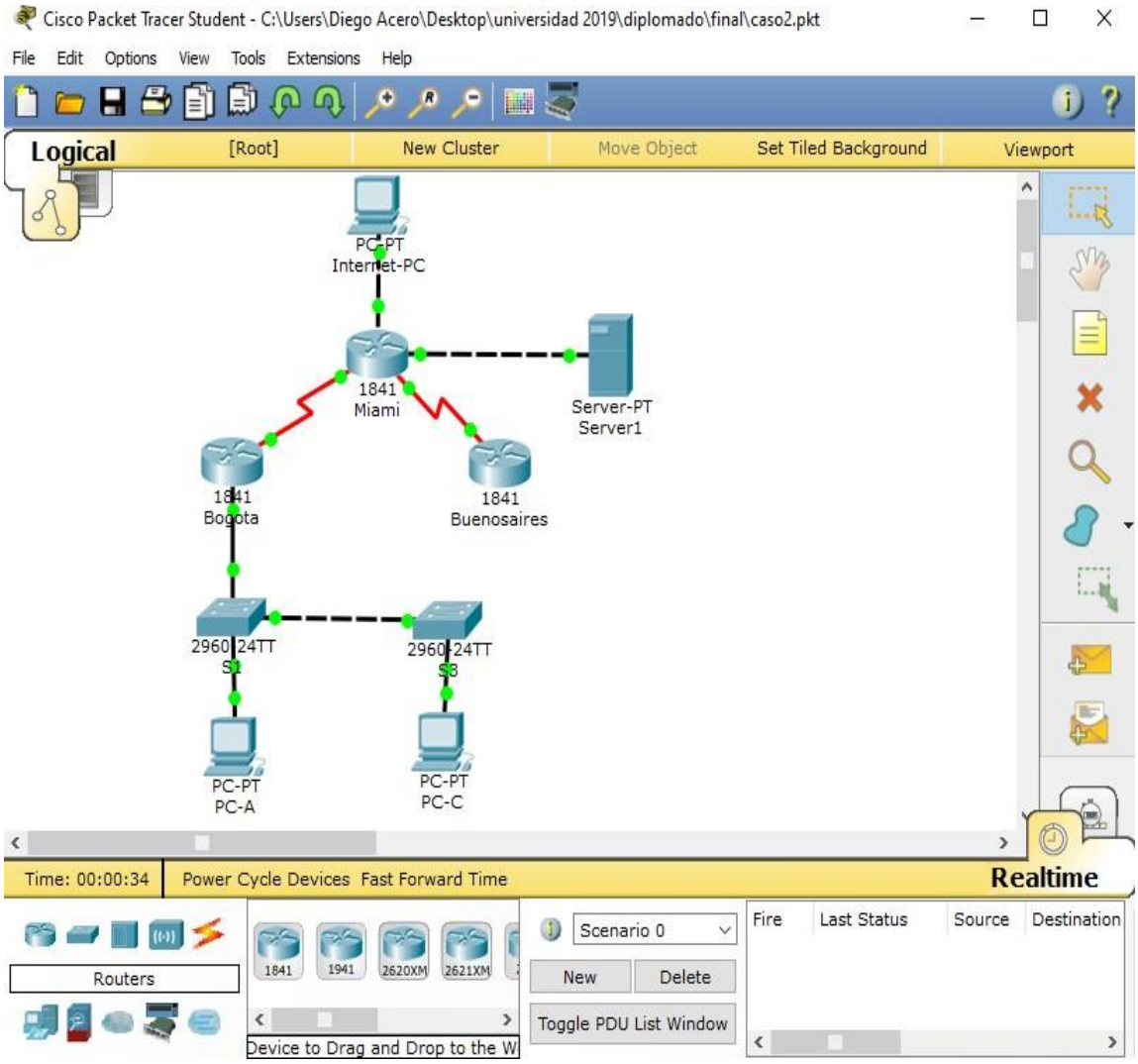
Imagen 9: escenario 2



VLAN	Direccionamiento	Nombre
30	192.168.30.0/24	Administración
40	192.168.40.0/24	Mercadeo
200	192.168.200.0/24	Mantenimiento

Fuente: prueba de habilidades practicas CNNA

Imagen 10: topología red escenario



Fuente: Estudiante

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

PC-A – IP ADDRESS 192.168.30.5
SUBNET MASK 192.168.30.1
DEFAULT GATEWAY 10.10.10.11

INTERNET PC – IP ADDRESS 209.165.200.230
SUBNET MASK 255.255.255.248
DEFAULT GATEWAY 209.165.200.255

PC-C- IP ADDRESS 192.168.40.5
SUBNET MASK 255.255.0.0
DEFAULT GATEWAY 192.168.40.1
DNS SERVER 10.10.10.11

WEB-SERVER IP ADDRESS 10.10.10.10
SUBNET MASK 255.255.255.0
DEFAULT GATEWAY10.10.10.1

R1

```
Router>enable
Router#
Router#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#Hostname R1
R1(config)#int s0/0/0
R1(config-if)#description Bogota
R1(config-if)#ip address 172.31.21.1 255.255.255.252
R1(config-if)#clock rate 128000
This command applies only to DCE interfaces
R1(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R1(config-if)#int s0/0/1
R1(config-if)#no ip address
```

```
R1(config-if)#clock rate 2000000
R1(config-if)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to up
R1>
R1>enable
R1#config t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#int fa0/0
R1(config-if)#no sh
R1(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

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

R1(config-if)#
R1#
%SYS-5-CONFIG_I: Configured from console by console
```

R2

```
Router>enable
Router#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R2(config)#int fa0/0
R2(config-if)#description Internet
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)#int fa0/1
R2(config-if)#description conexion webserver
R2(config-if)#ip address 10.10.10.1 255.255.255.0
R2(config-if)#duplex auto
R2(config-if)#speed auto
R2(config-if)#int s0/0/0
R2(config-if)#ip address 172.31.23.1 255.255.255.252
R2(config-if)#clock rate 128000
This command applies only to DCE interfaces
R2(config-if)#int s0/0/1
R2(config-if)#description MIAMI
R2(config-if)#ip address 172.31.21.2 255.255.255.252
R2(config-if)#exit
R2(config)#interface fa0/0
R2(config-if)#no shutdown

R2(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

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

R2(config-if)#exit
R2(config)#interface fa0/1
R2(config-if)#no shutdown

R2(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
```

```
R2(config-if)#exit
R2(config)#interface Serial0/0/0
R2(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R2(config-if)#
R2(config-if)#exit
R2(config)#interface Serial0/0/1
R2(config-if)#no sh

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

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

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

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

R2(config-if)#exit
R2(config)#int fa0/1
R2(config-if)#no sh
R2(config-if)#no shutdown
R2(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1,
changed state to up

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

R3

```
Router>enable
Router#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R3
R3(config)#int s0/0/0
R3(config-if)#no ip address
R3(config-if)#clock rate 2000000
R3(config-if)#shutdown
R3(config-if)#int s0/0/1
R3(config-if)#ip address 172.31.23.2 255.255.255.252
R3(config-if)#description Buenos Aires
R3(config-if)#no shutdown

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

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

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)#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)#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)#exit
R3(config)#

S1

Switch>ENABLE
Switch#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S1
S3(config)#no ip domain-lookup
S1(config)#EXIT
S1#

S3

Switch>enable
Switch#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S3
S3(config)#ip domain-lookup
S3(config)#exit

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

Tabla 2 :OSPFv2 area 0

Configuration Item or Task	Specification
Router ID R1	1.1.1.1
Router ID R2	5.5.5.5
Router ID R3	8.8.8.8
Configurar todas las interfaces LAN como pasivas	
Establecer el ancho de banda para enlaces seriales en	256 Kb/s
Ajustar el costo en la métrica de S0/0 a	9500

Fuente: Prueba de habilidades prácticas CCNA

Verificar información de OSPF

CONFIGURACIÓN OSPF V2

R1

```
R1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router ospf 1
R1(config-router)#router-id 1.1.1.1
R1(config-router)#network 172.31.21.0 0.0.0.0 area 0
R1(config-router)#network 172.31.21.0 0.0.0.3 area 0
R1(config-router)#network 192.168.30.0 0.0.0.3 area 0
R1(config-router)#network 192.168.40.0 0.0.0.3 area 0
R1(config-router)#network 192.168.200.0 0.0.0.3 area 0
R1(config-router)#int s0/0/0
R1(config-if)#bandwidth 256
R1(config-if)#ip ospf cost 9500
R1(config-if)#exit
R1(config)#router ospf 1
R1(config-router)#auto-cost refere
% Incomplete command.
```

R1(config-router)#auto-cost reference-bandwidth 9500
% OSPF: Reference bandwidth is changed.
Please ensure reference bandwidth is consistent across all routers.
R1(config-router)#
00:35:27: %OSPF-5-ADJCHG: Process 1, Nbr 5.5.5.5 on Serial0/0/0 from LOADING to FULL, Loading Done

R1(config-router)#exit
R1(config)#exit
R1#
%SYS-5-CONFIG_I: Configured from console by console

R2

R2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router ospf 1
R2(config-router)#router-id 5.5.5.5
R2(config-router)#network 172.31.21.0 0.0.0.3 area 0
R2(config-router)#
00:34:54: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial0/0/1 from LOADING to FULL, Loading Done

R2(config-router)#network 172.31.23.0 0.0.0.3 area 0
R2(config-router)#network 10.10.10.0 0.0.0.255 area 0
R2(config-router)#auto-cost reference-bandwidth 9500
% OSPF: Reference bandwidth is changed.
Please ensure reference bandwidth is consistent across all routers.
R2(config-router)#int s0/0/0
R2(config-if)#bandwidth 256
R2(config-if)#
00:36:20: %OSPF-5-ADJCHG: Process 1, Nbr 8.8.8.8 on Serial0/0/0 from LOADING to FULL, Loading Done

R2(config-if)#exit
R2(config)#exit
R2#

R3

```
R3>enable
R3#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)# router ospf 1
R3(config-router)#router-id 8.8.8.8
R3(config-router)#network 172.31.23.0 0.0.0.3 area 0
R3(config-router)#
R3(config-router)#
01:21:10: %OSPF-5-ADJCHG: Process 1, Nbr 5.5.5.5 on Serial0/0/1 from
LOADING to FULL, Loading Done

R3(config-router)#
R3(config-router)#network 192.168.4.0 0.0.3.255 area 0
R3(config-router)#passive-interface lo4
R3(config-router)#passive-interface lo5
R3(config-router)#passive-interface lo6
R3(config-router)#auto-cost reference-bandwidth 9500
% OSPF: Reference bandwidth is changed.
Please ensure reference bandwidth is consistent across all routers.
R3(config-router)#auto-cost reference-bandwidth 9500
R3(config-router)#exit
R3(config)#int s0/0/1
R3(config-if)#bandwidth 256
R3(config-if)#
R3(config-if)#exit
R3(config)#exit
R3#
%SYS-5-CONFIG_I: Configured from console by console
```

Verificar información de OSPF

- **Visualizar tablas de enrutamiento y routers conectados por OSPFv2**

R1

R1#show ip ospf neighbor
Neighbor ID Pri State Dead Time Address Interface
5.5.5.5 0 FULL/ - 00:00:36 172.31.21.2 Serial0/0/0

R2

R2#show ip ospf neighbor
Neighbor ID Pri State Dead Time Address Interface
8.8.8.8 0 FULL/ - 00:00:36 172.31.23.2 Serial0/0/0
1.1.1.1 0 FULL/ - 00:00:39 172.31.21.1 Serial0/0/1
R2#

R3

R3#show ip ospf neighbor
Neighbor ID Pri State Dead Time Address Interface
5.5.5.5 0 FULL/ - 00:00:33 172.31.23.1 Serial0/0/1

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

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: 6152
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 1.1.1.1
Suppress hello for 0 neighbor(s)
Serial0/0/0 is up, line protocol is up
Internet address is 172.31.23.1/30, Area
0
Process ID 1, Router ID 5.5.5.5, Network Type POINT-TO-POINT, Cost: 6152
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 00:00:09
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)
FastEthernet0/1 is up, line protocol is up
Internet address is 10.10.10.1/24, Area 0
Process ID 1, Router ID 5.5.5.5, Network Type BROADCAST, Cost: 95
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 5.5.5.5, Interface address 10.10.10.1
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 3/3, 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 0, Adjacent neighbor count is 0
Suppress hello for 0 neighbor(s)

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

```
R2#show 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 0.0.0.3 area 0
172.31.23.0 0.0.0.3 area 0
10.10.10.0 0.0.0.255 area 0
Routing Information Sources:
Gateway Distance Last Update
1.1.1.1 110 00:18:18
5.5.5.5 110 00:18:18
8.8.8.8 110 00:18:18
Distance: (default is 110)
```

```
R2#show ip route ospf
192.168.4.0/32 is subnetted, 1 subnets
O 192.168.4.1 [110/391] via 172.31.23.2, 00:06:56, Serial0/0/0
192.168.5.0/32 is subnetted, 1 subnets
O 192.168.5.1 [110/391] via 172.31.23.2, 00:06:56, Serial0/0/0
192.168.6.0/32 is subnetted, 1 subnets
O 192.168.6.1 [110/391] via 172.31.23.2, 00:06:56, Serial0/0/0
R2#
```

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

S1

```
S1>enable
S1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
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
```

S3

```
S3>enable
S3#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
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)#exit
S3(config)#int vlan 200
S3(config-if)#
%LINK-5-CHANGED: Interface Vlan200, changed state to up

S3(config-if)#ip add 192.168.99.3 255.255.255.0
S3(config-if)#no shut
S3(config-if)#end
```

S3#
%SYS-5-CONFIG_I: Configured from console by console

S3#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#ip default-gateway 192.168.99.1
S3(config)#int f0/3
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

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan200, changed state to up

S3(config-if)#switchport trunk native vlan 1
S3(config-if)#int f0/1
S3(config-if)#switchport mode acces
S3(config-if)#switchport acces vlan 40
S3(config-if)#

- **Configuracion encapsulamiento**

R1

R1>enable
R1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#int f0/0
R1(config-if)#int f0/0.30
R1(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.30, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.30, changed state to up

```
R1(config-subif)#description Administracion LAN
R1(config-subif)#encapsulation dot1Q 30
R1(config-subif)#ip add 192.168.30.1 255.255.255.0
R1(config-subif)#int f0/0.40
R1(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.40, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.40,
changed state to up

R1(config-subif)#description Mercadeo LAN
R1(config-subif)#encapsulation dot1Q 40
R1(config-subif)#ip add 192.168.40.1 255.255.255.0
R1(config-subif)#int f0/0.200
R1(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.200, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.200,
changed state to up

R1(config-subif)#description Mantenimiento LAN
R1(config-subif)#encapsulation dot1Q 200
R1(config-subif)#ip add 192.168.200.1 255.255.255.0
R1(config-subif)#
R1#
```

4. En el Switch 3 deshabilitar DNS lookup

```
S3#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#no ip domain-lookup
S3(config)#end
S3#
%SYS-5-CONFIG_I: Configured from console by console
```

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

S1

```
S1>enable
S1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
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)#exit
S1(config)#int vlan 200
S1(config-if)#ip add 192.168.99.2 255.255.255.0
S1(config-if)#no shut
S1(config-if)#end
S1#
%SYS-5-CONFIG_I: Configured from console by console

S1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#ip defaul
% Incomplete command.
S1(config)#ip default-gateway 192.168.99.1
S1(config)#
```

S3

```
S3>enable
S3#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
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)#exit
S3(config)#int vlan 200
S3(config-if)#
%LINK-5-CHANGED: Interface Vlan200, changed state to up

S3(config-if)#ip add 192.168.99.3 255.255.255.0
S3(config-if)#no shut
S3(config-if)#end
S3#
%SYS-5-CONFIG_I: Configured from console by console

S3#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#ip default-gateway 192.168.99.1
S3(config)#int f0/3
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

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan200, changed state to up

S3(config-if)#switchport trunk native vlan 1
S3(config-if)#int f0/1
S3(config-if)#switchport mode acces
S3(config-if)#switchport acces vlan 40
S3(config-if)#
S3(config-if)#END
S3#
%SYS-5-CONFIG_I: Configured from console by console
```

```
S3#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#no ip domain-lookup
S3(config)#end
S3#
%SYS-5-CONFIG_I: Configured from console by console

S3#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
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)#exit
S3(config)#int vlan 200
S3(config-if)#ip add 192.168.99.3 255.255.255.0
S3(config-if)#no shut
S3(config-if)#end
S3#
%SYS-5-CONFIG_I: Configured from console by console

S3#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#ip default-gateway 192.168.99.1
S3(config)#int f0/3
S3(config-if)#switchport mode trunk
S3(config-if)#switchport trunk native vlan 1
S3(config-if)#end
```

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

S1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#int f0/2
S1(config-if)#shutdown
%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to administratively down

7. Implement DHCP and NAT for IPv4,Configurar R1 como servidor DHCP para las VLANs 30 y 40, Reservar las primeras 30 direcciones IP de las VLAN 30 y 40 para configuraciones estáticas.

Tabla 3: configuración DHCP

Configurar DHCP pool para VLAN 30	Name: ADMINISTRACION DNS-Server: 10.10.10.11 Domain-Name: ccna-unad.com Establecer default gateway.
Configurar DHCP pool para VLAN 40	Name: MERCADEO DNS-Server: 10.10.10.11 Domain-Name: ccna-unad.com Establecer default gateway.

Fuente: Prueba de habilidades CNNA

R1

R1>enable
R1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
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)#ip dhcp pool Administracion
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#domain-name ccna-unad.edu.co
R1(dhcp-config)#default-router 192.168.30.1
R1(dhcp-config)#network 192.168.30.0 255.255.255.0

```
R1(dhcp-config)#exit
R1(config)#ip dhcp pool Mercadeo
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#default-router 192.168.40.1
R1(dhcp-config)#network 192.168.40.0 255.255.255.0
R1(dhcp-config)#
```

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

```
R2>ENABLE
R2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip nat inside source static 10.10.10.10 209.165.200.209
R2(config)#
```

9. 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#config
Configuring from terminal, memory, or network [terminal]?
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 192.168.4.0 0.0.3.255
R2(config)#
```

10. 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.

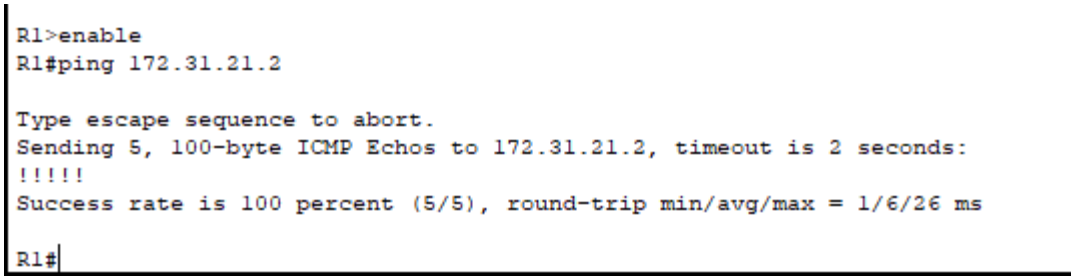
```
R2>enable
R2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#access-li
% Incomplete command.
R2(config)#access-list 101 permit tcp any host 209.165.200.229 eq www
R2(config)#int f0/0
```

```
R2(config-if)#ip access-group 101 in
R2(config-if)#int s0/0/0
R2(config-if)#ip access-group 101 out
R2(config-if)#int s0/0/1
R2(config-if)#ip access-group 101 out
R2(config-if)#int f0/1
R2(config-if)#ip access-group 101 out
R2(config-if)#exit
R2(config)#end
R2#
```

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

Ping R1 a R2

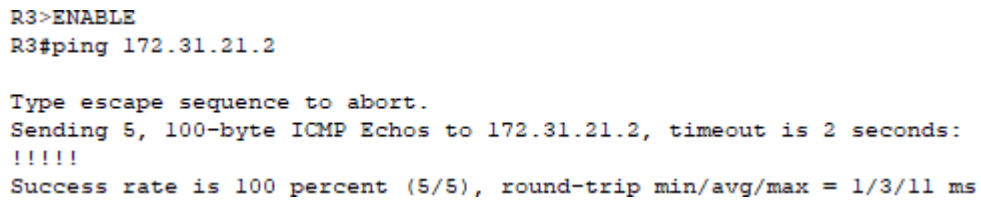
Imagen 11: Ping R1 a R2



Fuente: Estudiante

- Ping R3 a R2

Imagen 12: Ping R3 a R2



Fuente: Estudiante

- Ping R2 a R1

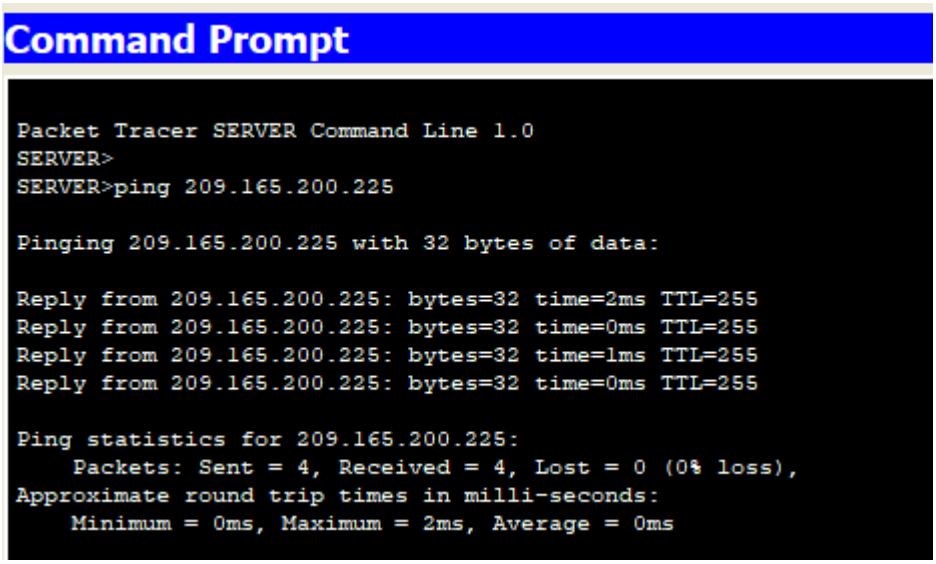
Imagen 13: Ping R2 a R1

```
R2#ping  172.31.21.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.21.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/4/16 ms
```

Fuente: Estudiante

- Ping WebServer a puerta de enlace.

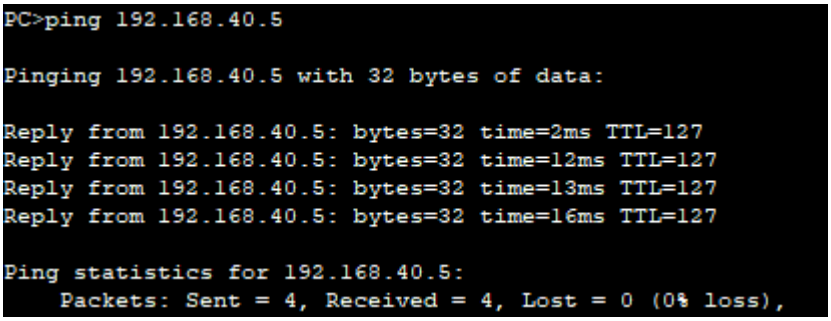
Imagen 14: Ping WebServer a puerta de enlace



Fuente: Estudiante

- Ping PCA VLAN 30 a PCC VLAN 40

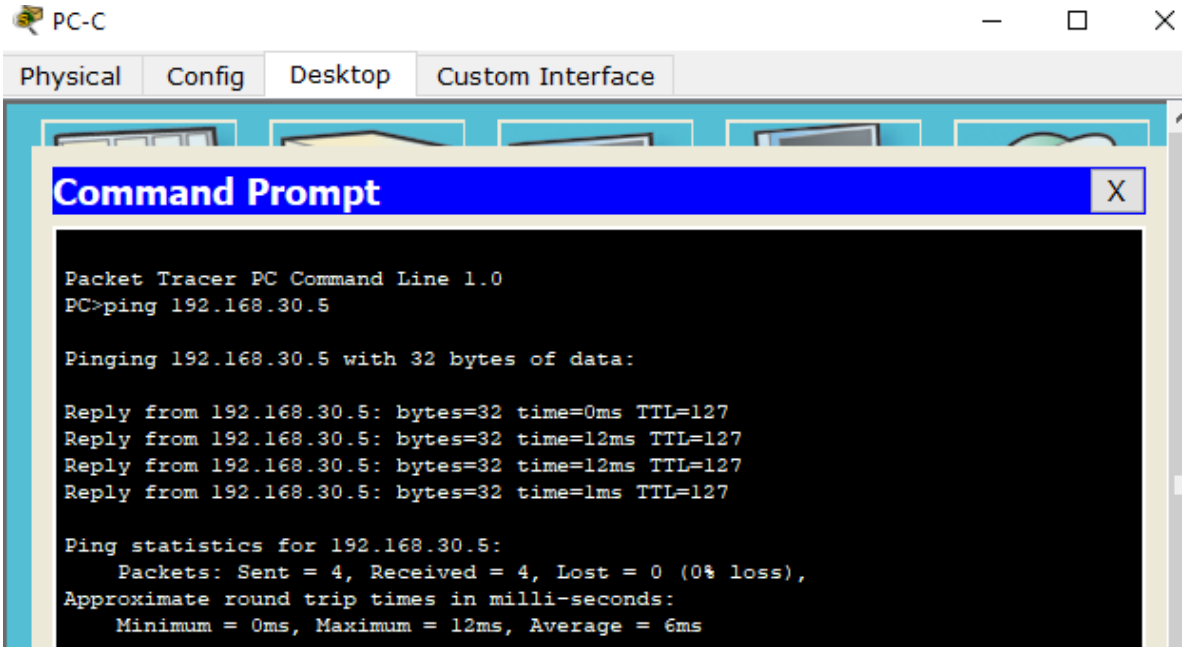
Imagen 15: Ping PCA VLAN 30 a PCC VLAN 40



Fuente: Estudiante

- Ping PCC VLAN 40 a PCA VLAN 30

Imagen 15: Ping PCC VLAN 40 a PCA VLAN 30



Fuente: Estudiante

CONCLUSIONES

- Se efectuó el desarrollar los escenarios propuestos por medio del conocimiento adquirido durante el diplomado dejando como evidencia pantalazos de los resultados.

- Se realizaron las simulaciones de situaciones de la vida real con el fin de dar solución a problemáticas que se pueden presentar en el momento de configurar una red

- Se Implemento de manera correcta una estructura de red y garantizando su correcto funcionamiento de acuerdo a los requerimientos de cada escenario propuesto.

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