Evaluación – Prueba de habilidades prácticas CCNA

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CONTENIDO

INTRODUCCION

A lo largo de la historia la comunicación se ha considerado como uno de los elementos fundamentales para el desarrollo y evolución de la humanidad, es así como en nuestros días escuchamos el término "red" dentro de las telecomunicaciones. Por definición, una red es un conjunto de dispositivos conectados por enlaces de un medio físico o virtual. Un nodo puede ser una computadora, una impresora o cualquier dispositivo capaz de enviar y/o recibir datos generados por otros nodos de la red. Las redes computacionales son de gran utilidad ya que posibilitan el intercambio de información entre dos o más sistemas conectados, gracias al desarrollo de estándares internacionales que son aplicados por los fabricantes tanto hardware como de software, los cuales son puestos al servicio de las personas.

El examen de habilidades comprende protocolos de routing dinámico (RIPv2, OSPF), configuración de servers DHCP, Network Address Translation (NAT), Listas de control de acceso (ACL). Estas pueden implementarse en routers para aumentar la seguridad de una red o implementar políticas de entrada y salida de paquetes para ciertos equipos específicos.

Se configuran servidores DHCP, el cual es un protocolo de difusión que trabaja de forma predeterminada en donde sus paquetes no pasan a través de enrutadores. Un agente de retransmisión DHCP recibe cualquier difusión DHCP de la subred y la reenvía a la dirección IP especificada en una subred distinta.
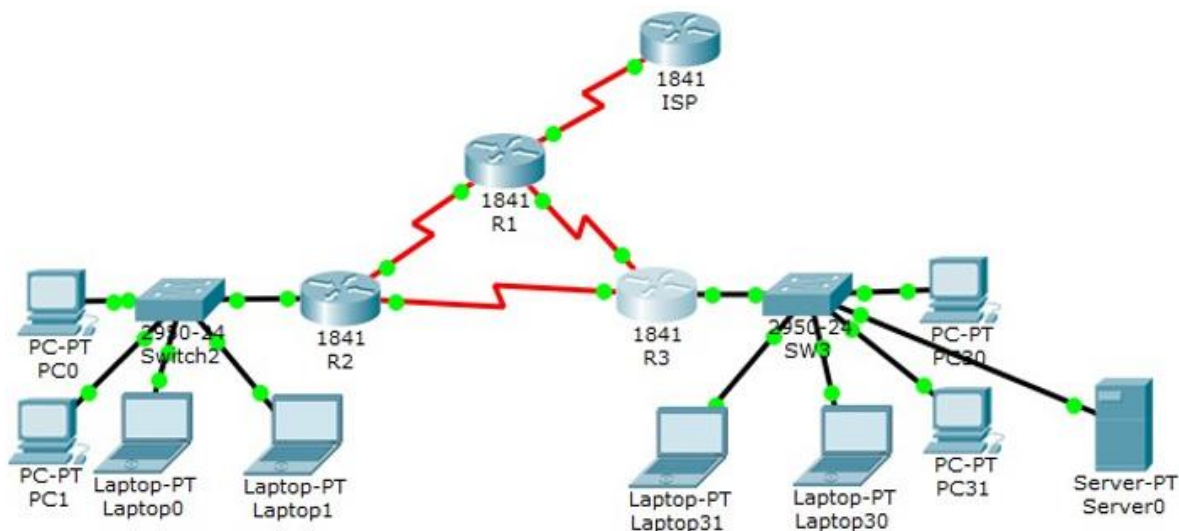
Topología

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

PC20	NIC	DHCP	DHCP	DHCP
PC21	NIC	DHCP	DHCP	DHCP
PC30	NIC	DHCP	DHCP	DHCP
PC31	NIC	DHCP	DHCP	DHCP
Laptop20	NIC	DHCP	DHCP	DHCP
Laptop21	NIC	DHCP	DHCP	DHCP
Laptop30	NIC	DHCP	DHCP	DHCP
Laptop31	NIC	DHCP	DHCP	DHCP

Tabla de asignación de VLAN y de puertos

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

Tabla de enlaces troncales

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

Escenario 1

Situación

En esta actividad, demostrará y reforzará su capacidad para implementar NAT, servidor de DHCP, RIPV2 y el routing entre VLAN, incluída la configuración de direcciones IP, las VLAN, los enlaces troncales y las subinterfaces. Todas las pruebas de alcance deben realizarse a través de

ping unicamente.

DESARROLLO DE LA ACTIVIDAD:

Descripción de las actividades

➢ **SW1** VLAN y las asignaciones de puertos de VLAN deben cumplir con la tabla 1.

Comandos:

Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S2
S2(config)#vlan 100
S2(config-vlan)#name LAPTOPS
S2(config-vlan)#EXIT
S2(config)#vlan 200
S2(config-vlan)#name DESTOPS
S2(config-vlan)#EXIT
S2(config)#exit

S2#

```
Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname S2
S2(config)#vlan 100
S2(config-vlan)#name LAPTOPS
S2(config-vlan)#EXIT
S2(config)#vlan 200
S2(config-vlan)#name DESTOPS
S2(config-vlan)#EXIT
S2(config)#exit
S2#
```

```
S2#
S2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
S2(config)#int range f0/2-3
S2(config-if-range)#switch mode access
S2(config-if-range)#switchport mode access
S2(config-if-range)#switch access vlan 100
S2(config-if-range)#switchport access vlan 100
S2(config-if-range)#int range f0/4-5
S2(config-if-range)#switchport mode access
S2(config-if-range)#switchport access vlan 200
S2(config-if-range)#exit
S2(config)#exit
S2#
```

```
100   LAPTOPS                         active     Fa0/2, Fa0/3
200   DESTOPS                         active     Fa0/4, Fa0/5
```

Comandos

Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S3
S3(config)# vlan 1
S3(config-vlan)#exit
S3(config)#int range f0/1-24
S3(config-if-range)#switchport mode access
S3(config-if-range)#switch access vlan 1
S3(config-if-range)#switchport access vlan 1
S3(config-if-range)#exit
S3(config)#exit

```
Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname S3
S3(config)# vlan 1
S3(config-vlan)#exit
S3(config)#int range f0/1-24
S3(config-if-range)#
```

```
1    default                     active    Fa0/1, Fa0/2,
Fa0/3, Fa0/4
                                           Fa0/5, Fa0/6,
Fa0/7, Fa0/8
                                           Fa0/9, Fa0/10,
Fa0/11, Fa0/12
                                           Fa0/13, Fa0/14,
Fa0/15, Fa0/16
                                           Fa0/17, Fa0/18,
Fa0/19, Fa0/20
                                           Fa0/21, Fa0/22,
Fa0/23, Fa0/24
```

➢ Los puertos de red que no se utilizan se deben deshabilitar.

Comandos

S3(config)#int range f0/6-23
S3(config-if-range)#shutdown

```
S3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
S3(config)#int range f0/7-24
S3(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

%LINK-5-CHANGED: Interface FastEthernet0/24, changed state to
administratively down
S3(config-if-range)#
```

```
S2>en
S2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
S2(config)#int range f0/7-24
S2(config-if-range)#shutdown
```

```
S2>en
S2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
S2(config)#int range f0/6-24
S2(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 FastEthernet0/10, 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
S2(config-if-range)#
```

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

Comandos.

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname R1
R1(config)#int s0/0/0
R1(config-if)#ip address 200.123.211.2 255.255.255.0
R1(config-if)#exit
R1(config)#int s0/1/0
R1(config-if)#ip address 10.0.0.1 255.255.255.252
R1(config-if)#exit
R1(config)#int s0/1/1
R1(config-if)#ip address 10.0.0.5 255.255.255.252
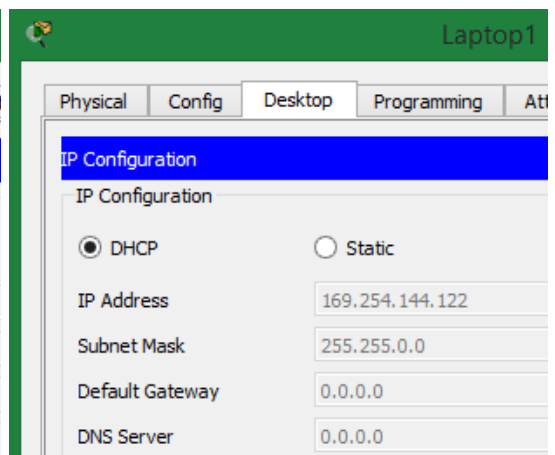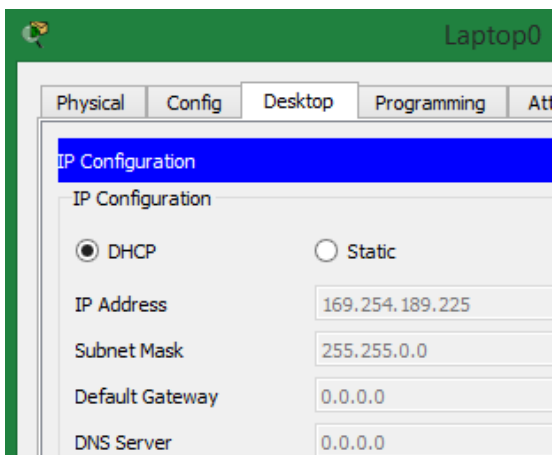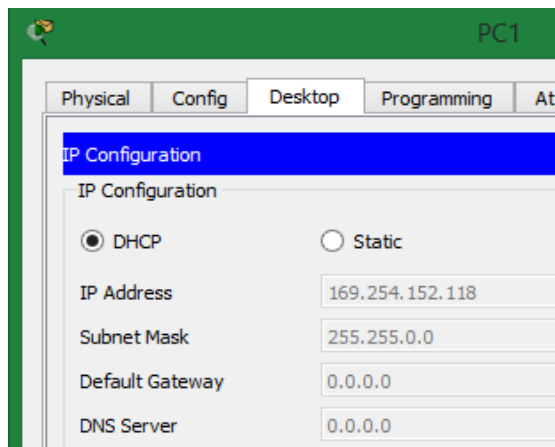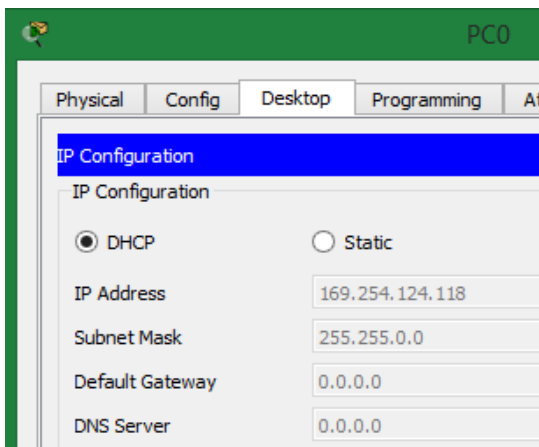R1(config-if)#exit

R1(config)#exit

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname R1
R1(config)#int s0/0/0
R1(config-if)#ip address 200.123.211.2 255.255.255.0
R1(config-if)#exit
R1(config)#int s0/1/0
R1(config-if)#ip address 10.0.0.1 255.255.255.252
R1(config-if)#exit
R1(config)#int s0/1/1
R1(config-if)#ip address 10.0.0.5 255.255.255.252
R1(config-if)#exit
R1(config)#exit
R1#
```
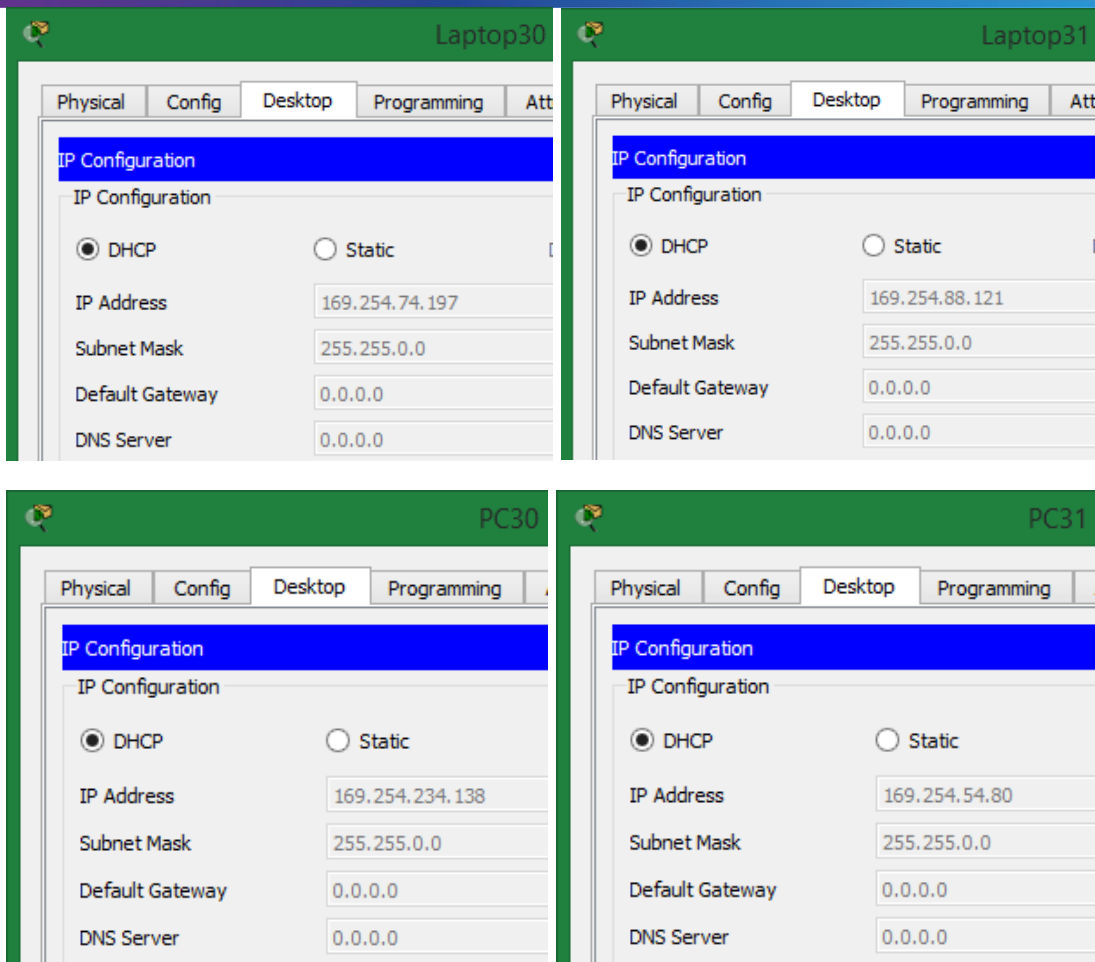
```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname R2
R2(config)#int f0/0
R2(config-if)#exit
R2(config)#int f0/0.100
R2(config-subif)#encapsulation dot1Q 100
R2(config-subif)#ip address 192.168.20.1 255.255.255.0
R2(config-subif)#exit
R2(config)#int f0/0.200
R2(config-subif)#encapsulation dot1Q 200
R2(config-subif)#ip address 192.168.21.1 255.255.255.0
R2(config-subif)#exit
R2(config)#int s0/0/0
R2(config-if)#ip address 10.0.0.2 255.255.255.252
R2(config-if)#exit
R2(config)#int s0/0/1
R2(config-if)#ip address 10.0.0.9 255.255.255.252
R2(config-if)#exit
R2(config)#exit
R2#
```

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname R3
R3(config)#int f0/0
R3(config-if)#ip address 192.168.30.1 255.255.255.0
R3(config-if)#exit
R3(config)#ipv6 unicast-routing
R3(config)#int s0/0/0
R3(config-if)#ip address 10.0.0.6 255.255.255.252
R3(config-if)#exit
R3(config)#int s0/0/1
R3(config-if)#ip address 10.0.0.10 255.255.255.252
R3(config-if)#
```

> **Laptop20, Laptop21, PC20, PC21, Laptop30, Laptop31, PC30 y PC3**

deben obtener información IPv4 del servidor DHCP.

Laptop30 — IP Configuration
- DHCP (selected) / Static
- IP Address: 169.254.74.197
- Subnet Mask: 255.255.0.0
- Default Gateway: 0.0.0.0
- DNS Server: 0.0.0.0

Laptop31 — IP Configuration
- DHCP (selected) / Static
- IP Address: 169.254.88.121
- Subnet Mask: 255.255.0.0
- Default Gateway: 0.0.0.0
- DNS Server: 0.0.0.0

PC30 — IP Configuration
- DHCP (selected) / Static
- IP Address: 169.254.234.138
- Subnet Mask: 255.255.0.0
- Default Gateway: 0.0.0.0
- DNS Server: 0.0.0.0

PC31 — IP Configuration
- DHCP (selected) / Static
- IP Address: 169.254.54.80
- Subnet Mask: 255.255.0.0
- Default Gateway: 0.0.0.0
- DNS Server: 0.0.0.0

➢ **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** debe tener una ruta estática predeterminada al ISP que se configuró yque incluye esa ruta en **el dominio** RIPv2.

Comandos.

```
R1>en
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#int 0/1/1
              ^
% Invalid input detected at '^' marker.
R1(config)#int s0/1/1
```

```
R1(config-if)#ip nat insede
                       ^
% Invalid input detected at '^' marker.
R1(config-if)#ip nat inside
R1(config-if)#exit
R1(config)#int s0/1/0
R1(config-if)#ip nat inside
R1(config-if)#exit
R1(config)#int s0/0/0
R1(config-if)#ip nat outside
R1(config-if)#exit
R1(config)#ip nat pool INSIDE-DEVS 200.123.211.2 200.123.211.128 netmask
255.255.255.0
R1(config)#list
           ^
% Invalid input detected at '^' marker.
R1(config)#access-list 1 permit 192.168.0.0 0.0.255.255
R1(config)#access-list 1 permit 10.0.0.0 0.255.255.255
R1(config)#ip nat inside source list 1 interface s0/0/0 overload
R1(config)#ip nat inside source static tcp 192.168.30.6 80 200.123.211.1 80
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#network 10.0.0.0
R1(config-router)#exit
R1(config)#exit
R1#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
R1#show ip nat translations
Pro Inside global Inside local Outside local Outside global
tcp 200.123.211.1:80 192.168.30.6:80 --- ---

R1#show ip nat statistics
Total translations: 1 (1 static, 0 dynamic, 1 extended)
Outside Interfaces: Serial0/0/0
Inside Interfaces: Serial0/1/0 , Serial0/1/1
Hits: 0 Misses: 0
Expired translations: 0
Dynamic mappings:
R1#
```

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

Comandos.

R2>en
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip dhcp excluded-address 10.0.0.2 10.0.0.9
R2(config)#ip dhcp pool INSIDE-DEVS
R2(dhcp-config)#network 192.168.20.1 255.255.255.0
R2(dhcp-config)#network 192.168.21.1 255.255.255.0
R2(dhcp-config)#default-router 192.168.1.1
R2(dhcp-config)#dns-server 0.0.0.0
R2(dhcp-config)#exit
R2(config)#

```
R2>en
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#ip dhcp excluded-address 10.0.0.2 10.0.0.9
R2(config)#ip dhcp pool INSIDE-DEVS
R2(dhcp-config)#network 192.168.20.1 255.255.255.0
R2(dhcp-config)#network 192.168.21.1 255.255.255.0
R2(dhcp-config)#default-router 192.168.1.1
R2(dhcp-config)#dns-server 0.0.0.0
R2(dhcp-config)#exit
R2(config)#
```

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

```
R2(config)#int vlan 100
R2(config-if)#ip address 192.168.20.1 255.255.255.0
% 192.168.20.0 overlaps with FastEthernet0/0.100
R2(config-if)#exit
R2(config)#int vlan 200
R2(config-if)#ip address 192.168.21.1 255.255.255.0
% 192.168.21.0 overlaps with FastEthernet0/0.200
R2(config-if)#end
R2#
```

➤ El Servidor 0 es sólo un servidor IPv6 y solo debe ser accesibles para los dispositivos en R3 (ping).
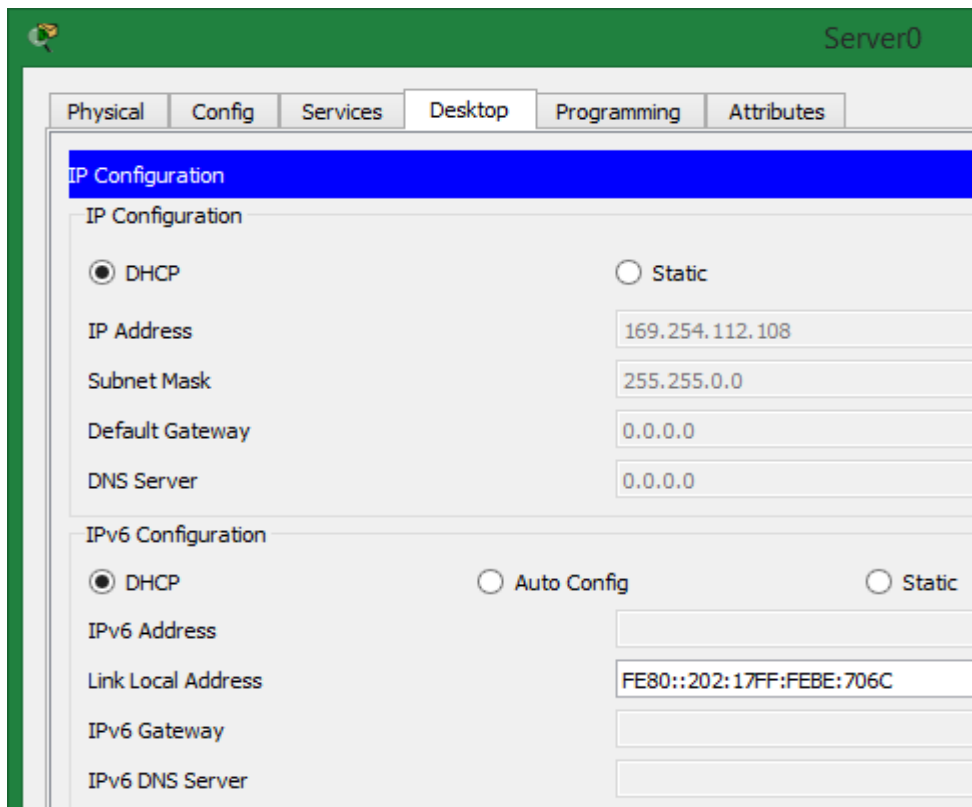
> La NIC instalado en direcciones IPv4 e IPv6 de Laptop30, de Laptop31,
> de PC30 y obligación de configurados PC31 simultáneas (dual-stack).
> Las direcciones se deben configurar mediante DHCP y DHCPv6.

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
🔴	Successful	PC31	Server0	ICMP		0.000	N	0	(edit)	(delete)
🔵	Successful	PC30	Server0	ICMP		0.000	N	1	(edit)	(delete)
🔴	Successful	Lapto...	Server0	ICMP		0.000	N	2	(edit)	(delete)
🔴	Successful	Lapto...	Server0	ICMP		0.000	N	3	(edit)	(delete)

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

Comandos.

R3>en
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#ipv6 unicast-routing
R3(config)#int f0/0
R3(config-if)#ipv6 enable
R3(config-if)#ip address 192.168.30.1 255.255.255.0
R3(config-if)#ipv6 address 2001:db8:130::9C0:80F:301/64
R3(config-if)#no shutdown
R3(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up
R3(config-if)#

```
R3>en
R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#ipv6 unicast-routing
R3(config)#int f0/0
R3(config-if)#ipv6 anable
                  ^
% Invalid input detected at '^' marker.

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

R3(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

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

R3(config-if)#
```

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

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

```
R1>en
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#do show ip route connected
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
```

```
R2>en
R2#conf ter
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#router rip
R2(config-router)#version 2
R2(config-router)#network 10.0.0.0
R2(config-router)#network 10.0.0.8
R2(config-router)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console
```

```
R3(config)#router rip
R3(config-router)#version 2
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
```

Escenario 2

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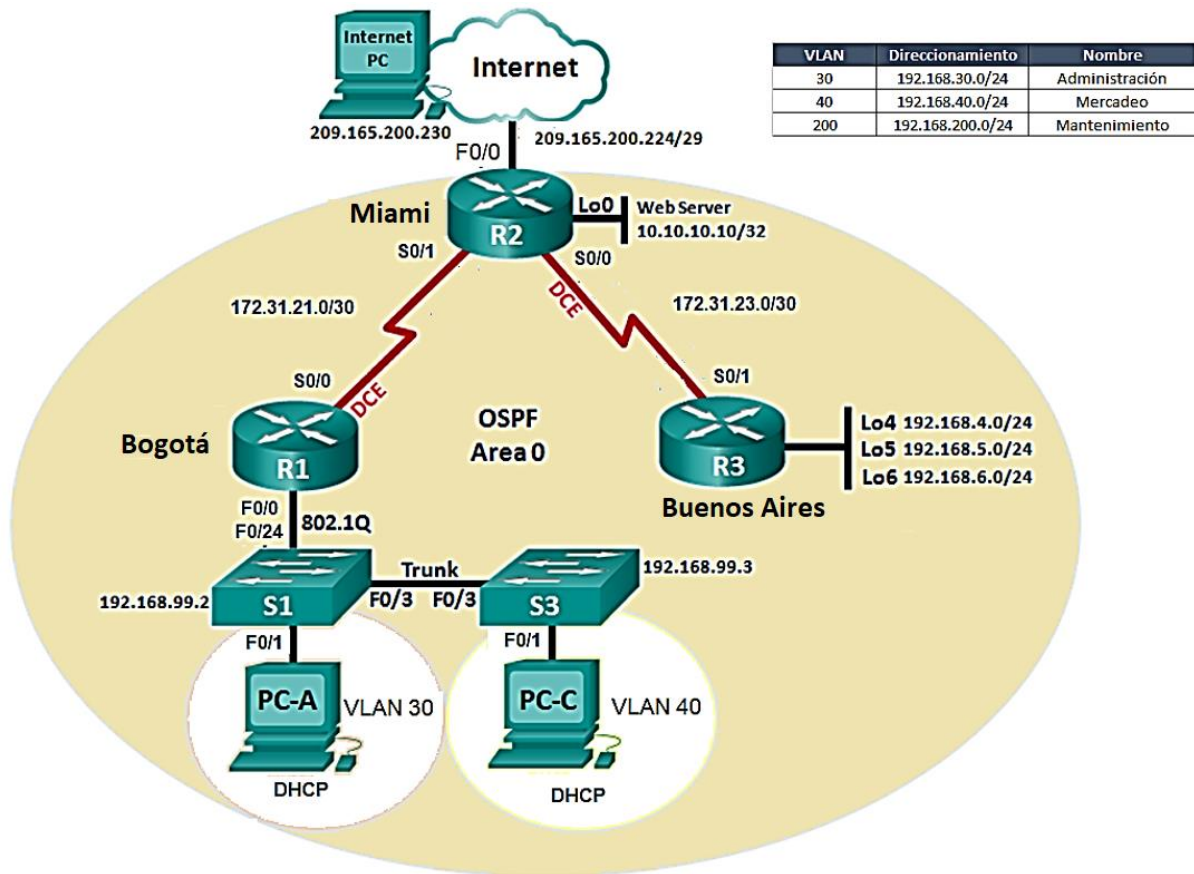
1. Configurar el direccionamiento IP acorde con la topología de red para cada uno de los dispositivos que forman parte del escenario

Internet PC

Physical | Config | Desktop | Programming | Attrib

IP Configuration

IP Configuration

- ○ DHCP ● Static

IP Address: 209.165.200.230

Subnet Mask: 255.255.255.248

Default Gateway: 209.165.200.225

DNS Server: 0.0.0.0

PCA

Physical | Config | Desktop | Programming

IP Configuration

IP Configuration

- ● DHCP ○ Static

IP Address: 169.254.188.30

Subnet Mask: 255.255.0.0

Default Gateway: 0.0.0.0

DNS Server: 0.0.0.0

PCC

Physical | Config | Desktop | Programming | A

IP Configuration

IP Configuration

- ● DHCP ○ Static

IP Address: 169.254.224.100

Subnet Mask: 255.255.0.0

Default Gateway: 0.0.0.0

DNS Server: 0.0.0.0

Web Server

Physical | Config | Services | Desktop | Programm

IP Configuration

IP Configuration

- ○ DHCP ● Static

IP Address: 10.10.10.10

Subnet Mask: 255.255.255.0

Default Gateway: 10.10.10.1

DNS Server: |

R1

config t

hostname Bogota

int s0/0/0

ip add 172.31.21.1 255.255.255.252
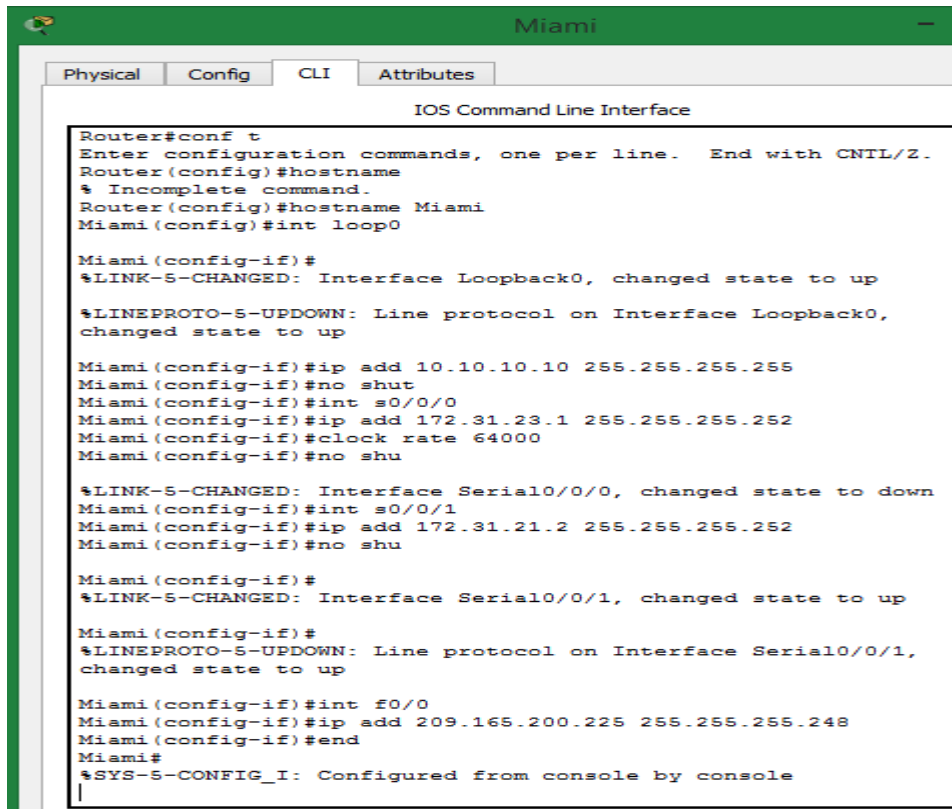
clock rate 64000

no shu

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname Bogota
Bogota(config)#int s0/0/0
Bogota(config-if)#ip add 172.31.21.1 255.255.255.252
Bogota(config-if)#clock rate 64000
Bogota(config-if)#no shu
```

R2

config t

hostname BOGOTÁ

int loop0

ip add 10.10.10.10 255.255.255.255

no shut

int s0/0/0

ip add 172.31.23.1 255.255.255.252

clock rate 64000

no shu

int s0/0/1

ip add 172.31.21.2 255.255.255.252

no shu

int g0/0

ip add 209.165.200.225 255.255.255.248

```
Miami                                              —

Physical   Config   CLI   Attributes

                    IOS Command Line Interface

Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname
% Incomplete command.
Router(config)#hostname Miami
Miami(config)#int loop0

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

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

Miami(config-if)#ip add 10.10.10.10 255.255.255.255
Miami(config-if)#no shut
Miami(config-if)#int s0/0/0
Miami(config-if)#ip add 172.31.23.1 255.255.255.252
Miami(config-if)#clock rate 64000
Miami(config-if)#no shu

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
Miami(config-if)#int s0/0/1
Miami(config-if)#ip add 172.31.21.2 255.255.255.252
Miami(config-if)#no shu

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

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

Miami(config-if)#int f0/0
Miami(config-if)#ip add 209.165.200.225 255.255.255.248
Miami(config-if)#end
Miami#
%SYS-5-CONFIG_I: Configured from console by console
|
```

R2

R3

config t

hostname BuenosAires

int loop4

ip add 192.168.4.1 255.255.255.0

no shut

int loop5

ip add 192.168.5.1 255.255.255.0

no shut

int loop4

ip add 192.168.6.1 255.255.255.0

no shut

int s0/0/1

ip add 172.31.23.2 255.255.255.252

no shu

```
Buenos Aires

Physical   Config   CLI   Attributes

                    IOS Command Line Interface
% Invalid input detected at '^' marker.

Router(config)#Hostname BuenosAires
BuenosAires(config)#int loop4

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

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

BuenosAires(config-if)#ip add 192.168.4.1 255.255.255.0
BuenosAires(config-if)#no shut
BuenosAires(config-if)#int loop5

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

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

BuenosAires(config-if)#ip add 192.168.5.1 255.255.255.0
BuenosAires(config-if)#no shut
BuenosAires(config-if)#int loop6

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

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

BuenosAires(config-if)#ip add 192.168.6.1 255.255.255.0
BuenosAires(config-if)#no shut
BuenosAires(config-if)#int s0/0/1
BuenosAires(config-if)#ip add 172.31.23.2 255.255.255.252
BuenosAires(config-if)#no shu

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

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

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

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

OSPFv2 area 0

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

R1 = Bogota

config t

router ospf 1

router-id 1.1.1.1

network 192.168.99.0 0.0.0.255 area 0

network 172.31.21.0 0.0.0.3 area 0

passive-interface f0/0

int s0/0/0

bandwidth 256

ip ospf cost 9500

int s0/0/1

bandwidth 256

```
Bogota>en
Bogota#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Bogota(config)#router ospf 1
Bogota(config-router)#router-id 1.1.1.1
Bogota(config-router)#network 192.168.99.0 0.0.0.255 area 0
Bogota(config-router)#network 172.31.21.0 0.0.0.3 area 0
Bogota(config-router)#passive-interface f0/0
Bogota(config-router)#int s0/0/0
Bogota(config-if)#bandwidth 256
Bogota(config-if)#ip ospf cost 9500
Bogota(config-if)#int s0/0/1
Bogota(config-if)#bandwidth 256
Bogota(config-if)#end
Bogota#
%SYS-5-CONFIG_I: Configured from console by console
```

R2 = Miami

config t

router ospf 1

router-id 5.5.5.5

network 209.165.200.224 0.0.0.7 area 0

network 172.31.21.0 0.0.0.3 area 0

network 10.10.10.10 0.0.0.3 area 0

passive-interface f0/0

int s0/0/0

bandwidth 256

ip ospf cost 9500

int s0/0/1

bandwidth 256

```
Miami>en
Miami#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Miami(config)#router ospf 1
Miami(config-router)#router-id 5.5.5.5
Miami(config-router)#network 209.165.200.224 0.0.0.7 area 0
Miami(config-router)#network 172.31.21.0 0.0.0.3 area 0
Miami(config-router)#network 10.10.10.10 0.0.0.3 area 0
01:35:44: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial0/0/1
from LOADING to FULL, Loading Done

Miami(config-router)#passive-interface f0/0
Miami(config-router)#int s0/0/0
Miami(config-if)#bandwidth 256
Miami(config-if)#ip ospf cost 9500
Miami(config-if)#int s0/0/1
Miami(config-if)#bandwidth 256
Miami(config-if)#end
Miami#
%SYS-5-CONFIG_I: Configured from console by console
|
```

R3 = Buenos Aires

config t

router ospf 1

router-id 8.8.8.8

network 172.31.23.0 0.0.0.3 area 0

network 192.168.4.0 0.0.0.255 area 0

network 192.168.5.0 0.0.0.255 area 0

network 192.168.6.0 0.0.0.255 area 0

int s0/0/0

bandwidth 256

ip ospf cost 9500

int s0/0/1

bandwidth 256

```
BuenosAires>en
BuenosAires#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
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)#network 192.168.4.0 0.0.0.255 area 0
BuenosAires(config-router)#network 192.168.5.0 0.0.0.255 area 0
BuenosAires(config-router)#network 192.168.6.0 0.0.0.255 area 0
BuenosAires(config-router)#int s0/0/0
BuenosAires(config-if)#bandwidth 256
BuenosAires(config-if)#ip ospf cost 9500
BuenosAires(config-if)#int s0/0/1
BuenosAires(config-if)#bandwidth 256
BuenosAires(config-if)#end
BuenosAires#
%SYS-5-CONFIG_I: Configured from console by console
```

Verificar información de OSPF

- Visualizar tablas de enrutamiento y routers conectados por OSPFv2

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

Gateway of last resort is not set

     10.0.0.0/32 is subnetted, 1 subnets
O       10.10.10.10 [110/9501] via 172.31.21.2, 00:24:26, Serial0/0/0
     172.31.0.0/30 is subnetted, 1 subnets
C       172.31.21.0 is directly connected, Serial0/0/0
```

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

Gateway of last resort is not set

     10.0.0.0/32 is subnetted, 1 subnets
C       10.10.10.10 is directly connected, Loopback0
     172.31.0.0/30 is subnetted, 2 subnets
C       172.31.21.0 is directly connected, Serial0/0/1
C       172.31.23.0 is directly connected, Serial0/0/0


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

Gateway of last resort is not set

     172.31.0.0/30 is subnetted, 1 subnets
C       172.31.23.0 is directly connected, Serial0/0/1
C     192.168.4.0/24 is directly connected, Loopback4
C     192.168.5.0/24 is directly connected, Loopback5
C     192.168.6.0/24 is directly connected, Loopback6
```

- Visualizar lista resumida de interfaces por OSPF en donde se ilustre el costo de cada interface
- Visualizar el OSPF Process ID, Router ID, Address summarizations, Routing Networks, and passive interfaces configuradas en cada router.

```
                                Bogota                            —

 Physical   Config   CLI   Attributes

                        IOS Command Line Interface

 Bogota#conf t
 Enter configuration commands, one per line.  End with CNTL/Z.
 Bogota(config)#router ospf 1
 Bogota(config-router)#do sh ip ospf interface

 Serial0/0/0 is up, line protocol is up
   Internet address is 172.31.21.1/30, Area 0
   Process ID 1, Router ID 1.1.1.1, Network Type POINT-TO-POINT,
 Cost: 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 00:00:02
   Index 1/1, flood queue length 0
   Next 0x0(0)/0x0(0)
   Last flood scan length is 1, maximum is 1
   Last flood scan time is 0 msec, maximum is 0 msec
   Neighbor Count is 1 , Adjacent neighbor count is 1
     Adjacent with neighbor 5.5.5.5
   Suppress hello for 0 neighbor(s)
 Bogota(config-router)#
```

```
 Miami#conf t
 Enter configuration commands, one per line.  End with CNTL/Z.
 Miami(config)#router ospf 1
 Miami(config-router)#do sh ip ospf interface

 Serial0/0/1 is up, line protocol is up
   Internet address is 172.31.21.2/30, Area 0
   Process ID 1, Router ID 5.5.5.5, Network Type POINT-TO-POINT,
 Cost: 390
   Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
   No designated router on this network
   No backup designated router on this network
   Timer intervals configured, Hello 10, Dead 40, Wait 40,
 Retransmit 5
     Hello due in 00:00:07
   Index 1/1, flood queue length 0
   Next 0x0(0)/0x0(0)
   Last flood scan length is 1, maximum is 1
   Last flood scan time is 0 msec, maximum is 0 msec
   Neighbor Count is 1 , Adjacent neighbor count is 1
     Adjacent with neighbor 1.1.1.1
   Suppress hello for 0 neighbor(s)
 Loopback0 is up, line protocol is up
   Internet address is 10.10.10.10/32, Area 0
   Process ID 1, Router ID 5.5.5.5, Network Type LOOPBACK, Cost: 1
   Loopback interface is treated as a stub Host
 Miami(config-router)#
```

```
BuenosAires(config)#router ospf 1
BuenosAires(config-router)#do sh ip ospf interface

Serial0/0/1 is up, line protocol is up
  Internet address is 172.31.23.2/30, Area 0
  Process ID 1, Router ID 8.8.8.8, Network Type POINT-TO-POINT,
Cost: 390
  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 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
  Suppress hello for 0 neighbor(s)
Loopback4 is up, line protocol is up
  Internet address is 192.168.4.1/24, Area 0
  Process ID 1, Router ID 8.8.8.8, Network Type LOOPBACK, Cost: 1
  Loopback interface is treated as a stub Host
Loopback5 is up, line protocol is up
  Internet address is 192.168.5.1/24, Area 0
  Process ID 1, Router ID 8.8.8.8, Network Type LOOPBACK, Cost: 1
  Loopback interface is treated as a stub Host
 --More--
```

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

```
Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname S1
S1(config)#vlan 30
S1(config-vlan)#name Administracion
S1(config-vlan)#exit
S1(config)#vlan 40
S1(config-vlan)#name Mercadeo
S1(config-vlan)#exit
S1(config)#vlan 200
S1(config-vlan)#name Mantenimiento
S1(config-vlan)#end
S1#
```

```
30   Administracion               active
40   Mercadeo                     active
200  Mantenimiento                active
```

Configuración de la seguridad:

```
S1>en
S1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
S1(config)#line console 0
S1(config-line)#pass cisco
S1(config-line)#line vty 0 4
S1(config-line)#pass cisco
S1(config-line)#enable secret cisco
S1(config)#
```

Configurar en el switch las interfaces que pertenecen a cada VLAN

```
S1(config)#interface range f0/1
S1(config-if-range)#switchport mode access
S1(config-if-range)#switchport access vlan 30
S1(config-if-range)#exit
S1(config)#
```

Configurar la encapsulación en los troncales:

```
Bogota>en
Bogota#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Bogota(config)#interface f0/0
Bogota(config-if)#no shutdown

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

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

Bogota(config-if)#exit
Bogota(config)#interface f0/0.3
Bogota(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.3, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/0.3, changed state to up

Bogota(config-subif)#encapsulation dot1Q 30
Bogota(config-subif)#ip address 192.168.30.1 255.255.255.0
Bogota(config-subif)#exit
Bogota(config)#interface f0/0.4
Bogota(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.4, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/0.4, changed state to up

Bogota(config-subif)#encapsulation dot1Q 40
Bogota(config-subif)#ip address 192.168.40.1 255.255.255.0
Bogota(config-subif)#exit
Bogota(config)#end
Bogota#
%SYS-5-CONFIG_I: Configured from console by console
```

4. En el Switch 3 deshabilitar DNS lookup

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

```
S1>en
Password:
S1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
S1(config)#no ip domain-lookup
S1(config)#int vlan 1
S1(config-if)#ip add 192.168.99.2 255.255.255.0
S1(config-if)#
```

```
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)#int vlan 1
S3(config-if)# ip add 192.168.99.3 255.255.255.0
S3(config-if)#
```

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

7. Implement DHCP and NAT for IPv4

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

```
Bogota>en
Bogota#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Bogota(config)#ip dhcp pool vlan30
Bogota(dhcp-config)#network 192.168.30.0 255.255.255.0
Bogota(dhcp-config)#default-router 192.168.30.1
Bogota(dhcp-config)#ip dhcp pool vlan40
Bogota(dhcp-config)#network 192.168.40.0 255.255.255.0
Bogota(dhcp-config)#default-router 192.168.40.1
Bogota(dhcp-config)#ip dhcp pool vlan200
Bogota(dhcp-config)#network 192.168.200.0 255.255.255.0
Bogota(dhcp-config)#default-router 192.168.200.1
Bogota(dhcp-config)#
```

```
Bogota>en
Bogota#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Bogota(config)#ip dhcp pool vlan30
Bogota(dhcp-config)#network 192.168.30.0 255.255.255.0
Bogota(dhcp-config)#default-router 192.168.30.1
Bogota(dhcp-config)#ip dhcp pool vlan40
Bogota(dhcp-config)#network 192.168.40.0 255.255.255.0
Bogota(dhcp-config)#default-router 192.168.40.1
Bogota(dhcp-config)#ip dhcp pool vlan200
Bogota(dhcp-config)#network 192.168.200.0 255.255.255.0
Bogota(dhcp-config)#default-router 192.168.200.1
Bogota(dhcp-config)#end
Bogota#
%SYS-5-CONFIG_I: Configured from console by console
|
```

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 192.168.40.1
192.168.40.30
Bogota(config)#
```

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

```
Miami>en
Miami#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Miami(config)#interface f0/0
Miami(config-if)#ip nat inside
Miami(config-if)#int s0/0/0
Miami(config-if)#ip nat outside
Miami(config-if)#int s0/0/1
Miami(config-if)#ip nat outside
Miami(config-if)#exit
Miami(config)#
```

```
Miami>en
Miami#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Miami(config)#interface f0/0
Miami(config-if)#ip nat inside
Miami(config-if)#int s0/0/0
Miami(config-if)#ip nat outside
Miami(config-if)#int s0/0/1
Miami(config-if)#ip nat outside
Miami(config-if)#exit
Miami(config)#
```

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.

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.

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

Conclusiones

➢ La práctica tiene un manual de instrucciones para la resolución de los ejercicios, en los cuales se aplicó diferentes estructuras como por ejemplo, se armó una topología simple mediante cableado LAN Ethernet, se accedió a diferentes switch Cisco para su configuración, utilizando los métodos de acceso de consola y remoto, también se visualizó la configuración predeterminada de cada componente, antes de configurar los parámetros básicos.

➢ (ACL) para permitir el acceso de direcciones IP específicas, lo que asegura que solo la computadora del administrador tenga permiso para acceder al router mediante telnet o SSH.

➢ En general se expresa satisfacción por el aprendizaje adquirido durante el desarrollo del curso y la aplicación de la teoría vista en la plataforma cisco, obteniendo grandes conocimientos en mi desarrollo profesional

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