

PRUEBA DE HABILIDADES CCNA

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INGENIERIA DE SISTEMAS

NEIVA

2019

Prueba de Habilidades Practicas CCNA

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Diplomado de Profundización CISCO como opción de Grado en
Ingeniería de Sistemas

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Nota de Aceptación

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Neiva, 23 de Mayo 2019

AGRADECIMIENTOS

Quiero agradecer primero a Dios por darme la vida y la sabiduría de llevar este maravilloso proceso de formación, a mi esposo por apoyarme en todo momento y alentarme a terminar mi carrera, a mi hijo por ser mi mayor motivación para poder terminar y cumplir mis sueños para poder darle una mejor calidad de vida y a mi madre porque ella ha sido mi mayor apoyo en todo el proceso de formación.

Tabla de Contenido

RESUMEN	7
ABSTRACT	8
INTRODUCCIÓN	9
OBJETIVOS	10
Objetivo General	10
Objetivos Específicos	10
EVALUACIÓN – PRUEBA DE HABILIDADES PRÁCTICAS CCNA	11
Escenario 1	11
Topología de Red	11
Configuraciones básicas	12
Verificación de la Configuración	22
Configuraciones usando rutas estaticas.	25
Verificación del balanceo de carga	27
Configuración del encapsulamiento y autenticación PPP	28
Configuración y autenticación CHAP del enlace Bogotá1 con ISP	30
Configuración del PAP	32
Configuración del servicio DHCP	34
VALIDACION	37
Escenario 2	41
Topología de red	41
Configuración del direccionamiento IP	41
Configuración del protocolo de enrutamiento	43
Configuración de las VLANS	43
Direccionamiento de Bogota (R1) hacia interfaces Miami(R2) y Buenos Aires (R3)	46
Configuración de Buenos Aires (R3) hacia Bogotá (R1) y Miami(R2)	47
Deshabilitación del DNS lookup en el Switch 3	48
Configuración de seguridad Switch, VLANs, Inter-VLANs Routing	48
Bogotá	48
802.1Q-R1	48
Verificación Ip Configuración Vlan 30 PC-A	55
Configuración R1 y el acceso al R2 Telnet y su aplicación en las líneas VTY55	

Configuración de lista de acceso de tipo extendido con su restricción del tráfico desde R1 o R3 hacia R2	55
CONCLUSIONES.....	56
REFERENCIAS BIBLIOGRAFICAS	57

RESUMEN

En presente trabajo tiene como objetivo demostrar las habilidades prácticas adquiridas durante el transcurso del diplomado de profundización CCNA y a través de la cual se demuestran los niveles de comprensión y solución de problemas relacionados con diversos aspectos de configuración de redes Cisco. En la configuración de switches y routers, empleando configuraciones de topologías más utilizadas.

ABSTRACT

The objective of this paper is to demonstrate the practical skills acquired during the CCNA deepening course and through which the levels of understanding and solving problems related to various aspects of Cisco network configuration are demonstrated. In the configuration of switches and routers, using most used topology configurations.

INTRODUCCIÓN

La Universidad Nacional Abierta y a Distancia UNAD y CISCO Networking Academy mediante el diplomado Diseño e implementación de soluciones integradas LAN –WAN nos ayuda a reforzar conocimiento para crear redes LAN simples, realizar configuraciones básicas de routers y switches, implementar esquemas de direccionamiento IP, configurar routers y switches, resolver problemas de RIPv1, de RIPv2, de OSPF, de LAN virtuales y de routing entre VLAN en redes IPv4 e IPv6. Por medio de la prueba de habilidades prácticas y la herramienta de simulación Packet Tracer, desarrollada por CISCO para diseñar e implementar una red vamos a poner en práctica los temas vistos durante el desarrollo del curso de acuerdo a los protocolos y estándares vistos en cada actividad.

OBJETIVOS

Objetivo General

Identificar el grado de desarrollo de competencias y habilidades que fueron adquiridas a lo largo del diplomado. Poniendo en práctica los niveles de comprensión y solución de problemas relacionados con diversos aspectos de Networking.

Objetivos Específicos

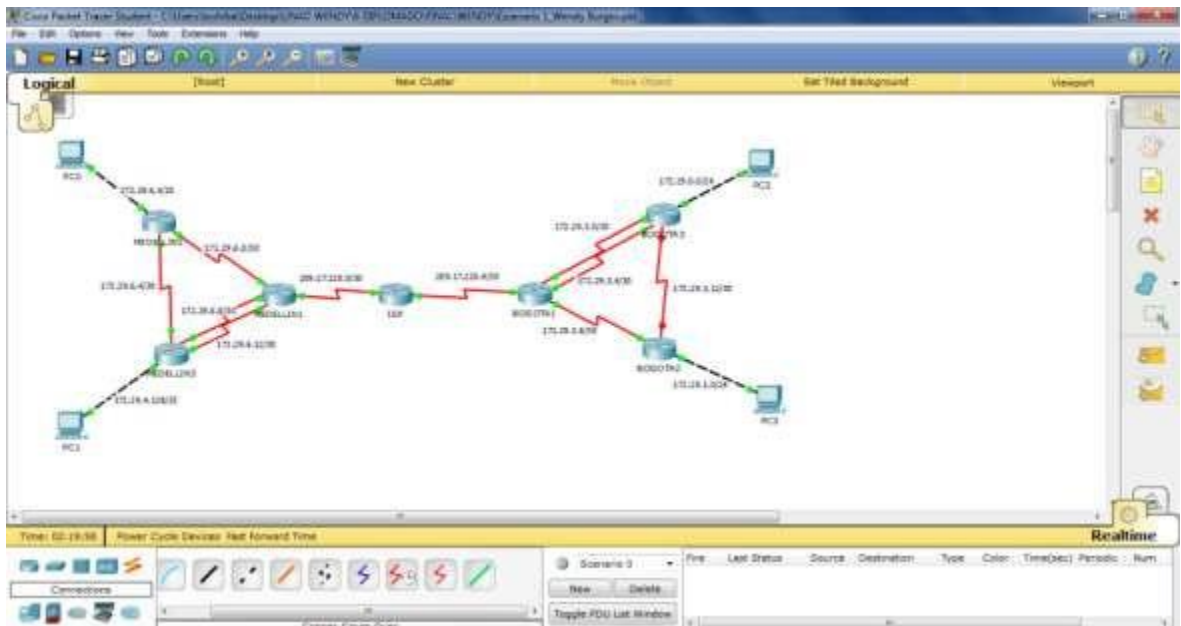
- ✓ Configurar el direccionamiento IP
- ✓ Configurar el protocolo de enrutamiento OSPFv2
- ✓ Verificar información de OSPF
- ✓ Configurar VLANs, puertos troncales, puertos de acceso, encapsulamiento, Inter-VLAN Routing y Seguridad en los Switches
- ✓ Deshabilitar DNS lookup
- ✓ Asignar direcciones IP a los Switches
- ✓ Implementar DHCP y NAT para IPv4
- ✓ Reservar direcciones IP
- ✓ Configurar NAT en un router
- ✓ Configurar listas de acceso de tipo estándar
- ✓ Verificar procesos de comunicación y re direccionamiento de tráfico en los routers

EVALUACIÓN – PRUEBA DE HABILIDADES PRÁCTICAS CCNA

Escenario 1

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

Topología de Red



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

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

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

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

Desarrollo

Como trabajo inicial se debe realizar lo siguiente.

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

Se establecen configuración básicas a los terminales:

Configuraciones básicas

```
BOGOTA>enable
BOGOTA#conf term
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 no autorizado%
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 cisco
BOGOTA(config-line)#login
```

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

Configuración del direccionamiento.

ISP

```
Router>enable
Router#conf ter
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 shutdown

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

MEDELLIN 1

```
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 209.17.220.2 255.255.255.252
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)#
```

MEDELLIN 2

```
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 172.29.6.2 255.255.255.252
Router(config-if)#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 172.29.6.5 255.255.255.252  
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)#  
Router(config-if)#int g0/0  
Router(config-if)#ip address 172.29.4.1 255.255.255.128  
Router(config-if)#no shutdown
```

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

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

MEDELLIN 3

```
Router>enable  
Router#conf term  
Enter configuration commands, one per line. End with CNTL/Z.  
Router(config)#int s0/0/0  
Router(config-if)#ip address 172.29.6.10 255.255.255.252  
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 172.29.6.14 255.255.255.252  
Router(config-if)#no shutdown
```

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

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

```
^
```

```
% Invalid input detected at '^' marker.
```

```
Router(config-if)#int s0/1/0  
Router(config-if)#ip address 172.29.6.6 255.255.255.252  
Router(config-if)#no shutdown
```

```
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 g0/0  
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 GigabitEthernet0/0, changed state to up
```

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

BOGOTA 1

```
Router>enable  
Router#conf term  
Enter configuration commands, one per line. End with CNTL/Z.  
Router(config)#int s0/0/0  
Router(config-if)#ip address 172.29.6.10 255.255.255.252  
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 172.29.6.14 255.255.255.252
Router(config-if)#no shutdown
```

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

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

```
% Invalid input detected at '^' marker.
```

```
Router(config-if)#int s0/1/0
Router(config-if)#ip address 172.29.6.6 255.255.255.252
Router(config-if)#no shutdown
```

```
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 g0/0
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 GigabitEthernet0/0, changed state to up
```

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

BOGOTA 2

```
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 172.29.6.10 255.255.255.252
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 172.29.6.14 255.255.255.252
Router(config-if)#no shutdown
```

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

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

```
^
% Invalid input detected at '^' marker.
Router(config-if)#int s0/1/0
Router(config-if)#ip address 172.29.6.6 255.255.255.252
Router(config-if)#no shutdown
```

```
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 g0/0
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 GigabitEthernet0/0, changed state to up
```

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

BOGOTA 3

```
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 172.29.3.2 255.255.255.252
```

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 172.29.3.6 255.255.255.252

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 g0/0

Router(config-if)#ip address 172.29.0.1 255.255.255.0

Router(config-if)#no shutdown

Router(config-if)#

%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

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

Router(config)#int s0/1/0

Router(config-if)#ip address 172.29.3.14 255.255.255.252

Router(config-if)#no shutdown

Router(config-if)#

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

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.

Configuración del RIP

Debido a que el ISP está en internet RIP debe ser configurado en la zona de MEDELLIN y en la zona de BOGOTA, ya que se utilizara otro protocolo de enrutamiento dinámico o estático, este es diferente a lo que el administrador de MEDELLIN configura RIP independientemente y lo que el administrador de BOGOTA configura RIP aquí también de forma independiente, por lo tanto se empezara a configurar en MEDELLIN

MEDELLIN 1

```
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router 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>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router 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, GigabitEthernet0/0
```

```
C 172.29.6.0/30 is directly connected, Serial0/0/0
C 172.29.6.4/30 is directly connected, Serial0/0/1
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 g0/0
Router(config-router)#
```

MEDELLIN 3

```
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router 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, GigabitEthernet0/0
C 172.29.6.4/30 is directly connected, Serial0/1/0
C 172.29.6.8/30 is directly connected, Serial0/0/0
C 172.29.6.12/30 is directly connected, Serial0/0/1
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 g0/0
Router(config-router)#
```

BOGOTA 1

```
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router 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>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router 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, GigabitEthernet0/0
C 172.29.3.8/30 is directly connected, Serial0/0/0
C 172.29.3.12/30 is directly connected, Serial0/0/1
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 g0/0
Router(config-router)#
```

BOGOTA 3

```
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router 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, GigabitEthernet0/0
C 172.29.3.0/30 is directly connected, Serial0/0/0
C 172.29.3.4/30 is directly connected, Serial0/0/1
C 172.29.3.12/30 is directly connected, Serial0/1/0
Router(config-router)#network 172.29.0.0
Router(config-router)#network 172.29.3.0
Router(config-router)#network 172.29.3.4
Router(config-router)#network 172.29.3.12
Router(config-router)#passive-interface g0/0
Router(config-router)#
```

Verificación de la Configuración.

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.

BOGOTA 1

```
Bogota-1>en
Bogota-1#conf t
Bogota-1(config)#ip route 0.0.0.0 0.0.0.0 209.17.220.5
Bogota-1(config)#router rip
Bogota-1(config-router)#default-information originate
```

MEDELLIN 1

```
Medellin-1>en
Medellin-1#conf t
Medellin-1(config)#ip route 0.0.0.0 0.0.0.0 209.17.220.1
Medellin-1(config)#route rip
Medellin-1(config-router)#default-information originate
```

En los routers Bogota1 y Medellín se añadió la configuración de enrutamiento una ruta hacia el ISP y, a su vez, se distribuyó dentro de las publicaciones de RIP.

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

ISP

```
ISP>en
ISP#conf t
ISP(config)#ip route 172.29.4.0 255.255.252.0 209.17.220.2
ISP(config)#ip route 172.29.0.0 255.255.252.0 209.17.220.6
```

MEDELLIN 1

```
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 0.0.0.0 0.0.0.0 209.17.220.1
Router(config)#router rip
```

```
Router(config-router)#default-information originate
```

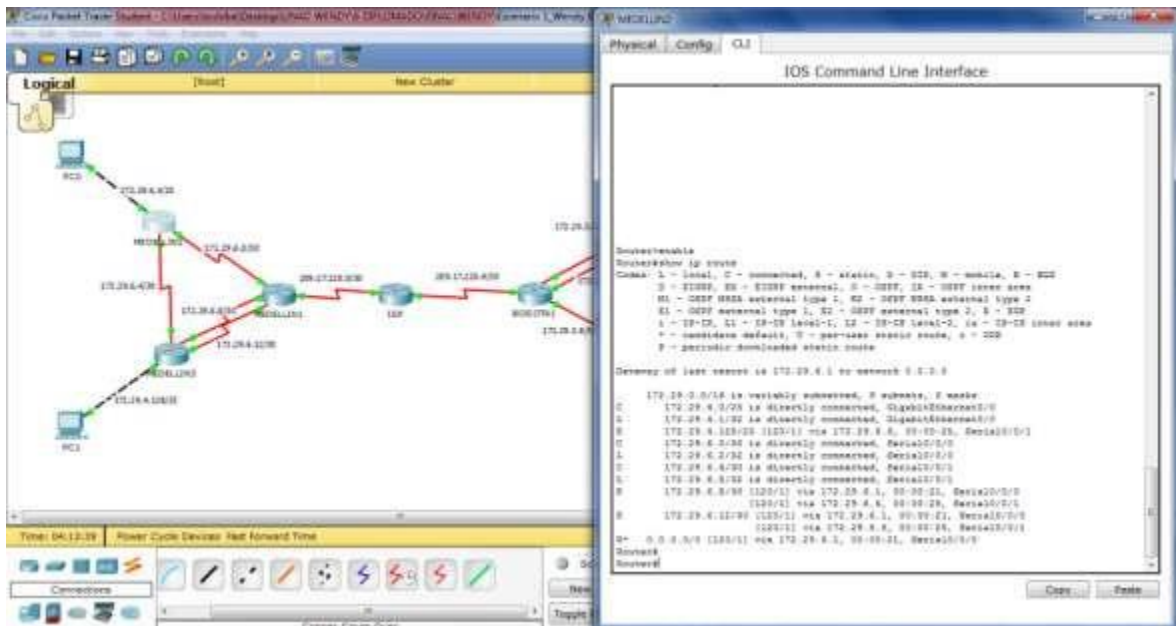
VERIFICACIÓN

MEDELLIN 2

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

```
Gateway of last resort is 172.29.6.1 to network 0.0.0.0
```

```
172.29.0.0/16 is variably subnetted, 9 subnets, 3 masks
C 172.29.4.0/25 is directly connected, GigabitEthernet0/0
L 172.29.4.1/32 is directly connected, GigabitEthernet0/0
R 172.29.4.128/25 [120/1] via 172.29.6.6, 00:00:25, Serial0/0/1
C 172.29.6.0/30 is directly connected, Serial0/0/0
L 172.29.6.2/32 is directly connected, Serial0/0/0
C 172.29.6.4/30 is directly connected, Serial0/0/1
L 172.29.6.5/32 is directly connected, Serial0/0/1
R 172.29.6.8/30 [120/1] via 172.29.6.1, 00:00:21, Serial0/0/0
[120/1] via 172.29.6.6, 00:00:25, Serial0/0/1
R 172.29.6.12/30 [120/1] via 172.29.6.1, 00:00:21, Serial0/0/0
[120/1] via 172.29.6.6, 00:00:25, Serial0/0/1
R* 0.0.0.0/0 [120/1] via 172.29.6.1, 00:00:21, Serial0/0/0
Router#
```



BOGOTA 1

```

Router>enable
Router#conf term
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
  
```

VERIFICACIÓN

BOGOTA 3

```

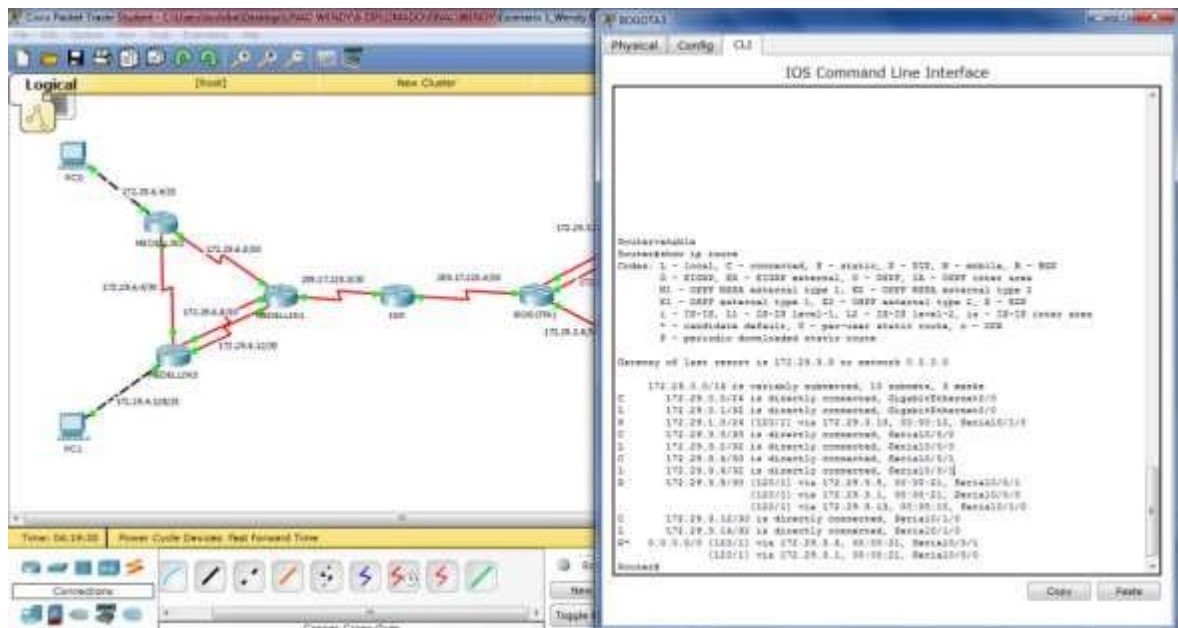
Router>enable
Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i -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

Gateway of last resort is 172.29.3.5 to network 0.0.0.0

```

172.29.0.0/16 is variably subnetted, 10 subnets, 3 masks
C 172.29.0.0/24 is directly connected, GigabitEthernet0/0
  
```


L 172.29.0.1/32 is directly connected, GigabitEthernet0/0
 R 172.29.1.0/24 [120/1] via 172.29.3.13, 00:00:10, Serial0/1/0
 C 172.29.3.0/30 is directly connected, Serial0/0/0
 L 172.29.3.2/32 is directly connected, Serial0/0/0
 C 172.29.3.4/30 is directly connected, Serial0/0/1
 L 172.29.3.6/32 is directly connected, Serial0/0/1
 R 172.29.3.8/30 [120/1] via 172.29.3.5, 00:00:21, Serial0/0/1
 [120/1] via 172.29.3.1, 00:00:21, Serial0/0/0
 [120/1] via 172.29.3.13, 00:00:10, Serial0/1/0
 C 172.29.3.12/30 is directly connected, Serial0/1/0
 L 172.29.3.14/32 is directly connected, Serial0/1/0
 R* 0.0.0.0/0 [120/1] via 172.29.3.5, 00:00:21, Serial0/0/1
 [120/1] via 172.29.3.1, 00:00:21, Serial0/0/0
 Router#



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

Configuraciones usando rutas estaticas.

ISP

Router>enable
 Router#conf term
 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

VERIFICACIÓN

BOGOTA 3

```
Router>enable  
Router#ping 172.29.3.1
```

```
Type escape sequence to abort.  
Sending 5, 100-byte ICMP Echos to 172.29.3.1, timeout is 2 seconds:  
!!!!  
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/20/96 ms
```

```
Router#ping 209.17.220.5
```

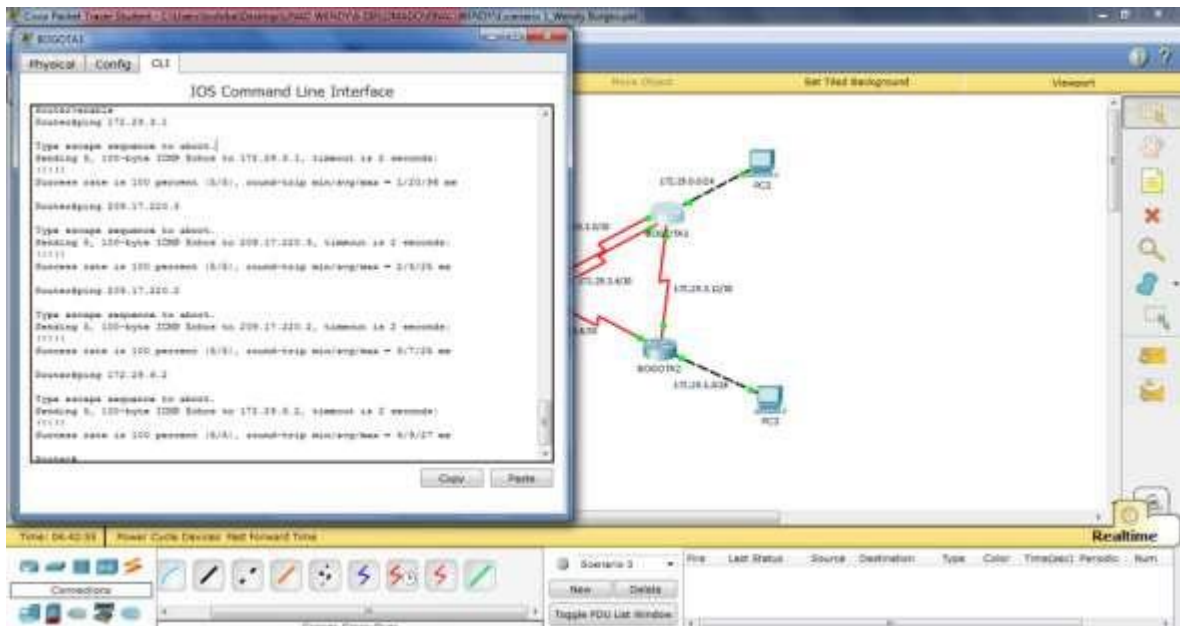
```
Type escape sequence to abort.  
Sending 5, 100-byte ICMP Echos to 209.17.220.5, timeout is 2 seconds:  
!!!!  
Success rate is 100 percent (5/5), round-trip min/avg/max = 2/6/25 ms
```

```
Router#ping 209.17.220.2
```

```
Type escape sequence to abort.  
Sending 5, 100-byte ICMP Echos to 209.17.220.2, timeout is 2 seconds:  
!!!!  
Success rate is 100 percent (5/5), round-trip min/avg/max = 3/7/25 ms
```

```
Router#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 = 4/9/27 ms
```



Verificación del balanceo de carga.

BOGOTA 3

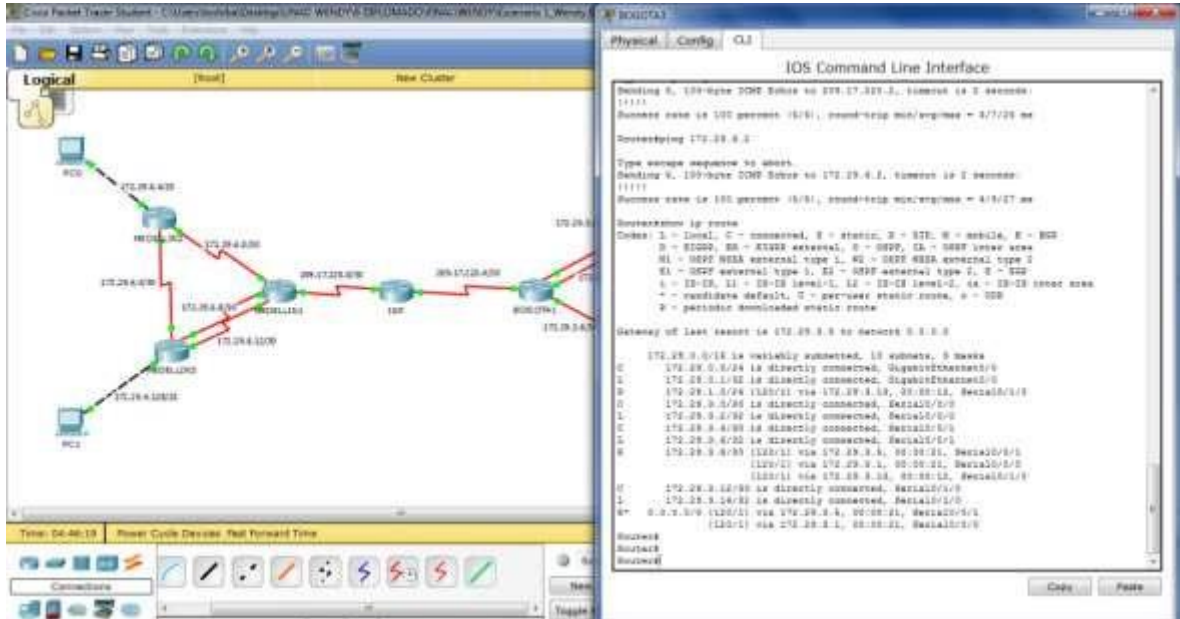
Router#show ip route

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

Gateway of last resort is 172.29.3.5 to network 0.0.0.0

172.29.0.0/16 is variably subnetted, 10 subnets, 3 masks
 C 172.29.0.0/24 is directly connected, GigabitEthernet0/0
 L 172.29.0.1/32 is directly connected, GigabitEthernet0/0
 R 172.29.1.0/24 [120/1] via 172.29.3.13, 00:00:12, Serial0/1/0
 C 172.29.3.0/30 is directly connected, Serial0/0/0
 L 172.29.3.2/32 is directly connected, Serial0/0/0
 C 172.29.3.4/30 is directly connected, Serial0/0/1
 L 172.29.3.6/32 is directly connected, Serial0/0/1
 R 172.29.3.8/30 [120/1] via 172.29.3.5, 00:00:21, Serial0/0/1
 [120/1] via 172.29.3.1, 00:00:21, Serial0/0/0
 [120/1] via 172.29.3.13, 00:00:12, Serial0/1/0
 C 172.29.3.12/30 is directly connected, Serial0/1/0

L 172.29.3.14/32 is directly connected, Serial0/1/0
 R* 0.0.0.0/0 [120/1] via 172.29.3.5, 00:00:21, Serial0/0/1
 [120/1] via 172.29.3.1, 00:00:21, Serial0/0/0
 Router#



Configuración del encapsulamiento y autenticación PPP.

Configuración del enlace MEDELLIN1 con ISP con la autenticación PAP

ISP

```

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

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 cisco
ISP(config-if)#
  
```

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

MEDELLIN 1

```
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname MEDELLIN
MEDELLIN(config)#username ISP password cisco
MEDELLIN(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to down

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 cisco
MEDELLIN(config-if)#
```

VERIFICACIÓN

```
MEDELLIN#ping 209.17.220.1
```

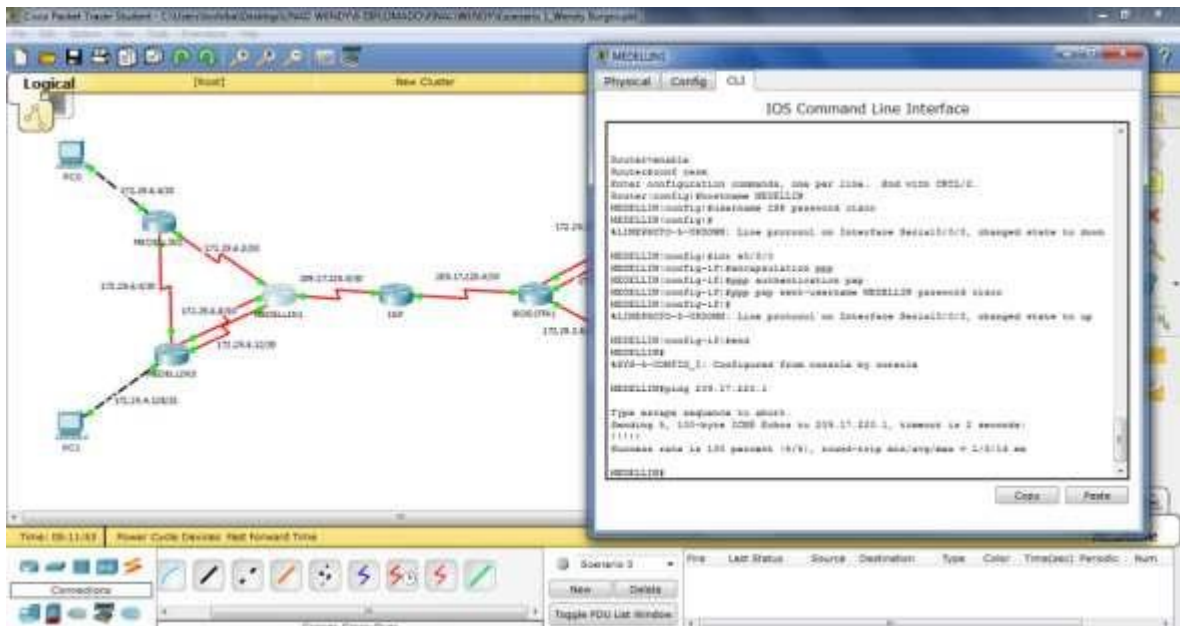
Type escape sequence to abort.

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

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/14 ms

```
MEDELLIN#
```



Configuración y autenticación CHAP del enlace Bogotá1 con ISP.

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.

BOGOTA 1

```
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname BOGOTA
BOGOTA(config)#username ISP password cisco
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

ISP

ISP>enable

ISP#conf term

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

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

^

% Invalid input detected at '^' marker.

ISP(config)#username BOGOTA password cisco

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

VERIFICACION

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.

ISP#ping 209.17.220.6

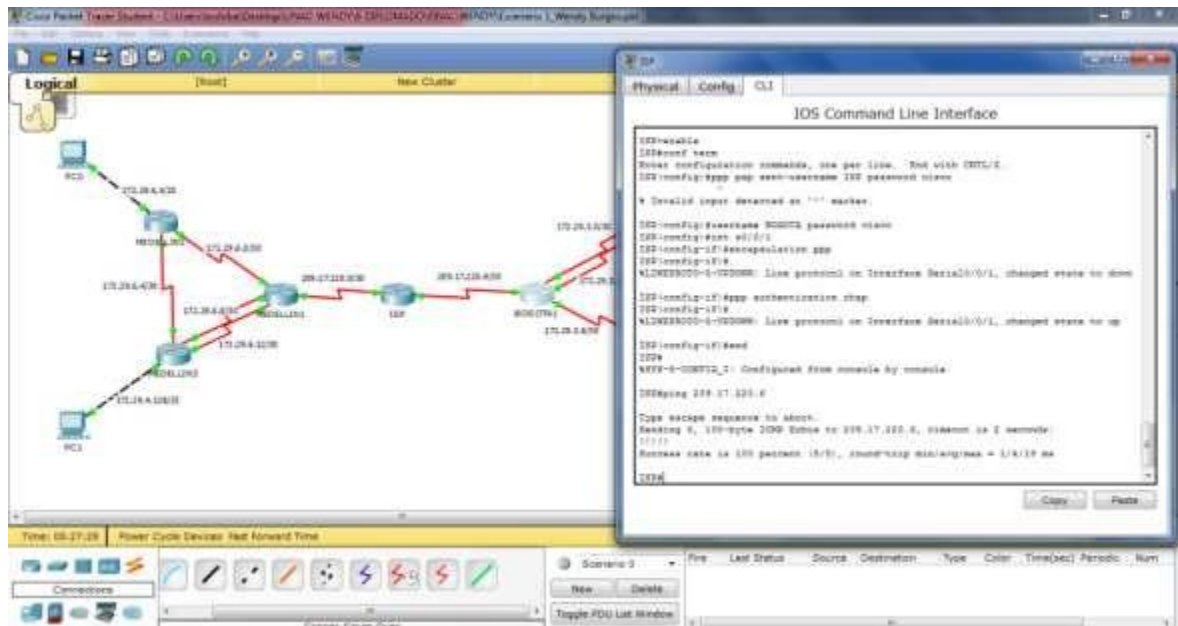
Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 209.17.220.6, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 1/4/19 ms

ISP#



Configuración del PAP

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

MEDELLIN 1

```

MEDELLIN>en
MEDELLIN#conf term
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

```

BOGOTA 1

```

BOGOTA>enable
BOGOTA#conf term
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
```

VERIFICACIÓN

PC2-ISP

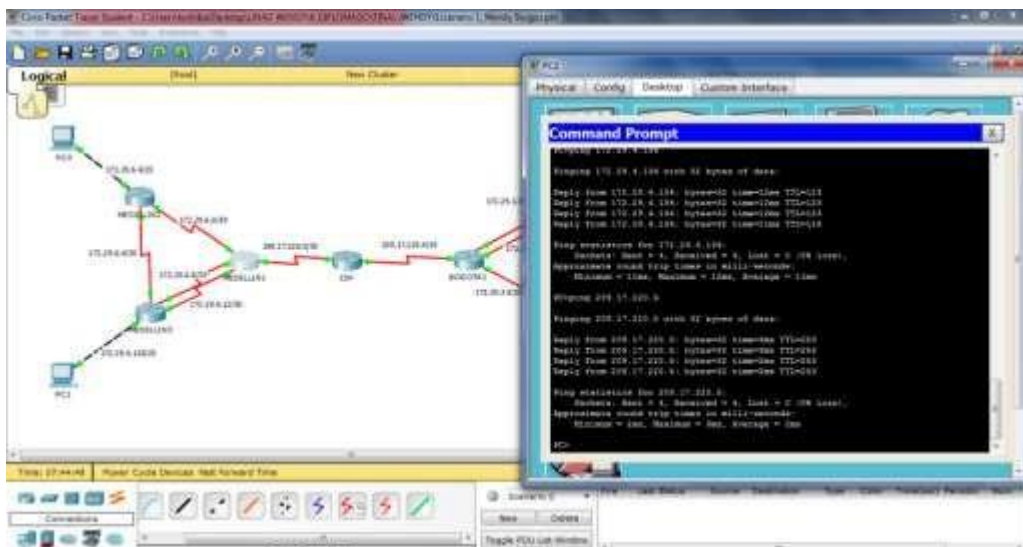
```
PC>ping 209.17.220.5
```

Pinging 209.17.220.5 with 32 bytes of data:

```
Reply from 209.17.220.5: bytes=32 time=3ms TTL=253
Reply from 209.17.220.5: bytes=32 time=3ms TTL=253
Reply from 209.17.220.5: bytes=32 time=2ms TTL=253
Reply from 209.17.220.5: bytes=32 time=2ms TTL=253
```

Ping statistics for 209.17.220.5:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 3ms, Average = 2ms



Ping PC0-ISP

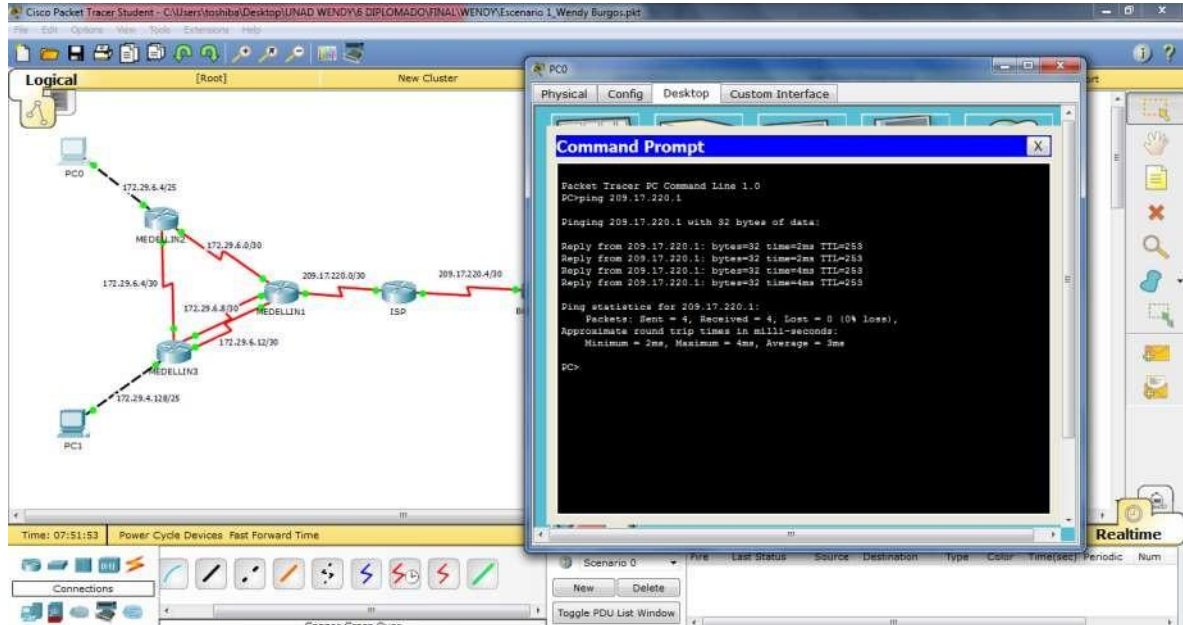
PC>ping 209.17.220.1

Pinging 209.17.220.1 with 32 bytes of data:

```
Reply from 209.17.220.1: bytes=32 time=2ms TTL=253
Reply from 209.17.220.1: bytes=32 time=2ms TTL=253
Reply from 209.17.220.1: bytes=32 time=4ms TTL=253
Reply from 209.17.220.1: bytes=32 time=4ms TTL=253
```

Ping statistics for 209.17.220.1:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 4ms, Average = 3ms

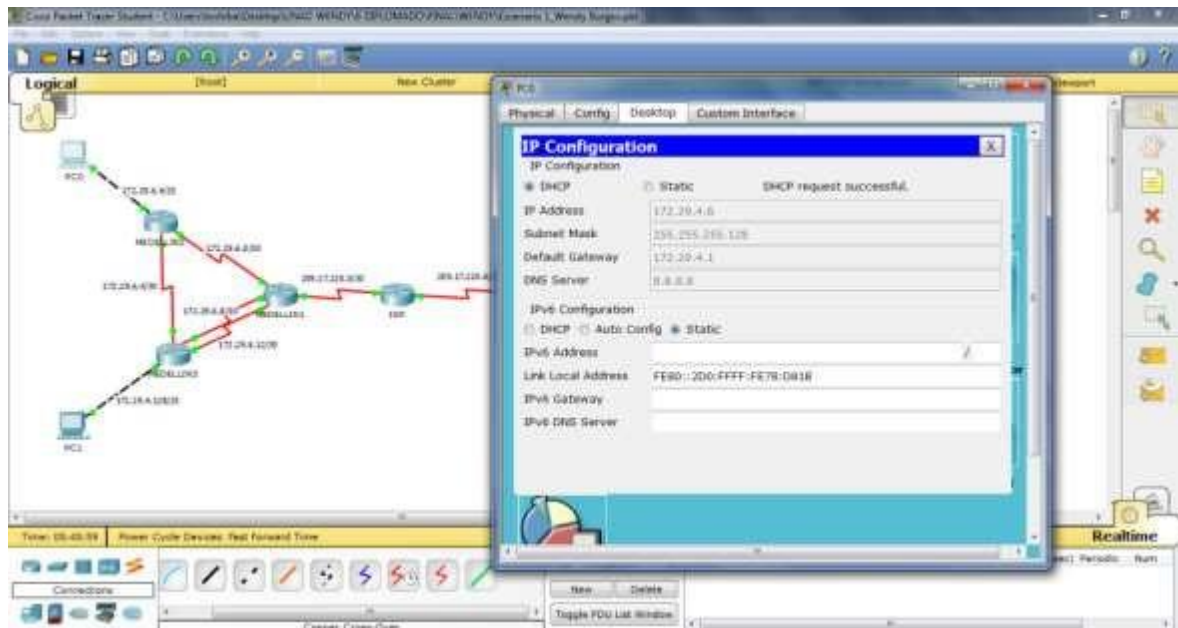


Configuración del servicio DHCP

MEDELLIN 2

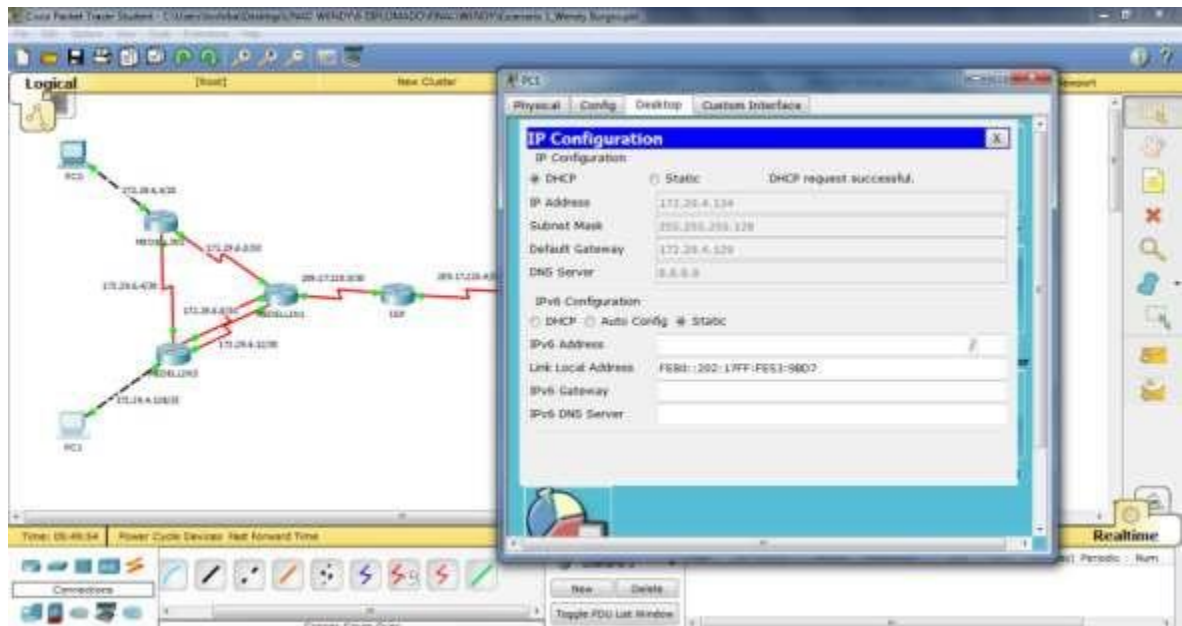
```
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip dhcp excluded-address 172.29.4.1 172.29.4.5
Router(config)#ip dhcp excluded-address 172.29.4.129 172.29.4.133
Router(config)#ip dhcp pool MEDE2
Router(dhcp-config)#network 172.29.4.0 255.255.255.128
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 MEDE3
Router(dhcp-config)#network 172.29.4.128 255.255.255.128
Router(dhcp-config)#default-router 172.29.4.129
Router(dhcp-config)#dns-server 8.8.8.8
Router(dhcp-config)#exit
```



MEDELLIN 3

```
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int g0/0
Router(config-if)#ip helper-address 172.29.6.5
```



BOGOTA 2

```

Router>enable
Router#conf term
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 BGTA2
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 BGTA3
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)#

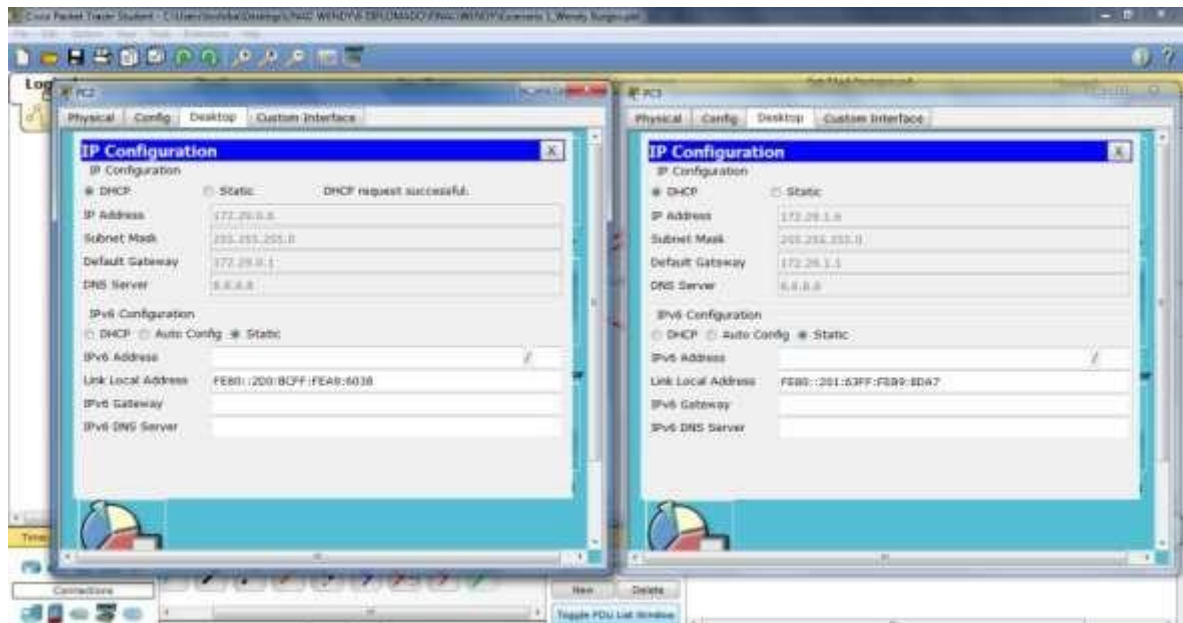
```

BOGOTA 3

```

Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int g0/0
Router(config-if)#ip helper-address 172.29.3.13

```



VALIDACION

Ping PC2-PC3

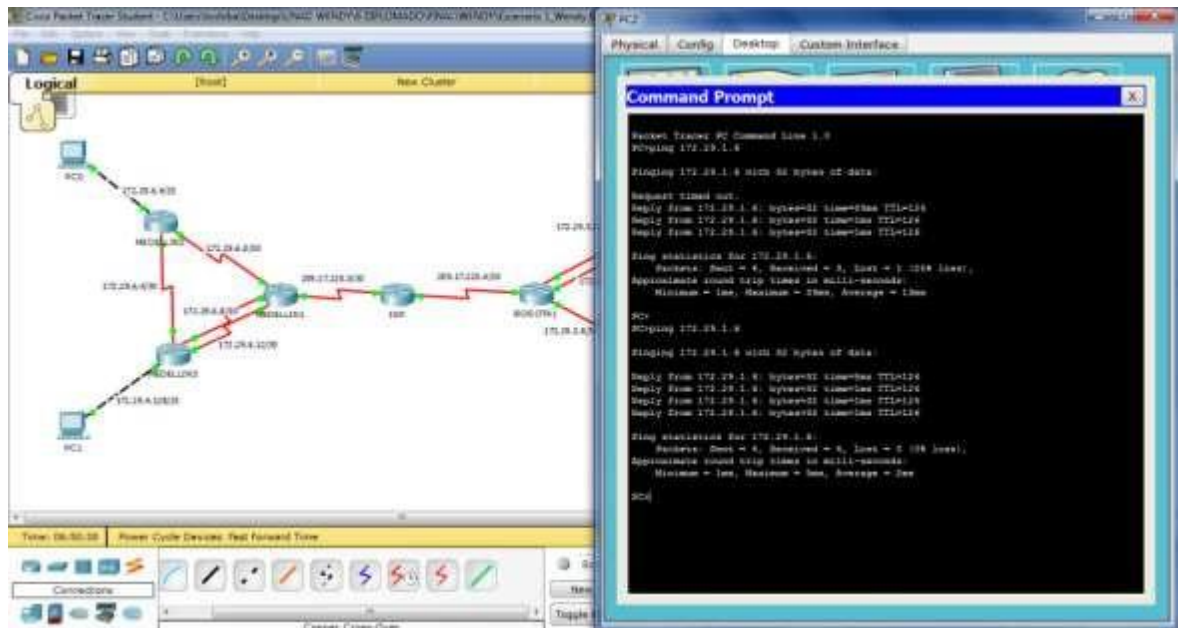
```
PC>ping 172.29.1.6
```

Pinging 172.29.1.6 with 32 bytes of data:

```
Reply from 172.29.1.6: bytes=32 time=5ms TTL=126  
Reply from 172.29.1.6: bytes=32 time=1ms TTL=126  
Reply from 172.29.1.6: bytes=32 time=1ms TTL=126  
Reply from 172.29.1.6: bytes=32 time=1ms TTL=126
```

Ping statistics for 172.29.1.6:

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 1ms, Maximum = 5ms, Average = 2ms  
PC>
```



Ping PC2-PC0

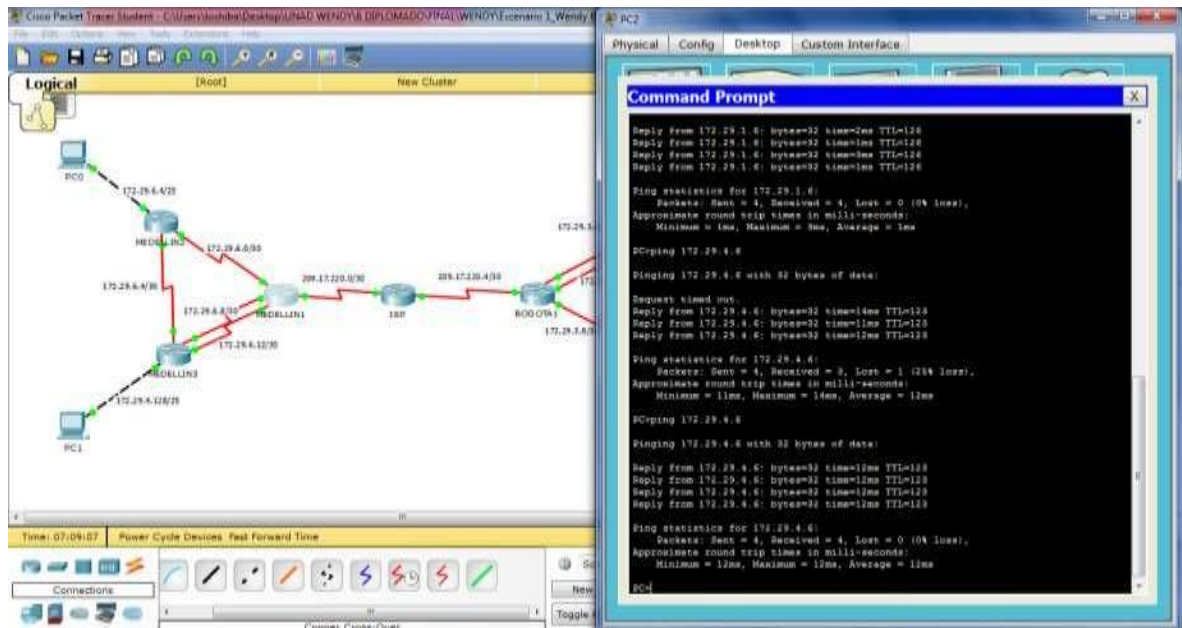
PC>ping 172.29.4.6

Pinging 172.29.4.6 with 32 bytes of data:

```
Reply from 172.29.4.6: bytes=32 time=12ms 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  
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 = 12ms, Average = 12ms



PING PC2-PC1

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

Cisco Packet Tracer Student - C:\Users\toshiba\Desktop\UNAD WENDY 6 DIPLOMADO\FINAL\WENDY\escenario 1 Wendy Burgos.pkt

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster

```
graph LR
    PC0[PC0] --- MEDULLA2[MEDULLA2]
    MEDULLA2 --- MEDULLA1[MEDULLA1]
    MEDULLA1 --- ISP[ISP]
    ISP --- BOGOTA1[BOGOTA1]
    MEDULLA2 --- MEDULLA3[MEDULLA3]
    MEDULLA3 --- PC1[PC1]
```

PC0 172.28.6.4/25
MEDULLA2 172.28.6.4/25
MEDULLA2 172.28.6.0/30
MEDULLA1 172.28.6.8/30
MEDULLA1 172.28.6.12/30
MEDULLA3 172.28.4.128/25
PC1 172.28.4.128/25
MEDULLA1 209.17.220.0/30
ISP 209.17.220.4/30
BOGOTA1 172.29.4.134

Time: 07:22:15 Power Cycle Devices Fast Forward Time

Scenario 0

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num

PC2

Physical Config Desktop Custom Interface

Command Prompt

```
Pinging 172.29.4.134

Pinging 172.29.4.134 with 32 bytes of data:
Request timed out.
Reply from 172.29.4.134: bytes=32 time=12ms 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

Ping statistics for 172.29.4.134:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 12ms, Maximum = 13ms, Average = 12ms

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

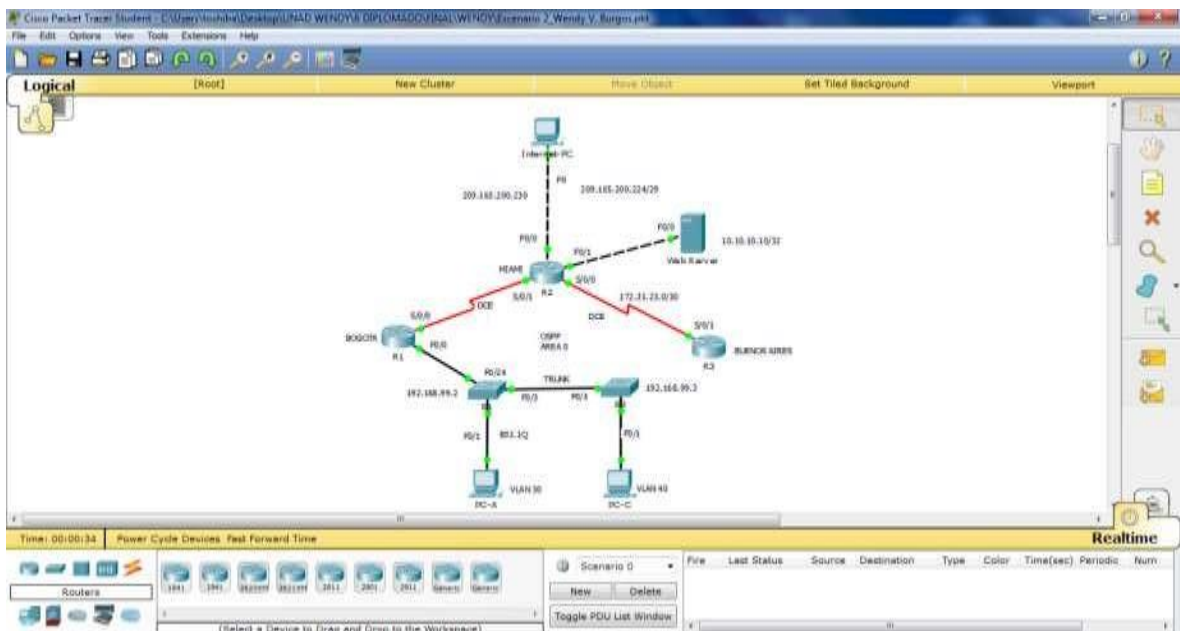
Ping statistics for 172.29.4.134:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 11ms, Maximum = 12ms, Average = 11ms

PC>
```


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.

Topología de red



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

Configuración del direccionamiento IP

Bogotá (R1)

```
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router (config)#hostname Bogota
Bogota (config)#no ip domain-lookup
Bogota (config)#enable secret class
```

```
Bogota (config)#line con 0
Bogota (config-line)#password cisco
Bogota (config-line)#login
Bogota (config-line)#line vty 0 4
Bogota (config-line)#password cisco
Bogota (config-line)#login
Bogota (config-line)#exit
Bogota (config)#service password-encryption
Bogota (config)#banner motd $ Unauthorized Access is Prohibited $
Bogota (config)#
```

Miami (R2)

```
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router (config)#hostname Miami
Miami (config)#no ip domain-lookup
Miami (config)#enable secret class
Miami (config)#line con 0
Miami (config-line)#password cisco
Miami (config-line)#login
Miami (config-line)#line vty 0 4
Miami (config-line)#password cisco
Miami (config-line)#login
Miami (config-line)#exit
Miami (config)#service password-encryption
Miami (config)#banner motd $ Prohibido el ingreso sin ser autorizado $
Miami (config)#
```

Buenos Aires (R3)

```
Router>enable
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router (config)#hostname Buenos aires
Buenos aires (config)#no ip domain-lookup
Buenos aires (config)#enable secret class
Buenos aires (config)#line con 0
Buenos aires (config-line)#password cisco
Buenos aires (config-line)#login
Buenos aires (config-line)#line vty 0 4
Buenos aires (config-line)#password cisco
Buenos aires (config-line)#login
Buenos aires (config-line)#exit
Buenos aires (config)#service password-encryption
```

```
Buenos aires (config)#banner motd $ Prohibido el ingreso sin ser autorizado
$
Buenos aires (config)#
```

Configuración del protocolo de enrutamiento.

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

Configuración de las VLANS

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

S1

```
S1>enable
S1#conf term
Enter configuration commands, one perper line. End with CNTL/Z.
S1 (config)#vlan 30
S1 (config-vlan)#name Administracion
S1 (config)#vlan 40
S1 (config-vlan)#name Mercadeo
S1 (config)#vlan 200
S1 (config-vlan)#name Mantenimiento
S1 (config-vlan)#

F0/3
S1>enable
S1#conf term
S1 (config)#int f0/3
S1 (config-if)#swichtport mode trunk
S1 (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
S1 (config-if)#switchport trunk native vlan 1
S1 (config-if)#
F0/24
S1 (config-if)#int f0/24
S1 (config-if)#switchport mode trunk
S1 (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
S1 (config-if)#switchport trunk native vlan 1
S1 (config-if)#
```

Mode Access

```
S1>enable
S1#conf term
S1 (config-if)#switchport trunk native vlan 1
S1 (config-if)#int range fa0/1-2, fa0/4-24, g0/1-2
S1 (config-if-range)#switchport mode access
S1 (config-if-range)#
```

Puerto F0/1 y apagados de puertos

```
S1>enable
S1#conf term
S1 (config)#int f0/1
S1(config-if)#switchport mode access
S1(config-if)#switchport access vlan 30
S1(config-if)#int range fa0/2, fa0/4-24, g0/1-2
S1(config-range)#shutdown
```

Vlan Mantenimiento

```
S1>enable
S1#conf term
S1(config)#int vlan 200
S1(config-if)#
%LINK-5-CHANGED: Interface Vlan200, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface vlan200
S1 (config-if)#ip address 192.168.99.2 255.255.255.0
S1 (config-if)#
```

S3

```
S3>enable
S3#conf term
Enter configuration commands, one perper line. End with CNTL/Z.
S3 (config)#vlan 30
S3 (config-vlan)#name Administracion
S3 (config)#vlan 40
S3 (config-vlan)#name Mercadeo
S3 (config)#vlan 200
S3 (config-vlan)#name Mantenimiento
S3 (config-vlan)#
```

VLAN Mantenimiento

```
S3>enable
S3#conf term
S3 (config)#int vlan 200
S3 (config-if)#
%LINK-5-CHANGED: Interface Vlan200, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan200, changed
state to up
S3 (config-if)#ip address 192.168.99.3 255.255.255.0
S3 (config-if)#
```

Puerto de enlace S3 VLAN Mantenimiento

```
S3 (config-if)#exit
S3 (config)#ip default-gateway 192.168.99.1
S3 (config-if)#
```

F0/3

```
S3 (config)#
S3 (config)#int F0/3
S3 (config-if)#switchport mode trunk
S3 (config-if)#switchport trunk native vlan 1
S3 (config-if)#
```

Puerto en mode Access

```
S3>enable
```

```
S3#conf term
S3 (config-if)#
S3 (config-if)#int range fa0/1-2, fa0/4-24, g0/1-2
S3 (config-if)#switchport mode access
```

Puerto F0/1 y apagado de puertos

```
S3>enable
S3#conf term
S3 (config)#int f0/1
S3 (config-if)#switchport mode access
S3 (config-if)#switchport access vlan 40
S3 (config-if)#int range fa0/2, fa0/4-24, g0/1-2
S3 (config-if-range)#switchport
```

Configuracion de Bogotá (R1) hacia Miami (R2)

```
Bogota>enable
Bogota#conf term
Bogota (config)#int s0/0/0
Bogota (config-if)#description connection to Miami
Bogota (config-if)#ip address 172.31.21.1 255.255.255.252
Bogota (config-if)#clock rate 128000
Bogota (config-if)#no shutdown
%LINK-5-CHANGED: Interface serial0/0/0, changed state tp down
Bogota (config-if)#
Ruta de salida S0/0/0 - R1
Bogota (Config)#ip router 0.0.0.0 0.0.0.0 s0/0/0
```

Direccionamiento de Bogota (R1) hacia interfaces Miami (R2) y Buenos Aires (R3)

Interface S0/0/1 - R2

```
Bogota>enable
Bogota#conf term
Bogota (config)#int S0/0/1
Bogota (config-if)#description connection Miami
Bogota (config-if)#ip address 172.31.21.2 255.255.255.252
Bogota (config-if)#no shutdown
```

Interface S0/0/0 – R3

```
Miami>enable
Miami#conf term
```

```
Miami (config)#int S0/0/0
Miami (config-if)#description connection Buenos aires
Miami (config-if)#ip address 172.31.23.2 255.255.255.252
Miami (config-if)#clock rate 9500
Miami (config-if)#no shutdown
```

Interface F0/0 - R2

```
Bogota>enable
Bogota#conf term
Bogota (config-if)#int f0/0
Bogota (config-if)#ip address 209.165.200.225 255.255.255.248
Bogota (config-if)#no shutdown
```

Interface F0/1 - R2

```
Bogota>enable
Bogota#conf term
Bogota (config-if)#int f0/1
Bogota (config-if)#ip address 10.10.10.10 255.255.255.0
Bogota (config-if)#no shutdown
Bogota (config-if)#
```

Configuración de Buenos Aires (R3) hacia Bogotá (R1) y Miami(R2)

```
Buenos aires>enable
Buenos aires#conf term
Buenos aires (config)#int S0/0/1
Buenos aires (config-if)#description connection to R1
Buenos aires (config-if)#ip address 172.31.23.2 255.255.255.252
Buenos aires (config-if)#no shutdown
```

Loopback 4

```
Buenos aires>enable
Buenos aires#conf term
Buenos aires (config-if)#int lo4
Buenos aires (config-if)#ip address 192.168.4.1 255.255.255.0
Buenos aires (config-if)#no shutdown
```

Loopback 5

```
Buenos aires>enable
Buenos aires#conf term
Buenos aires (config-if)#int lo5
```

```
Buenos aires (config-if)#ip address 192.168.5.2 255.255.255.0
Buenos aires (config-if)#no shutdown
Buenos aires (config-if)#
```

Loopback 6

```
Buenos aires>enable
Buenos aires#conf term
Buenos aires (config-if)#int lo6
Buenos aires (config-if)#ip address 192.168.6.1 255.255.255.0
Buenos aires (config-if)#no shutdown
Buenos aires (config-if)#
```

Deshabilitación del DNS lookup en el Switch 3

```
Switch>enable
Switch#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Switch (config)#hostname S3
S3 (config)#no ip domain-lookup
S3 (config)#enable secret class
S3 (config)#line con 0
S3 (config-line)#password cisco
S3 (config-line)#login
S3 (config-line)#exit
S3 (config)#service password-encryption
S3 (config)#banner motd $ Solo personal Autorizado $
S3 (config)#
```

Configuración de seguridad Switch, VLANs, Inter-VLANs Routing

Bogotá

802.1 Q-R1

```
Bogota>enable
Bogota#conf term
Bogota (config-subif)# int f0/0.30
Bogota (config-subif)#description accounting LAN
Bogota (config-subif)#encapsulation dot1q 30
Bogota (config-subif)#ip address 192.168.30.1 255.255.255.0
Bogota (config-subif)#int f0/0.40
```



```
Bogota (config-subif)#description accouting LAN
Bogota (config-subif)#encaptulation dot1q 40
Bogota (config-subif)#ip address 192.168.40.1 255.255.255.0
Bogota (config-subif)#int f0/0.200
Bogota (config-subif)#description accouting LAN
Bogota (config-subif)#encaptulation dot1q 200
Bogota (config-subif)#ip address 192.168.200.1 255.255.255.0
```

Interface F0/0

```
Bogota (config-subif)#int f0/0
Bogota (config-subif)#no shutdown
```

OSPF área 0 – R1

```
Bogota>enable
Bogota#conf term
Bogota (config)#router ospf 1
Bogota (config-router)#router-id 1.1.1.1
%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
Bogota (config-router)#router-id 1.1.1.1
Bogota (config-router)#network 172.31.21.0 0.0.0.3 area 0
Bogota (config-router)#network 172.168.30.0 0.0.0.255 area 0
Bogota (config-router)#network 172.168.40.0 0.0.0.255 area 0
Bogota (config-router)#network 172.168.200.0 0.0.0.255 area 0
Bogota (config-router)#
```

Interfaces LAN Pasivas . R1

```
Bogota>enable
Bogota#conf term
Bogota (config-router)#network 192.168.200 0.0.0.0
Bogota (config-router)#passive-intrface f0/0.30
Bogota (config-router)#passive-intrface f0/0.40
Bogota (config-router)#passive-intrface f0/0.200
Bogota (config-router)#
```

Ancho de banda y costo de la metrica - R1

```
Bogota>enable
Bogota#conf term
Bogota (config-router)#exit
Bogota (config)#int S0/0/0
Bogota (config-if)#bandwidth 256
Bogota (config-if)#ip ospf cost 9500
Bogota (config-if)#
```

Miami

OSPF área 0 - R2

```
Miami (config)#router ospf 1
Miami (config-router)#router-id 5.5.5.5
%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
Miami (config-router)#
06:03:12: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial0/0/0
Full, Loading Done
Miami (config-router)#network 172.31.23.0 0.0.0.3 area 0
Miami (config-router)#network 172.31.23.0 0.0.0.3 area 0
Miami (config-router)#network 10.10.10.0 0.0.0.255 area 0
Miami (config-router)#
Miami (config-router)#passive-interface f0/1
Miami (config-router)#int s0/0/0
Miami (config-if)#bandwidth 256
Miami (config-if)#ip ospf cost 9500
Miami (config-if)#
```

Desde Buenos aires (R3) hacia Miami (R2) y Bogotá (R1)

```
Miami#show ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
1.1.1.1	0	FULL/	- 00:00:39	172.31.21.1	Serial0/0/1
5.5.5.5	0	FULL/	- 00:00:34	172.31.23.2	Serial0/0/0

```
Miami#
```

Bogotá

OSPF area 0 – R1

```
Bogota>enable
Bogota#conf term
Bogota (config)#router ospf 1
Bogota (config-router)#router-id 1.1.1.1
%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
Bogota (config-router)#router-id 1.1.1.1
Bogota (config-router)#network 172.31.21.0 0.0.0.3 area 0
Bogota (config-router)#network 172.168.30.0 0.0.0.255 area 0
Bogota (config-router)#network 172.168.40.0 0.0.0.255 area 0
Bogota (config-router)#network 172.168.200.0 0.0.0.255 area 0
Bogota (config-router)#
```

Interfaces LAN Pasivas . R1

```
Bogota (config-router)#network 192.168.200 0.0.0.0
Bogota (config-router)#passive-interface f0/0.30
Bogota (config-router)#passive-interface f0/0.40
Bogota (config-router)#passive-interface f0/0.200
Bogota (config-router)#
```

Ancho de banda y costo de la metrica - R1

```
Bogota (config-router)#exit
Bogota (config)#int S0/0/0
Bogota (config-if)#bandwidth 256
Bogota (config-if)#ip ospf cost 9500
Bogota (config-if)#
```

Miami

OSPF área 0 - R2

```
Miami>enable
```

```

Miami#conf term
Miami (config)#router ospf 1
Miami (config-router)#router-id 5.5.5.5
%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
Miami (config-router)#
06:03:12: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial0/0/0
Full, Loading Done
Miami (config-router)#network 172.31.23.0 0.0.0.3 area 0
Miami (config-router)#network 172.31.23.0 0.0.0.3 area 0
Miami (config-router)#network 10.10.10.0 0.0.0.255 area 0
Miami (config-router)#
Miami (config-router)#passive-interface f0/1
Miami (config-router)#int s0/0/0
Miami (config-if)#bandwidth 256
Miami (config-if)#ip ospf cost 9500
Miami (config-if)#

```

Desde Buenos aires (R3) hacia Miami (R2) y Bogota (R1)

```
Miami#show ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
1.1.1.1	0	FULL/ -	00:00:39	172.31.21.1	Serial0/0/1
5.5.5.5	0	FULL/	- 00:00:34	172.31.23.2	Serial0/0/0

```
Miami#
```

Miami#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 area in this router is 1. 1 normal o stub nasa
Maximun path: 4
Routing for Networks:
  172.31.21.0 0.0.0.0.3 area 0
  172.31.23.0 0.0.0.0.3 area 0

```

10.10.10.0 0.0.0.0.255 area 0

Passive interface (s):
FastEthernet0/1

Routing information Sources:

Gateway	Distance	Last Update
1.1.1.1	110	00:03:21
5.5.5.5	110	00:12:23
8.8.8.8	110	00:06:09

Distance: (default is 110)

NAT DHCO en Bogota (R1)

Reservar VLAN 30 y VLAN 40 las primeras 30 direcciones

```
Bogota>enable
Bogota#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Bogota (config)#ip dhcp excluded-address 192.168.30.1 192.18.30.30
Bogota (config)#ip dhcp excluded-address 192.168.40.1 192.18.40.30
```

DHCP Pool VLAN 30

```
Bogota>enable
Bogota#conf term
Bogota (config)#ip dhcp pool ADMINISTRACION
Bogota (dhcp-config)#dns-server 10.10.10.11
Bogota (dhcp-config)#default-router 192.168.30.1
Bogota (dhcp-config)#network 192.168.30.0 255.255.255.0
Bogota (dhcp-config)#
```

DHCP pool VLAN 40

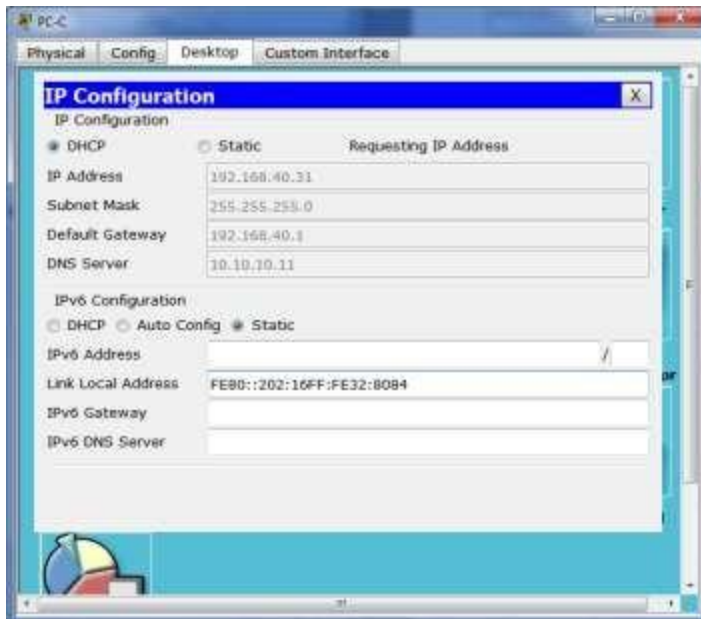
```
Bogota>enable
Bogota#conf term
Bogota (config)#ip dhcp pool MERCADEO
Bogota (dhcp-config)#dns-server 10.10.10.11
Bogota (dhcp-config)#default-router 192.168.40.1
Bogota (dhcp-config)#network 192.168.30.0 255.255.255.0
Bogota (dhcp-config)#
```

NAT en Miami (R2)

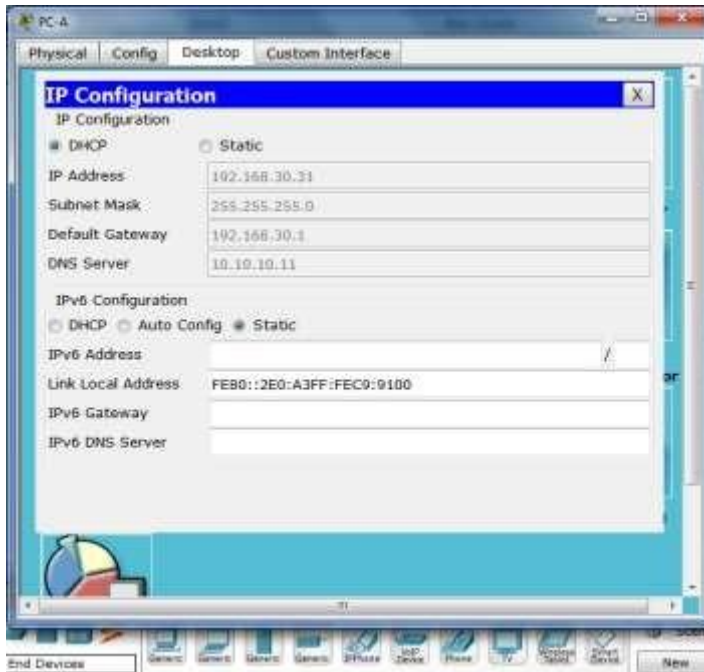
```
Miami>enable
password:
Miami# conf term
Enter configuration commands, one per line. End with CNTL/Z.
Miami (config)#user webuser privilege 15 secret cisco12345
Miami (config)#ip nat inside source static 10.10.10.10 209.165.200.229
Miami (config)#int f0/0
Miami (config-if)#ip nat outside
Miami (config-if)#int f0/1
Miami (config-if)#ip nat inside
Miami (config-if)#
```

```
Enter configuration commads, one per line. End with CNTL/Z.
Miami (config)#access-list 1 permit 192.168.30.0 0.0.0.0.255
Miami (config)#access-list 1 permit 192.168.40.0 0.0.0.0.255
Miami (config)#
Miami (config)#
Miami (config)#access-list 1 permit 192.168.4.0 0.0.3.255
Miami (config)#
Miami (config)#ip nat pool INTERNET 209.165.299.225 209.165.200.229
```

Verificación del direccionamiento DHCP en VLANs



Verificación Ip Configuración Vlan 30 PC-A



Configuración R1 y el acceso al R2 Telnet y su aplicación en las líneas VTY.

```
Bogota>enable
Bogota#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Bogota (config)#ip access-list standard ADMINISTRADOR
Bogota (config-std-nacl)#exit
Bogota (config)#line v t y 0 4
Bogota (config-line)#access-class ADMINISTRADOR in
Bogota (config-line)#
```

Configuración de lista de acceso de tipo extendido con su restricción del tráfico desde R1 o R3 hacia R2

```
Bogota>enable
Bogota#conf term
Bogota (config)#access-list 100 permit tcp any host 209.165.200.229 eq
wxa
Bogota (config)#access-list 100 permit icmp any echo-reply
Bogota (config)#access-list 100 permit icmp any echo-reply
Bogota (config)#
```

CONCLUSIONES

En el desarrollo del trabajo se evidencia la importancia que juegan las telecomunicaciones en cualquier entorno, además de adquirimos conocimientos de redes en cada actividad planteada durante el curso "Network Fundamentals" donde comprendimos los conceptos básicos y el diseño e implementación de subredes y "Routing Protocols and Concepts" aprendiendo la configuración y solución de problemas de protocolos de enrutamiento obteniendo un crecimiento personal y profesional para así tener mejores oportunidades en el mundo de las telecomunicaciones.

Además logramos identificar el grado de desarrollo de competencias y habilidades que fueron adquiridas a lo largo del diplomado. Poniendo en práctica los niveles de comprensión y solución de problemas relacionados con diversos aspectos de Networking, aplicando la configuración el direccionamiento IP, configuración del protocolo de enrutamiento OSPFv2, realizando las verificaciones en la información de OSPF, configurando VLANs, puertos troncales, puertos de acceso, encapsulamientos, Inter-VLAN Routing y Seguridad en los Switches, comprendimos como deshabilitar DNS lookup, asignar direcciones IP a los Switches, Implementar DHCP y NAT para IPv4, reservar direcciones IP, configurar NAT en un router, configurar listas de acceso de tipo estándar y verificar procesos de comunicación y re direccionamiento de tráfico en los routers.

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