Prueba de Habilidades Prácticas CCNA

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Universidad Nacional Abierta Y A Distancia - UNAD
Programa de Ingeniería de Sistemas

Diplomado de profundización CISCO (Diseño e Implementación de
Soluciones Integradas Lan/Wan)
Pitalito Huila
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Código 18103667

GRUPO: 203092_31

Informes de Habilidades Practicas CCNA

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Nota De Aceptación

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Introducción

Con el desarrollo de la presente actividad, denominada Prueba de habilidades Practicas CCNA, correspondiente a fase final del diplomado de profundización CISCO (Diseño e Implementación de Soluciones Integradas Lan/Wan), donde se plante la solución de dos escenarios se pretende aplicar los conocimientos y habilidades adquiridas durante el desarrollo del curso.

Mediante el uso de la herramienta Packet Tracert se dará solución a las dos situaciones planteadas empleando los conocimientos de enrutamiento de routers, switches, servidores, terminales entre otros elementos de red, para lo cual se hara uso de comandos tales como: Vlans, implementación protocolos DHCP-NAT, Configuraciones OSPF, ACL.

Escenario 1.

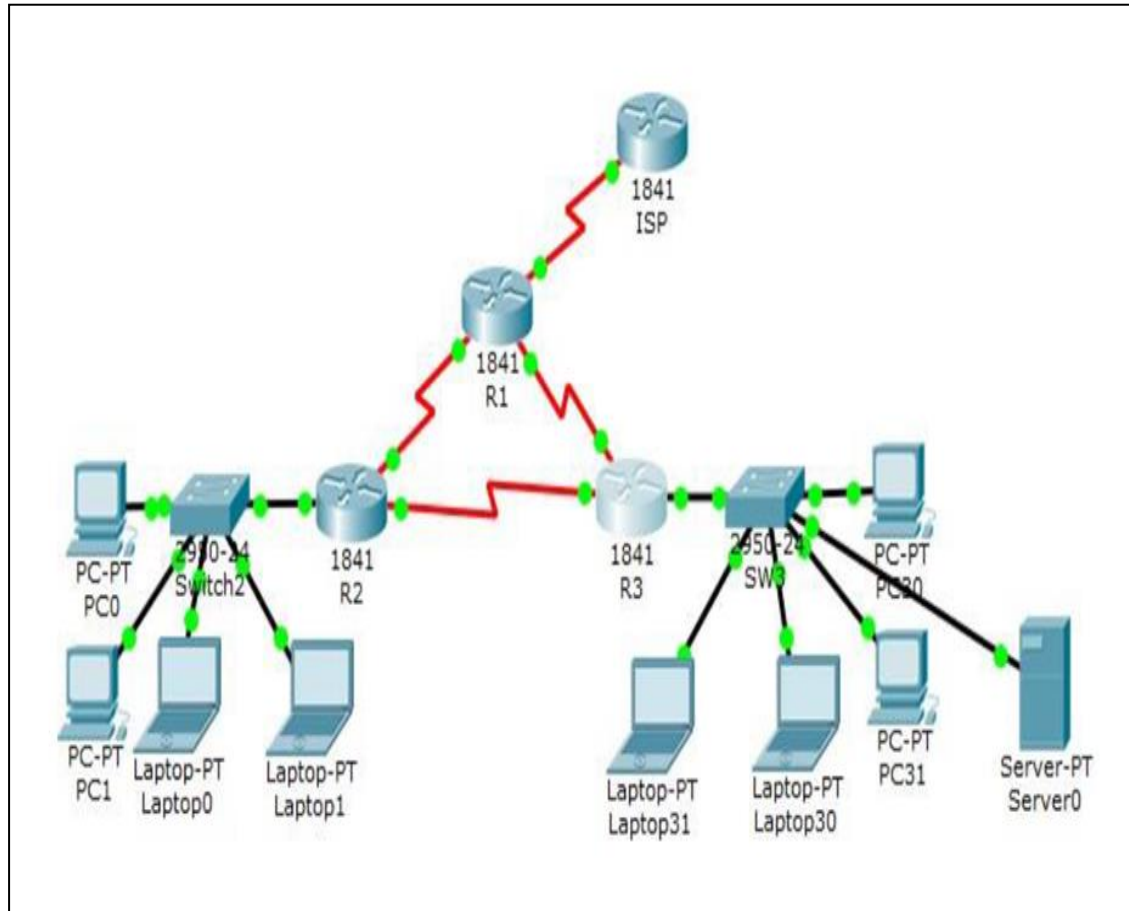**Ilustración 1 Topología de Red Escenario 1**

Tabla 1 Tabla de Direccionamiento

El administrador	Interfaces	Dirección IP	Máscara de subred	Gateway predeterminado
ISP	S0/0/0	200.123.211.1	255.255.255.0	N/D
R1	Se0/0/0	200.123.211.2	255.255.255.0	N/D
	Se0/1/0	10.0.0.1	255.255.255.252	N/D
	Se0/1/1	10.0.0.5	255.255.255.252	N/D
R2	Fa0/0,100	192.168.20.1	255.255.255.0	N/D
	Fa0/0,200	192.168.21.1	255.255.255.0	N/D
	Se0/0/0	10.0.0.2	255.255.255.252	N/D
	Se0/0/1	10.0.0.9	255.255.255.252	N/D
R3	Fa0/0	192.168.30.1	255.255.255.0	N/D
		2001:db8:130::9C0:80F:301	/64	N/D
	Se0/0/0	10.0.0.6	255.255.255.252	N/D
	Se0/0/1	10.0.0.10	255.255.255.252	N/D
SW2	VLAN 100	N/D	N/D	N/D
	VLAN 200	N/D	N/D	N/D
SW3	VLAN1	N/D	N/D	N/D

Configuración escenario 1

Configuración Básica R1

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1
R1(config)#no ip domain-lookup
R1(config)#enable secret class
R1(config)#line con 0
R1(config-line)#password cisco
R1(config-line)#login
R1(config-line)#exit
R1(config)#service password-encryption
R1(config)#banner motd $ Acceso no autorizado o prohibido! $ R1(config)#
```

Configuración Básica R2

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R2(config)#no ip domain-lookup
R2(config)#enable secret class
R2(config)#line con 0
R2(config-line)#password cisco
R2(config-line)#login
R2(config-line)#exit
R2(config)#service password-encryption
R2(config)#banner motd $ Acceso no autorizado o prohibido! $ R2(config)#
```

Configuración Básica R3

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R3
R3(config)#no ip domain-lookup
R3(config)#enable secret class
R3(config)#line con 0
R3(config-line)#password cisco
R3(config-line)#login
R3(config-line)#exit
R3(config)#service password-encryption
R3(config)#banner motd $ Acceso no autorizado o prohibido! $
R3(config)#
```

Configuración Básica Sw2

```
Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname SW2
SW2(config)#no ip domain-lookup
SW2(config)#enable secret class
SW2(config)#line con 0
SW2(config-line)#password cisco
SW2(config-line)#login
```

```
SW2(config-line)#exit
SW2(config)#service password-encryption
SW2(config)#banner motd $ Solo personal autorizado! $
SW2(config)#
```

Configuración Básica Sw3

```
Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname SW3
SW3(config)#no ip domain-lookup
SW3(config)#enable secret class
SW3(config)#line con 0
SW3(config-line)#password cisco
SW3(config-line)#login
SW3(config-line)#exit
SW3(config)#service password-encryption
SW3(config)#banner motd $ Solo personal autorizado! $
SW3(config)#
```

- **SW VLAN y las asignaciones de puertos de VLAN deben cumplir con la tabla.**

Tabla 2 Tabla de VLAN y Puertos

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

Tabla 3 Tabla de enlaces Troncales

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

Vlan Sw 2

SW2(config)#vlan 100
SW2(config-vlan)#name LAPTOPS
SW2(config-vlan)#vlan 200
SW2(config-vlan)#name DESTOPS
SW2(config-vlan)#

Vlan Puertos Sw2 F0/2-3 Y F0/4-5

SW2(config)#int range f0/2-3
SW2(config-if-range)#switchport mode access
SW2(config-if-range)#switchport access vlan 100
SW2(config-if-range)#exit
SW2(config)#int range f0/4-5
SW2(config-if-range)#switchport mode access
SW2(config-if-range)#switchport access vlan 200
SW2(config-if-range)#exit
SW2(config)#

Vlan Puertos Sw3 F0/1-24

SW3#conf ter
SW3#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
SW3(config)#vlan 1
SW3(config-vlan)#exit
SW3(config)#int range f0/1-24
SW3(config-if-range)#sw
SW3(config-if-range)#switchport mode acc
SW3(config-if-range)#switchport mode access
SW3(config-if-range)#sw
SW3(config-if-range)#switchport access vlan 1
SW3(config-if-range)#exit
SW3(config)#
SW3#
%SYS-5-CONFIG_I: Configured from console by console

Vlan Troncal Sw2

SW2#
SW2#config ter
SW2#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
SW2(config)#int f0/1
SW2(config-if)#sw
SW2(config-if)#switchport mode tr
SW2(config-if)#switchport mode trunk
SW2(config-if)#exit
SW2(config)#int ran
SW2(config)#int range f0/6-24
SW2(config-if-range)#shut
SW2(config-if-range)#shutdown
SW2(config-if-range)#exit
SW2(config)#exit
SW2#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
SW2#

Configurar Puerto Troncal A Sw2

SW2(config)#int f0/1
SW2(config-if)#sw
SW2(config-if)#switchport mode trun
SW2(config-if)#switchport mode trunk
SW2(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed
state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed
state to up
SW2(config-if)#end
SW2#
%SYS-5-CONFIG_I: Configured from console by console
SW2#wr
Building configuration...
[OK]
SW2#

Configurar puerto troncal a SW3

SW3(config)#int f0/1
SW3(config-if)#sw
SW3(config-if)#switchport mode trunk
SW3(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
SW3(config-if)#exit
SW3(config)#wr
% Invalid input detected at '^' marker.
SW3(config)#
SW3(config)#

- **Los puertos de red que no se utilizan se deben deshabilitar.**

Desactivar Los Puertos Que No Se Utilizaran En Sw3

SW3#
SW3#config ter
SW3#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
SW3(config)#int rang f0/6-23
SW3(config-if-range)#shutdown
%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/12, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/13, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/14, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/15, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/16, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/17, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/18, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/19, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/20, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/21, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/22, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/23, changed state to administratively down
SW3(config-if-range)#
%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to administratively down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/6, changed state to down
SW3#
%SYS-5-CONFIG_I: Configured from console by console

Desactivar los Puerto que no se utilizan en SW2

SW2#config ter
SW2#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
SW2(config)#int range f0/6-24
SW2(config-if-range)#shutdown
%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/12, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/13, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/14, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/15, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/16, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/17, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/18, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/19, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/20, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/21, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/22, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/23, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/24, changed state to administratively down
SW2(config-if-range)#

- **La información de dirección IP R1, R2 y R3 debe cumplir con la tabla 1.**

Interface S0/0/0 Isp

Router(config)#int s0/0/0
Router(config-if)#ip address 200.123.211.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#

Interface S0/0/0 –R1

R1(config)#int s0/0/0
R1(config-if)#ip address 200.123.211.2 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#exit

Interface S0/1/0 –R1

R1(config)#int s0/1/0
R1(config-if)#ip address 10.0.0.1 255.255.255.252
R1(config-if)#no shutdown
R1(config-if)#exit

Interface S0/1/1 –R1

R1(config)#int s0/1/1
R1(config-if)#ip address 10.0.0.5 255.255.255.252
R1(config-if)#no shutdown
 R1(config-if)#exit

Interface S0/0/0 –R2

R2(config)#int s0/0/0
R2(config-if)#ip address 10.0.0.2 255.255.255.252
R2(config-if)#no shutdown
R2(config-if)#exit

Interface S0/0/1 –R2

R2(config)#int s0/0/1
R2(config-if)#ip address 10.0.0.9 255.255.255.252
R2(config-if)#no shutdown
R2(config-if)#exit

Interface S0/0/0 –R3

R3(config)#int s0/0/0
R3(config-if)#ip address 10.0.0.6 255.255.255.252

R3(config-if)#no shutdown
R3(config-if)#exit

Interface S0/0/1 –R3

R3(config)#int s0/0/1
R3(config-if)#ip address 10.0.0.10 255.255.255.252
R3(config-if)#no shutdown
R3(config-if)#exit

Interface F0/0 –R3

R3(config)#int f0/0
R3(config-if)#ip address 192.168.30.1 255.255.255.0
R3(config-if)#no shutdown
R3(config-if)#ipv6 address 2001:db8:130::9C0:80F:301/64
R3(config-if)#no shutdown
R3(config-if)#

ipv6 dhcp server vlan_1
ipv6 nd other-config-flag
no shutdown

Interface F0/0.100 –R2

Conectividad entre las VLAN

R2(config)#int f0/0.100
R2(config-subif)#encap dot1q 100
R2(config-subif)#ip address 192.168.20.1 255.255.255.0
R2(config-subif)#no shutdown
R2(config-subif)#exit

Interface F0/0.200 –R2

R2(config)#int f0/0.200
R2(config-subif)#encap dot1q 200
R2(config-subif)#ip address 192.168.21.1 255.255.255.0

R2(config-subif)#no shutdown
R2(config-subif)#exit
R2(config)#

- **Laptop20, Laptop21, PC20, PC21, Laptop30, Laptop31, PC30 y PC31 deben obtener información IPv4 del servidor DHCP.**

R2

R2#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip dhcp pool vlan_100
R2(dhcp-config)#net
R2(dhcp-config)#network 192.168.20.1 255.255.255.0
R2(dhcp-config)#defa
R2(dhcp-config)#default-router 192.168.20.1
R2(config)#ip dhcp pool vlan_200
R2(dhcp-config)#network 192.168.21.1 255.255.255.0
R2(dhcp-config)#default-router 192.168.21.1
R2(dhcp-config)#

R3

R3#conf terminal
Enter configuration commands, one per line. End with CNTL/Z..
R3(config)#ip dhcp pool vlan_1
R3(dhcp-config)#net
R3(dhcp-config)#network 192.168.30.1 255.255.255.0
R3(dhcp-config)#def
R3(dhcp-config)#default-router 192.268.30.1
R3(dhcp-config)#exit
R3(config)#end
R3#

- **R1 debe realizar una NAT con sobrecarga sobre una dirección IPv4 pública. Asegúrese de que todos los terminales pueden comunicarse con Internet pública (haga ping a la dirección ISP) y la lista de acceso estándar se llama INSIDE-DEVS.**

R1#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip nat pool INSIDE-DEVS 200.123.211.2 200.123.211.128 netmask
255.255.255.0
R1(config)#acce
R1(config)#access-list 1 permit
R1(config)#access-list 1 permit 192.168.0.0 0.0.255.255
R1(config)#access-list 1 permit 10.0.0.0 0.0.255.255
R1(config)#ip nat inside sour
R1(config)#ip nat inside source list 1 int s0/0/0 over
R1(config)#ip nat inside source list 1 int s0/0/0 overload
R1(config)#int s0/1/0
R1(config-if)#ip nat ins
R1(config-if)#ip nat inside
R1(config-if)#int s0/1/1
R1(config-if)#ip nat inside

R1(config-if)#int s0/0/0
R1(config-if)#ip nat ous
R1(config-if)#ip nat out
R1(config-if)#ip nat outside
R1(config-if)#

- **R1 debe tener una ruta estática predeterminada al ISP que se configuró y que incluye esa ruta en el dominio RIPv2.**

Configuración router ripv2 en R1

R1(config)#rou
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#ip route 0.0.0.0 0.0.0.0 s0/0/0
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#net

R1(config-router)#network 10.0.0.4
R1(config-router)#network 10.0.0.0
R1(config-router)#def
R1(config-router)#default-information originate
R1(config-router)# exit

- **R2 es un servidor de DHCP para los dispositivos conectados al puerto FastEthernet0/0.**

R2(config)#router
R2(config)#router rip
R2(config-router)#version 2
R2(config-router)#net
R2(config-router)#network 192.168.30.0
R2(config-router)#network 192.168.20.0
R2(config-router)#network 192.168.21.0
R2(config-router)#network 10.0.0.0
R2(config-router)#network 10.0.0.8
R2(config-router)#

R2 debe, además de enrutamiento a otras partes de la red, ruta entre las VLAN 100 y 200.

R2(config)#ip dhcp pool vlan_100
R2(dhcp-config)#network 192.168.20.1 255.255.255.0
R2(dhcp-config)#default-router 192.168.20.1

R2(dhcp-config)#ip dhcp pool vlan_200
R2(dhcp-config)#network 192.168.21.1 255.255.255.0
R2(dhcp-config)#default-router 192.168.21.1
R2(dhcp-config)#exit
R2(config)#wr
^
% Invalid input detected at '^' marker.
R2(config)#exit
R2#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
R2#

- **El Servidor0 es sólo un servidor IPv6 y solo debe ser accesibles para los dispositivos en R3 (ping).**

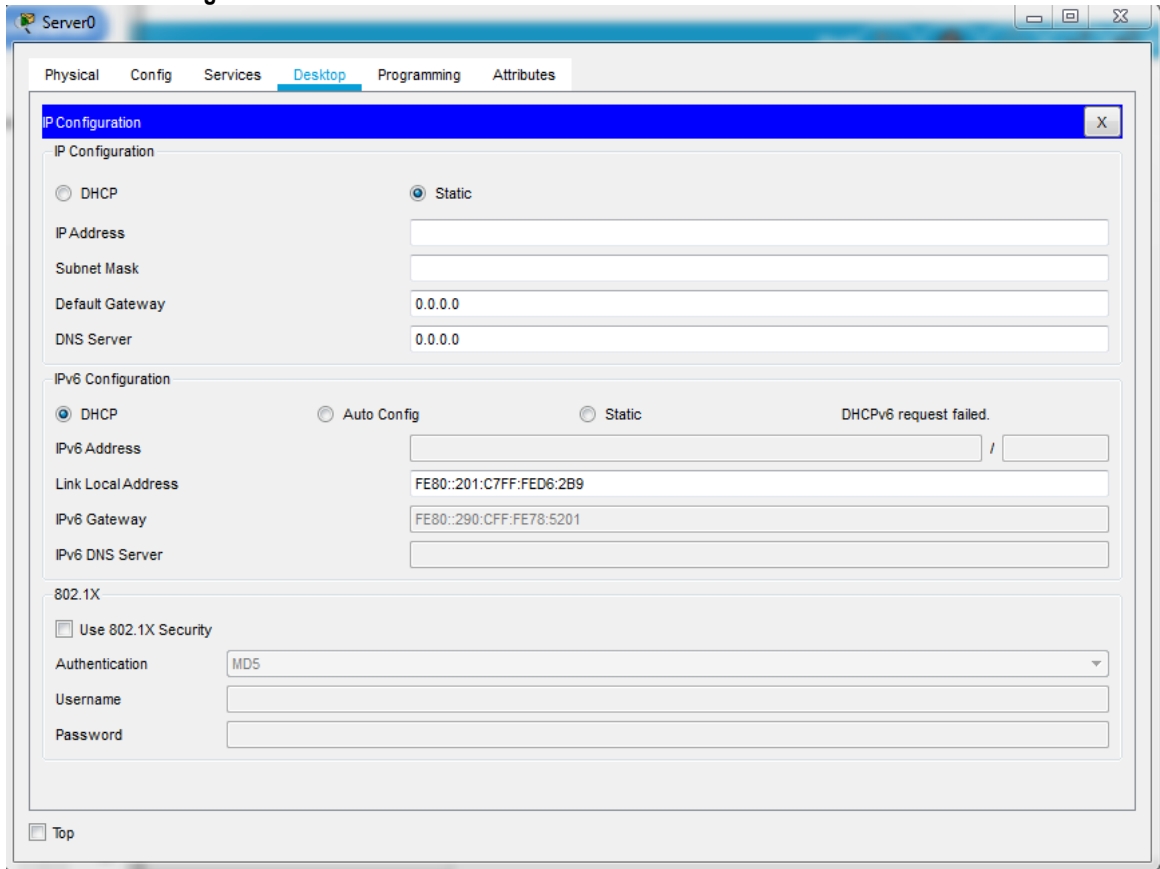**Ilustración 2 Configuración Servidor**

Ilustración 3 Ping de PC a Server0

- **La NIC instalado en direcciones IPv4 e IPv6 de Laptop30, de Laptop31, de PC30 y obligación de configurados PC31 simultáneas (dual-stack). Las direcciones se deben configurar mediante DHCP y DHCPv6.**

- **La interfaz FastEthernet 0/0 del R3 también deben tener direcciones IPv4 e IPv6 configuradas (dual- stack).**

```
R3(config)#ipv6 unicast-routing
R3(config)#int f0/0
R3(config-if)#ipv6 ena
R3(config-if)#ipv6 enable
R3(config-if)#ip add
R3(config-if)#ip address 192.168.30.1 255.255.255.0
R3(config-if)#ipv6 add
R3(config-if)#ipv6 address 2001:db8::9c0:80f:301/64
R3(config-if)#no shu
R3(config-if)#no shutdown
R3(config-if)#
```

- **R1, R2 y R3 intercambian información de routing mediante RIP versión 2.**

R1

```
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#do dhow ip rout
R1(config-router)#do show
R1(config-router)#do show ip ro
R1(config-router)#do show ip route conn
R1(config-router)#do show ip route connected
C 10.0.0.0/30 is directly connected, Serial0/1/0
C 10.0.0.4/30 is directly connected, Serial0/1/1
C 200.123.211.0/24 is directly connected, Serial0/0/0
R1(config-router)#net
R1(config-router)#network 10.0.0.0
R1(config-router)#network 10.0.0.4
R1(config-router)#end
R1#
```

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

R1#wr
Building configuration...
[OK]
R1#

R2

R2#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router rip
R2(config-router)#version 2
R2(config-router)#netw
R2(config-router)#network 10.0.0.0
R2(config-router)#network 10.0.0.8
R2(config-router)#do show ip route conneted
Translating "conneted"...domain server (255.255.255.255)
% Invalid input detected

R2(config-router)#do show ip route connected
C 10.0.0.0/30 is directly connected, Serial0/0/0
C 10.0.0.8/30 is directly connected, Serial0/0/1
C 192.168.20.0/24 is directly connected, FastEthernet0/0.100
C 192.168.21.0/24 is directly connected, FastEthernet0/0.200

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

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

R3

R3#conf terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#route rip

R3(config)#route rip
R3(config-router)#version 2
R3(config-router)#net
R3(config-router)#network 10.0.0.0
R3(config-router)#network 10.0.0.8
R3(config-router)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#show ip route conn
R3#show ip route connected
C 10.0.0.4/30 is directly connected, Serial0/0/0
C 10.0.0.8/30 is directly connected, Serial0/0/1
C 192.168.30.0/24 is directly connected, FastEthernet0/0

R3#

- **R1, R2 y R3 deben saber sobre las rutas de cada uno y la ruta predeterminada desde R1.**

- **Verifique la conectividad. Todos los terminales deben poder hacer ping entre sí y a la dirección IP del ISP. Los terminales bajo el R3 deberían poder hacer IPv6-ping entre ellos y el servidor.**

Ilustración 4 Ping de PC21 a PC20

```
Packet Tracer PC Command Line 1.0
C:\>ping 169.254.22.39

Pinging 169.254.22.39 with 32 bytes of data:

Reply from 169.254.22.39: bytes=32 time<1ms TTL=128
Reply from 169.254.22.39: bytes=32 time<1ms TTL=128
Reply from 169.254.22.39: bytes=32 time<1ms TTL=128
Reply from 169.254.22.39: bytes=32 time<1ms TTL=128

Ping statistics for 169.254.22.39:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

Ilustración 5 Ping de LAPTOP 21 a LAPTOP 20

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.21.3

Pinging 192.168.21.3 with 32 bytes of data:

Reply from 192.168.21.3: bytes=32 time<1ms TTL=128
Reply from 192.168.21.3: bytes=32 time<1ms TTL=128
Reply from 192.168.21.3: bytes=32 time<1ms TTL=128
Reply from 192.168.21.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.21.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

Ilustración 6 Ping de PC30 a SERVER0

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.30.5

Pinging 192.168.30.5 with 32 bytes of data:

Reply from 192.168.30.5: bytes=32 time=1ms TTL=128
Reply from 192.168.30.5: bytes=32 time<1ms TTL=128
Reply from 192.168.30.5: bytes=32 time<1ms TTL=128
Reply from 192.168.30.5: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.30.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

Ilustración 7 Ping de LAPTOP31 a PC30

```
C:\>ping 192.168.30.3

Pinging 192.168.30.3 with 32 bytes of data:

Reply from 192.168.30.3: bytes=32 time<1ms TTL=128
Reply from 192.168.30.3: bytes=32 time<1ms TTL=128
Reply from 192.168.30.3: bytes=32 time<1ms TTL=128
Reply from 192.168.30.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.30.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Ilustración 8 Ping de PC31 a SERVER0 -IPV6

```
Pinging FE80::201:C7FF:FED6:2B9 with 32 bytes of data:

Reply from FE80::201:C7FF:FED6:2B9: bytes=32 time<1ms TTL=128
Reply from FE80::201:C7FF:FED6:2B9: bytes=32 time<1ms TTL=128
Reply from FE80::201:C7FF:FED6:2B9: bytes=32 time<1ms TTL=128
Reply from FE80::201:C7FF:FED6:2B9: bytes=32 time<1ms TTL=128

Ping statistics for FE80::201:C7FF:FED6:2B9:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Ilustración 9 Ping de LAPTOP31 a R3

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.30.1

Pinging 192.168.30.1 with 32 bytes of data:

Reply from 192.168.30.1: bytes=32 time=1ms TTL=255
Reply from 192.168.30.1: bytes=32 time=1ms TTL=255
Reply from 192.168.30.1: bytes=32 time<1ms TTL=255
Reply from 192.168.30.1: bytes=32 time=1ms TTL=255

Ping statistics for 192.168.30.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

Ilustración 10 Conectividad de LAPTOP20 a R2

```
C:\>ping 192.168.20.1

Pinging 192.168.20.1 with 32 bytes of data:

Reply from 192.168.20.1: bytes=32 time=2ms TTL=255
Reply from 192.168.20.1: bytes=32 time<1ms TTL=255
Reply from 192.168.20.1: bytes=32 time<1ms TTL=255
Reply from 192.168.20.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.20.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 2ms, Average = 0ms

C:\>
```

Ilustración 11 Ping entre LAPTOP20 y LAPTOP21

```
C:\>ping 192.168.20.3

Pinging 192.168.20.3 with 32 bytes of data:

Reply from 192.168.20.3: bytes=32 time=1ms TTL=128
Reply from 192.168.20.3: bytes=32 time<1ms TTL=128
Reply from 192.168.20.3: bytes=32 time<1ms TTL=128
Reply from 192.168.20.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.20.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```
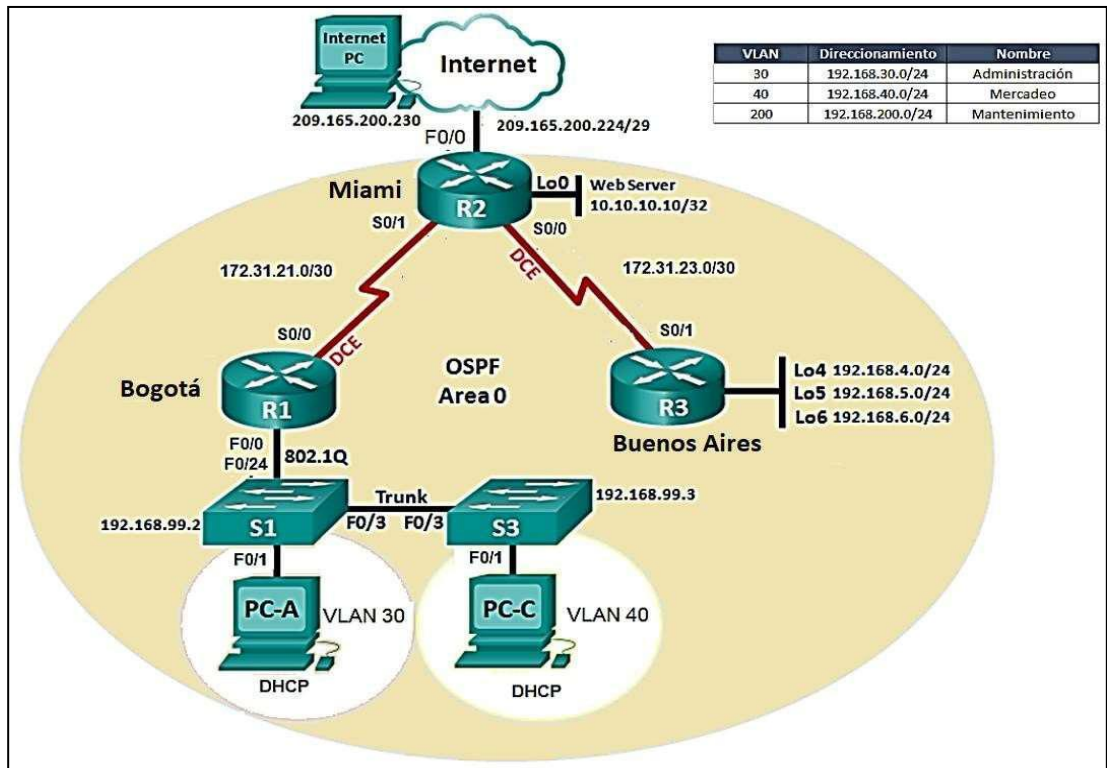
Escenario 2

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.

Ilustración 12 Topología de Red Escenario 2

Configuración Escenario 2

Configuración Básica R1

Router>en
Router#conf t
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)#exit
BOGOTA(config)#service password-encryption
BOGOTA(config)#banner motd $ Acceso no autorizado o prohibido!! $
BOGOTA(config)#

Configuración Básica R2

Router>en
Router#conf t
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)#exit
MIAMI(config)#service password-encryption
MIAMI(config)#banner motd $ Acceso no autorizado o prohibido!! $
MIAMI(config)#

Configuración Básica R3

Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname BUENOSAIRES
BUENOSAIRES(config)#no ip domain-lookup

BUENOSAIRES(config)#enable secret class
BUENOSAIRES(config)#line con 0
BUENOSAIRES(config-line)#password cisco
BUENOSAIRES(config-line)#login
BUENOSAIRES(config-line)#exit
BUENOSAIRES(config)#service password-encryption
BUENOSAIRES(config)#banner motd $ Acceso no autorizado o prohibido!! $
BUENOSAIRES(config)#

Configuración Básica S1

Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S1
S1(config)#no ip domain-lookup
S1(config)#enable secret class
S1(config)#line con 0
S1(config-line)#password cisco
S1(config-line)#login
S1(config-line)#exit
S1(config)#service password-encryption S1(config)#banner motd $ Solo personal
autorizado!! $ S1(config)#

Configuración Básica S3

Switch>en
Switch#conf t
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)#

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

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

OSPFv2 area 0

Tabla 4 Criterios enrutamiento OSPFv2

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

Verificar información de OSPF

BOGOTA(config)#router ospf 1
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 192.168.30.0 0.0.0.255 area 0
BOGOTA(config-router)#network 192.168.40.0 0.0.0.255 area 0
BOGOTA(config-router)#network 192.168.200.0 0.0.0.255 area 0
BOGOTA(config-router)#
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)#

BOGOTA(config)#int s0/0/0
BOGOTA(config-if)#bandwidth 256
BOGOTA(config-if)#ip ospf cost 9500
BOGOTA(config-if)#

MIAMI(config)#router ospf 1
MIAMI(config-router)#router-id 5.5.5.5
MIAMI(config-router)#network 172.31.21.0 0.0.0.3 area 0

MIAMI(config-router)#
00:16:21: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial0/1/0 from
LOADING to FULL, Loading Done

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)#exit
MIAMI(config)#int s0/1/1
MIAMI(config-if)#bandwidth 256
MIAMI(config-if)#ip ospf cost 9500
MIAMI(config-if)#

BUENOSAIRES(config)#router ospf 1
BUENOSAIRES(config-router)#router-id 8.8.8.8
BUENOSAIRES(config-router)#network 172.31.23.0 0.0.0.3 area 0
BUENOSAIRES(config-router)#
00:25:00: %OSPF-5-ADJCHG: Process 1, Nbr 5.5.5.5 on Serial0/0/0 from
LOADING to FULL, Loading Done

BUENOSAIRES(config-router)#network 192.168.4.0 0.0.3.255 area 0
BUENOSAIRES(config-router)#passive-interface lo4
BUENOSAIRES(config-router)#passive-interface lo5
BUENOSAIRES(config-router)#passive-interface lo6
BUENOSAIRES(config-router)#exit
BUENOSAIRES(config)#int s0/0/0
BUENOSAIRES(config-if)#bandwidth 256
BUENOSAIRES(config-if)#ip ospf cost 9500
BUENOSAIRES(config-if)#

```
MIAMI(config)#router ospf 1
MIAMI(config-router)#router-id 5.5.5.5
MIAMI(config-router)#network 172.31.21.0 0.0.0.3 area 0
MIAMI(config-router)#
00:16:21: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial0/1/0
from LOADING to FULL, Loading Done
```

```
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)#exit
MIAMI(config)#int s0/1/1
MIAMI(config-if)#bandwidth 256
MIAMI(config-if)#ip ospf cost 9500
MIAMI(config-if)#


BOGOTA(config)#router ospf 1
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 192.168.30.0 0.0.0.255 area 0
BOGOTA(config-router)#network 192.168.40.0 0.0.0.255 area 0
BOGOTA(config-router)#network 192.168.200.0 0.0.0.255 area 0
BOGOTA(config-router)#


BUENOSAIRES(config)#router ospf 1
BUENOSAIRES(config-router)#router-id 8.8.8.8
BUENOSAIRES(config-router)#network 172.31.23.0 0.0.0.3 area 0
BUENOSAIRES(config-router)#
00:25:00: %OSPF-5-ADJCHG: Process 1, Nbr 5.5.5.5 on Serial0/0/0
from LOADING to FULL, Loading Done

BUENOSAIRES(config-router)#network 192.168.4.0 0.0.3.255 area 0
BUENOSAIRES(config-router)#passive-interface lo4
BUENOSAIRES(config-router)#passive-interface lo5
BUENOSAIRES(config-router)#passive-interface lo6
BUENOSAIRES(config-router)#exit
BUENOSAIRES(config)#int s0/0/0
BUENOSAIRES(config-if)#bandwidth 256
BUENOSAIRES(config-if)#ip ospf cost 9500
```

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

Tabla 5 Enrutamiento y routers conectados por OSPFv2

```
MIAMI#show ip ospf neighbor


Neighbor ID     Pri    State          Dead Time    Address
Interface
1.1.1.1          0     FULL/   -      00:00:34     172.31.21.1
Serial0/1/0
8.8.8.8          0     FULL/   -      00:00:31     172.31.23.2
Serial0/1/1
MIAMI#
```

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

```
MIAMI#show ip ospf interface

FastEthernet0/1 is up, line protocol is up
  Internet address is 10.10.10.10/24, Area 0
  Process ID 1, Router ID 5.5.5.5, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State WAITING, Priority 1
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    No Hellos (Passive interface)
  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 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
Serial0/1/1 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: 9500
  Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:00
  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)
Serial0/1/0 is up, line protocol is up
  Internet address is 172.31.21.2/30, Area 0
  Process ID 1, Router ID 5.5.5.5, Network Type POINT-TO-POINT, Cost: 64
  Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:09
  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 1 , Adjacent neighbor count is 1
    Adjacent with neighbor 1.1.1.1
  Suppress hello for 0 neighbor(s)
```

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

```
router ospf 1
 router-id 5.5.5.5
 log-adjacency-changes
 passive-interface FastEthernet0/1
 network 172.31.21.0 0.0.0.3 area 0
 network 172.31.23.0 0.0.0.3 area 0
 network 10.10.10.0 0.0.0.255 area 0
```

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(config)#
S1(config)#int f0/3
S1(config-if)#switchport mode trunk
S1(config-if)#switchport trunk native vlan 1
S1(config-if)#

S1(config)#int f0/24
S1(config-if)#switchport mode trunk
S1(config-if)#switchport trunk native vlan 1
S1(config-if)#no shutdown
S1(config-if)#

S1(config)#int range fa0/1-2, fa0/4-24

S1(config-if-range)#switchport mode access
S1(config-if-range)#

S1(config)#int f0/1
S1(config-if)#switchport mode access
S1(config-if)#switchport access vlan 30
S1(config-if)#int range fa0/1-2, fa0/4-24
S1(config-if-range)#shutdown

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

S1(config-if)#ip address 192.168.99.2 255.255.255.0

S1(config-if)#

S3#conf t

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)#

S3(config)#int vlan 200

S3(config-if)#

%LINK-5-CHANGED: Interface Vlan200, changed state to up

S3(config-if)#ip address 192.168.99.3 255.255.255.0
S3(config-if)#

S3(config)#ip default-gateway 192.168.99.1
S3(config)#
S3#

S3(config)#int f0/3
S3(config-if)#switchport mode trunk
S3(config-if)#switchport trunk native vlan 1
S3(config-if)#

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

S3(config)#int f0/1
S3(config-if)#switchport mode access
S3(config-if)#switchport access vlan 40
S3(config-if)#int range fa0/1-2, fa0/4-24
S3(config-if-range)#shutdown

BOGOTA(config)#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)#
BOGOTA(config)#int f0/0.40
BOGOTA(config-subif)#description accounting LAN
BOGOTA(config-subif)#encapsulation dot1q 40

BOGOTA(config-subif)#ip address 192.168.40.1 255.255.255.0

BOGOTA(config-subif)#
BOGOTA(config)#int f0/0.200
BOGOTA(config-subif)#description accounting LAN
BOGOTA(config-subif)#encapsulation dot1q 200

BOGOTA(config-subif)#ip address 192.168.200.1 255.255.255.0

BOGOTA(config-subif)#

4. En el Switch 3 deshabilitar DNS lookup

S3(config)#no ip domain-lookup

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

S1(config-if)#ip address 192.168.99.2 255.255.255.0
S1(config-if)#

S3(config-if)#ip address 192.168.99.3 255.255.255.0
S3(config-if)#

S3(config)#ip default-gateway 192.168.99.1
S3(config)#

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

S1(config-if)#int range fa0/1-2, fa0/4-24

S1(config-if-range)#shutdown

S3(config-if)#int range fa0/1-2, fa0/4-24
S3(config-if-range)#shutdown

7. Implement DHCP and NAT for IPv4

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)#exit
MIAMI(config)#int f0/1
MIAMI(config-if)#ip nat inside
MIAMI(config-if)#
MIAMI(config-if)#exit

MIAMI(config)#access-list 1 permit 192.168.30.0 0.0.0.255
MIAMI(config)#access-list 1 permit 192.168.40.0 0.0.0.255
MIAMI(config)#access-list 1 permit 192.168.4.0 0.0.3.255
MIAMI(config)#ip nat pool INTERNET 209.165.200.225 209.165.200.229 netmask
255.255.255.248

MIAMI(config)#

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

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)#
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 192.168.40.0 255.255.255.0
BOGOTA(dhcp-config)#

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

BOGOTA#conf t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30
BOGOTA(config)#ip dhcp excluded-address 192.168.30.1 192.168.40.30
BOGOTA(config)#

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

MIAMI(config)#int f0/0
MIAMI(config-if)#ip nat outside
MIAMI(config-if)#exit
MIAMI(config)#int f0/1
MIAMI(config-if)#ip nat inside
MIAMI(config-if)#

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

MIAMI(config)#access-list 1 permit 192.168.30.0 0.0.0.255
MIAMI(config)#access-list 1 permit 192.168.40.0 0.0.0.255
MIAMI(config)#access-list 1 permit 192.168.4.0 0.0.3.255
MIAMI(config)#ip nat pool INTERNET 209.165.200.225 209.165.200.229 netmask 255.255.255.248

MIAMI(config)#ip access-list standard ADMIN
MIAMI(config-std-nacl)#permit host 172.31.21.1
MIAMI(config-std-nacl)#exit
MIAMI(config)#line vty 0 4
MIAMI(config-line)#access-class ADMIN in
MIAMI(config-line)#

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

MIAMI(config)#access-list 100 permit tcp any host 209.165.200.229 eq www
MIAMI(config)#access-list 100 permit icmp any any echo-reply

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

```
MIAMI#show access-lists
Standard IP access list 1
    10 permit 192.168.30.0 0.0.0.255
    20 permit 192.168.40.0 0.0.0.255
    30 permit 192.168.4.0 0.0.3.255
Standard IP access list ADMIN
    10 permit host 172.31.21.1
Extended IP access list 100
    10 permit tcp any host 209.165.200.229 eq www
    20 permit icmp any any echo-reply
```

```
BOGOTA#ping 209.165.200.230

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.165.200.230, timeout is 2
seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 1/5/18
ms

BOGOTA#
```

Conclusiones

Se implementó y se llevó a la práctica las competencias y habilidades adquiridas en el transcurso del diplomado, y se dio solución a los escenarios planteados en la prueba.

La actividad permitió aplicar y reforzar las habilidades para trabajar en temas relacionados como:

- Implementación de NAT
- configuración de servidores DHCP
- protocolo RIPV2
- configuración de VLAN
- configuración de enlaces troncales y subinterfaces.
- Configuración de protocolo de enrutamiento OSPFv2

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