

EVALUACIÓN PRUEBA DE HABILIDADES PRÁCTICAS CCNA

POR : EDWIN IVAN MONTOYA ESCOBAR

UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA UNAD  
ESCUELA DE CIENCIAS BÁSICAS TECNOLOGÍA E INGENIERÍA  
DIPLOMADO CCNA  
OPCIÓN DE GRADO PARA INGENIERÍA ELECTRÓNICA  
BOGOTÁ DC  
AÑO 2018

EVALUACIÓN – PRUEBA DE HABILIDADES PRÁCTICAS CCNA

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Diplomado CCNA como opción de grado del programa ingeniería electrónica

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## Dedicatoria.

En estas cortas líneas quiero expresar el amor que siento por mi familia mi profesión y muchas cosas bellas que la vida me ha regalado; En especial quiero dedicarle este capítulo importante de mi vida a mi familia, a mis padres por haberme inculcado valores para ser un ciudadano de bien, a mi amada esposa, por apoyarme en este camino universitario, ya que ella fue mi inspiración para poder convertirme en un profesional digno de una mujer maravillosa como lo es ella, a mi valorada UNAD ya que en ella forje un sin número de aprendizajes que hoy me permiten ser un profesional, a mis profesores Unadistas, quienes me dieron asesorías oportunas en mi recorrido por la institución, y a mis compañeros de carrera quienes me enseñaron del trabajo en equipo y la paciencia que debe tener un profesional en un mundo pluralista como en el que vivimos.

## CONTENIDO

INTRODUCCIÓN

DESARROLLO DEL TRABAJO.

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## INTRODUCCIÓN

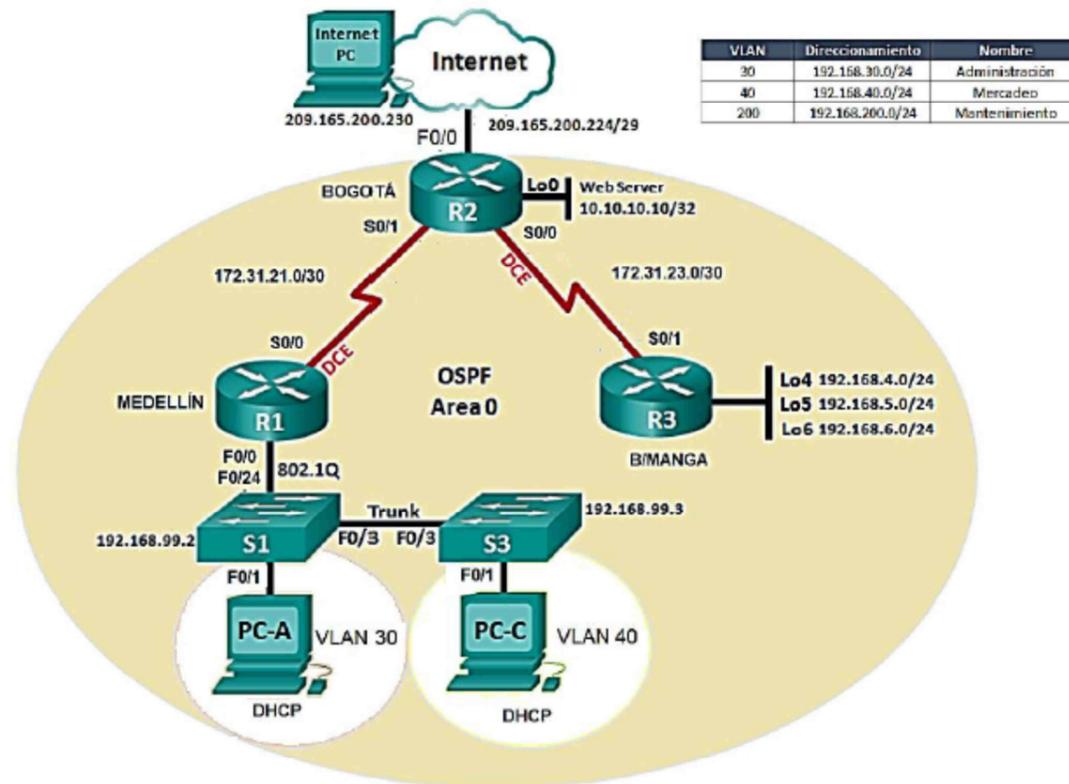
Por medio del presente documento se pretenden evidenciar las competencias obtenidas a lo largo del curso, DIPLOMADO DE PROFUNDIZACIÓN CISCO (DISEÑO E IMPLEMENTACIÓN DE SOLUCIONES INTEGRADAS LAN/WAN) (OPCI 203092A\_471), por medio de una prueba de habilidades prácticas en CCNA, la cual profundiza un caso para la solución a un problema en que se puede llegar a presentar en algún aspecto relacionado con Networking.

## DESARROLLO DEL TRABAJO.

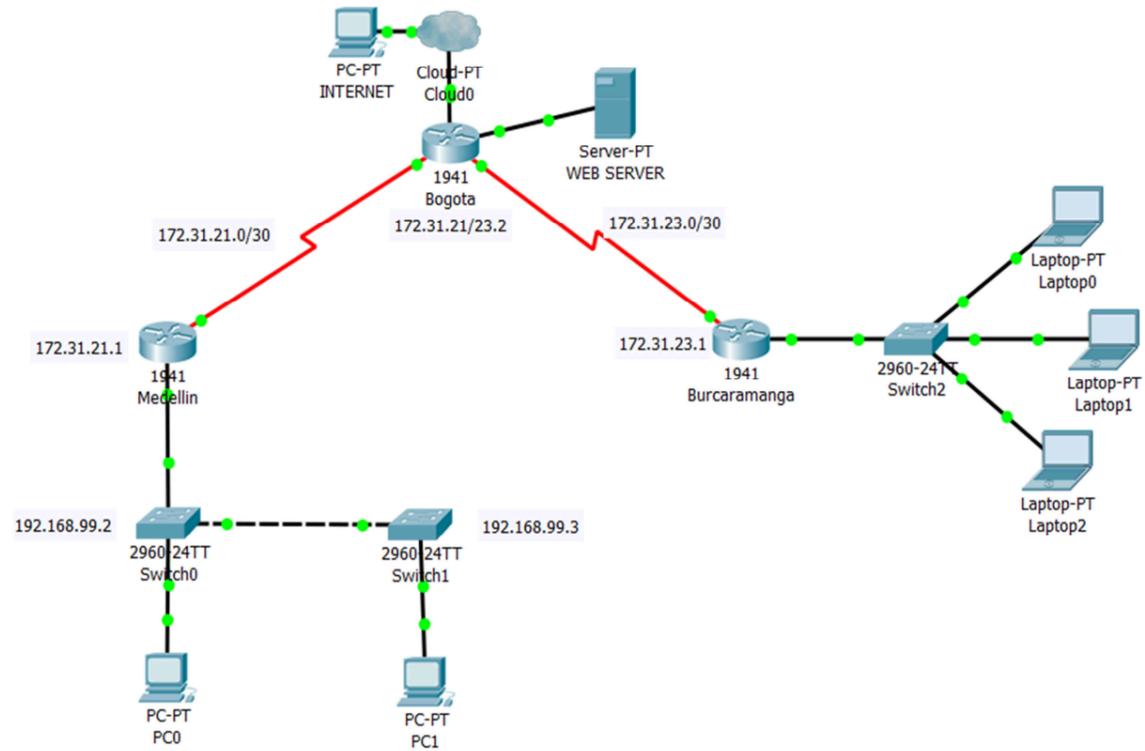
### Descripción del escenario propuesto para la prueba de habilidades

**Escenario:** Una empresa de Tecnología posee tres sucursales distribuidas en las ciudades de Bogotá, Medellín y Bucaramanga, 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



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**

Configuration Item or Task	Specification
Router ID R1	1.1.1.1
Router ID R2	2.2.2.2
Router ID R3	3.3.3.3
Configurar todas las interfaces LAN como pasivas	
Establecer el ancho de banda para enlaces seriales en	128 Kb/s
Ajustar el costo en la métrica de S0/0 a	7500

Establecer el ancho de banda para enlaces seriales en 128 Kb/s

**R1**

```
Medellin#show interfaces serial 0/0/0
Serial0/0/0 is up, line protocol is up (connected)
Hardware is HD64570
Internet address is 172.31.21.1/30
MTU 1500 bytes, BW 128 Kbit, DLY 20000 usec,
```

## R2

```
Bogota#show interface serial 0/0/0
Serial0/0/0 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 172.31.21.2/30
  MTU 1500 bytes, BW 128 Kbit, DLY 20000 usec,
Bogota#show interface serial 0/0/1
Serial0/0/1 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 172.31.23.2/30
  MTU 1500 bytes, BW 128 Kbit, DLY 20000 usec,
```

## R3

```
Bucaramanga#show interfaces ser0/0/1
Serial0/0/1 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 172.31.23.1/30
  MTU 1500 bytes, BW 128 Kbit, DLY 20000 usec,
```

7500

Ajustar el costo en la métrica de S0/0 a

## R1

```
Medellin#show ip ospf interface serial 0/0/0
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: 7500
```

## R2

```
Bogota#show ip ospf interface serial 0/0/0
Serial0/0/0 is up, line protocol is up
  Internet address is 172.31.21.2/30, Area 0
  Process ID 1, Router ID 2.2.2.2, Network Type POINT-TO-POINT, Cost: 7500
```

## Verificar información de OSPF

- Visualizar tablas de enrutamiento y routers conectados por OSPFv2

## R1

```
Medellin#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 not set

 10.0.0.0/30 is subnetted, 1 subnets
O   10.10.10.8/30 [110/7501] via 172.31.21.2, 03:10:18, Serial0/0/0
C   172.31.0.0/16 is variably subnetted, 3 subnets, 2 masks
C   172.31.21.0/30 is directly connected, Serial0/0/0
L   172.31.21.1/32 is directly connected, Serial0/0/0
O   172.31.23.0/30 [110/8281] via 172.31.21.2, 06:28:49, Serial0/0/0
O   192.168.4.0/24 [110/8282] via 172.31.21.2, 05:49:34, Serial0/0/0
O   192.168.5.0/24 [110/8282] via 172.31.21.2, 05:49:02, Serial0/0/0
O   192.168.6.0/24 [110/8282] via 172.31.21.2, 05:48:45, Serial0/0/0
O   192.168.30.0/24 is variably subnetted, 2 subnets, 2 masks
C   192.168.30.0/24 is directly connected, GigabitEthernet0/0.3
L   192.168.30.1/32 is directly connected, GigabitEthernet0/0.3
O   192.168.40.0/24 is variably subnetted, 2 subnets, 2 masks
C   192.168.40.0/24 is directly connected, GigabitEthernet0/0.4
L   192.168.40.1/32 is directly connected, GigabitEthernet0/0.4
O   209.165.200.0/29 is subnetted, 1 subnets
O   209.165.200.224/29 [110/7501] via 172.31.21.2, 00:48:22,
Serial0/0/0
```

## R2

```
Bogota#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 not set

10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    10.10.10.8/30 is directly connected, GigabitEthernet0/1
L    10.10.10.9/32 is directly connected, GigabitEthernet0/1
L    172.31.0.0/16 is variably subnetted, 4 subnets, 2 masks
C    172.31.21.0/30 is directly connected, Serial0/0/0
L    172.31.21.2/32 is directly connected, Serial0/0/0
C    172.31.23.0/30 is directly connected, Serial0/0/1
L    172.31.23.2/32 is directly connected, Serial0/0/1
O    192.168.4.0/24 [110/782] via 172.31.23.1, 05:52:17, Serial0/0/1
O    192.168.5.0/24 [110/782] via 172.31.23.1, 05:51:45, Serial0/0/1
O    192.168.6.0/24 [110/782] via 172.31.23.1, 05:51:28, Serial0/0/1
O    192.168.30.0/24 [110/7501] via 172.31.21.1, 02:13:08, Serial0/0/0
O    192.168.40.0/24 [110/7501] via 172.31.21.1, 02:12:58, Serial0/0/0
O    209.165.200.0/24 is variably subnetted, 2 subnets, 2 masks
C    209.165.200.224/29 is directly connected, GigabitEthernet0/0
L    209.165.200.225/32 is directly connected, GigabitEthernet0/0
```

## R3

```
Bucaramanga#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 not set

10.0.0.0/30 is subnetted, 1 subnets
O    10.10.10.8/30 [110/65] via 172.31.23.2, 00:49:54, Serial0/0/1
O    172.31.0.0/16 is variably subnetted, 3 subnets, 2 masks
O    172.31.21.0/30 [110/7564] via 172.31.23.2, 06:32:00, Serial0/0/1
C    172.31.23.0/30 is directly connected, Serial0/0/1
L    172.31.23.1/32 is directly connected, Serial0/0/1
C    192.168.4.0/24 is variably subnetted, 2 subnets, 2 masks
L    192.168.4.0/24 is directly connected, GigabitEthernet0/0.4
L    192.168.4.1/32 is directly connected, GigabitEthernet0/0.4
C    192.168.5.0/24 is variably subnetted, 2 subnets, 2 masks
L    192.168.5.0/24 is directly connected, GigabitEthernet0/0.5
L    192.168.5.1/32 is directly connected, GigabitEthernet0/0.5
C    192.168.6.0/24 is variably subnetted, 2 subnets, 2 masks
L    192.168.6.0/24 is directly connected, GigabitEthernet0/0.6
L    192.168.6.1/32 is directly connected, GigabitEthernet0/0.6
O    192.168.30.0/24 [110/7565] via 172.31.23.2, 02:13:47, Serial0/0/1
O    192.168.40.0/24 [110/7565] via 172.31.23.2, 02:13:37, Serial0/0/1
O    209.165.200.0/29 is subnetted, 1 subnets
O    209.165.200.224/29 [110/65] via 172.31.23.2, 00:51:43, Serial0/0/1
```

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

## R1

```
Medellin#show 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: 7500
 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
 Neighbor Count is 1 , Adjacent neighbor count is 1
   Adjacent with neighbor 2.2.2.2
 Suppress hello for 0 neighbor(s)
GigabitEthernet0/0.3 is up, line protocol is up
 Internet address is 192.168.30.1/24, Area 0
 Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
 Transmit Delay is 1 sec, State DR, Priority 1
 Designated Router (ID) 1.1.1.1, Interface address 192.168.30.1
 No backup designated router on this network
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
   Hello due in 00:00:03
 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 0, Adjacent neighbor count is 0
 Suppress hello for 0 neighbor(s)
GigabitEthernet0/0.4 is up, line protocol is up
 Internet address is 192.168.40.1/24, Area 0
 Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
 Transmit Delay is 1 sec, State DR, Priority 1
 Designated Router (ID) 1.1.1.1, Interface address 192.168.40.1
 No backup designated router on this network
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
   Hello due in 00:00:03
 Index 3/3, flood queue length 0
 Next 0x0(0)/0x0(0)
 Last flood scan length is 1, maximum is 1
 Last flood scan time is 0 msec, maximum is 0 msec
 Neighbor Count is 0, Adjacent neighbor count is 0
 Suppress hello for 0 neighbor(s)
```

## R2

Bogota#show ip ospf interface

```
Serial0/0/0 is up, line protocol is up
Internet address is 172.31.21.2/30, Area 0
Process ID 1, Router ID 2.2.2.2, Network Type POINT-TO-POINT, Cost: 7500
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 00:00:08
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1, Adjacent neighbor count is 1
  Adjacent with neighbor 1.1.1.1
  Suppress hello for 0 neighbor(s)
Serial0/0/1 is up, line protocol is up
Internet address is 172.31.23.2/30, Area 0
Process ID 1, Router ID 2.2.2.2, Network Type POINT-TO-POINT, Cost: 781
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 00:00:08
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 3.3.3.3

GigabitEthernet0/0 is up, line protocol is up
Internet address is 209.165.200.225/29, Area 0
Process ID 1, Router ID 2.2.2.2, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 2.2.2.2, Interface address 209.165.200.225
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  No Hellos (Passive interface)
Index 3/3, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
GigabitEthernet0/1 is up, line protocol is up
Internet address is 10.10.10.9/30, Area 0
Process ID 1, Router ID 2.2.2.2, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 2.2.2.2, Interface address 10.10.10.9
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  No Hellos (Passive interface)
Index 4/4, 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)
```

### R3

Bucaramanga#show ip ospf interface

```
Serial0/0/1 is up, line protocol is up
  Internet address is 172.31.23.1/30, Area 0
  Process ID 1, Router ID 3.3.3.3, Network Type POINT-TO-POINT, Cost: 781
  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 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 2.2.2.2
  Suppress hello for 0 neighbor(s)
GigabitEthernet0/0.4 is up, line protocol is up
  Internet address is 192.168.4.1/24, Area 0
  Process ID 1, Router ID 3.3.3.3, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 3.3.3.3, Interface address 192.168.4.1
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:06
  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 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)

GigabitEthernet0/0.5 is up, line protocol is up
  Internet address is 192.168.5.1/24, Area 0
  Process ID 1, Router ID 3.3.3.3, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 3.3.3.3, Interface address 192.168.5.1
  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 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
GigabitEthernet0/0.6 is up, line protocol is up
  Internet address is 192.168.6.1/24, Area 0
  Process ID 1, Router ID 3.3.3.3, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 3.3.3.3, Interface address 192.168.6.1
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:06
  Index 4/4, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
```

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

## R1

```
Medellin#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 1.1.1.1
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.31.21.0 0.0.0.3 area 0
    192.168.0.0 0.0.255.255 area 0
  Passive Interface(s):
    GigabitEthernet0/0
    GigabitEthernet0/1
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110          00:04:34
    2.2.2.2          110          00:11:07
    3.3.3.3          110          00:12:01
  Distance: (default is 110)
```

## R2

```
Bogota#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 2.2.2.2
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.31.0.0 0.0.255.255 area 0
    209.165.0.0 0.0.255.255 area 0
    10.10.10.0 0.0.0.3 area 0
  Passive Interface(s):
    GigabitEthernet0/0
    GigabitEthernet0/1
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110          00:08:14
    2.2.2.2          110          00:14:46
    3.3.3.3          110          00:15:40
  Distance: (default is 110)
```

### R3

```
Bucaramanga#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 3.3.3.3
```

```
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
```

```
Maximum path: 4
```

```
Routing for Networks:
```

```
172.31.23.0 0.0.0.3 area 0
```

```
192.168.0.0 0.0.255.255 area 0
```

```
Passive Interface(s):
```

```
GigabitEthernet0/0
```

```
GigabitEthernet0/1
```

```
Routing Information Sources:
```

```
Gateway Distance Last Update
```

```
1.1.1.1 110 00:09:31
```

```
2.2.2.2 110 00:16:03
```

```
3.3.3.3 110 00:16:57
```

```
Distance: (default is 110)
```

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

### SW1

```
Switch#show vlan brief
```

VLAN Name	Status	Ports
1 default	active	Fa0/2, 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 Gig0/1, Gig0/2
30 Administracion	active	Fa0/1
1002 fddi-default	active	
1003 token-ring-default	active	
1004 fddinet-default	active	
1005 trnet-default	active	

```
Switch#
```

### SW3

```
Switch#show vlan brief
```

VLAN Name	Status	Ports
1 default	active	Fa0/2, 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, Gig0/1, Gig0/2
40 Mercadeo	active	Fa0/1
1002 fddi-default	active	
1003 token-ring-default	active	
1004 fddinet-default	active	
1005 trnet-default	active	

```
Switch#
```

4. En el Switch 3 deshabilitar DNS lookup

```
no ip domain-lookup
```

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

```
SW1 ip address 192.168.99.2 255.255.255.0
```

```
SW3 ip address 192.168.99.3 255.255.255.0
```

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.

```
ip dhcp pool lan30
network 192.168.30.0 255.255.255.0
default-router 192.168.30.1
ip dhcp pool lan40
network 192.168.40.0 255.255.255.0
default-router 192.168.40.1
.
```

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

```
ip dhcp excluded-address 192.168.30.1 192.168.30.30
ip dhcp excluded-address 192.168.40.1 192.168.40.30
```

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

```
ip nat inside source list 10 interface GigabitEthernet0/0
overload
ip classless
!
ip flow-export version 9
!
!
access-list 10 permit 172.31.21.0 0.0.0.3
access-list 10 permit 172.31.23.0 0.0.0.3
```

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.

```
02:27:18: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial0/0/0
from FULL to DOWN, Neighbor Down: Interface down or detached
access-list 10 permit 172.31.23.0 0.0.0.3
access-list 20 permit host 192.168.30.1
access-list 30 deny host 192.168.6.1
.
```

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.

```
access-list 100 deny tcp host 192.168.6.21 any eq www
access-list 101 deny icmp host 192.168.4.21 any
```

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

```
C:\>tracert 192.168.4.21

Tracing route to 192.168.4.21 over a maximum of 30 hops:

  0  1 ms    1 ms    0 ms    192.168.30.1
  1  1 ms    2 ms    0 ms    172.31.21.2
  2  0 ms    1 ms    1 ms    172.31.23.1
  3  1 ms    1 ms    12 ms   192.168.4.21

Trace complete.

C:\>ping 209.165.200.225

Pinging 209.165.200.225 with 32 bytes of data:

Reply from 209.165.200.225: bytes=32 time=1ms TTL=254
Reply from 209.165.200.225: bytes=32 time=1ms TTL=254
Reply from 209.165.200.225: bytes=32 time=1ms TTL=254
Reply from 209.165.200.225: bytes=32 time=2ms TTL=254

Ping statistics for 209.165.200.225:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms
```

```
C:\>tracert 209.165.200.225

Tracing route to 209.165.200.225 over a maximum of 30 hops:

  1  0 ms    0 ms    0 ms    192.168.5.1
  2  0 ms    0 ms    0 ms    209.165.200.225

Trace complete.

C:\>tracert 192.168.40.1

Tracing route to 192.168.40.1 over a maximum of 30 hops:

  1  0 ms    0 ms    2 ms    192.168.5.1
  2  0 ms    1 ms    0 ms    172.31.23.2
  3  1 ms    1 ms    1 ms    192.168.40.1

Trace complete.

C:\>|
```

```
Bogota#ping 192.168.30.31

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.30.31, timeout is 2
seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max =
1/6/27 ms

Bogota#ping 192.168.6.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.6.1, timeout is 2
seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max =
1/3/10 ms

Bogota#
```

## CONCLUSIONES

Queda para mí como estudiante la satisfacción de haber adquiridos conocimientos, los cuales me servirán para mi futuro profesional como ingeniero electrónico, ya que las soluciones integradas lan/wan, pueden ser aplicadas de igual manera en el campo industrial,

## BIBLIOGRAFÍA

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