

ESCUELA DE CIENCIAS BÁSICAS TECNOLOGÍAS E INGENIERÍA
DIPLOMADO CISCO OPCIÓN DE GRADO



TRABAJO FINAL
DIPLOMADO CISCO

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NOVIEMBRE DE 2018

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INTRODUCCIÓN

La “Prueba de habilidades prácticas”, es el paso final en las actividades del Diplomado de Profundización CCNA, lo que identifica el alcance de competencia y habilidades obtenidas por el estudiante en el desarrollo del diplomado de profundización.

El desarrollo de la actividad pretende dar solución a ciertos parámetros establecidos para lograr comunicar tres ciudades de Colombia, se implementa una serie de comandos y condiciones de operación que permiten la comunicación en internet de los hosts conectados a otra red de entre las ciudades de Medellín, Bucaramanga y Bogotá, poniendo en práctica los conceptos de VLANs, los servidores DHCP, topologías de red , información de OSPF entre otros.

OBJETIVOS

Objetivo General

Ejecutar de manera asertiva la prueba de habilidades propuesta en el DIPLOMADO DE PROFUNDIZACIÓN CISCO (DISEÑO E IMPLEMENTACIÓN DE SOLUCIONES INTEGRADAS LAN / WAN), ofreciendo una solución completa que cumpla con los parámetros designados en el planteamiento de las condiciones de navegación de red, en las diferentes ciudades planteadas en el ejercicio.

Objetivos Específicos

- ✓ Uso de la herramienta Cisco Packet Tracer.
- ✓ Elegir los dispositivos necesarios y adecuados para la topología de la red.
- ✓ Configurar el servidor DHCP.
- ✓ Configurar el direccionamiento IP acorde con la topología de red para cada dispositivo.
- ✓ Configurar las VLANs, puertos troncales y de acceso, parámetros de seguridad.
- ✓ Configurar seguridad de switches acorde con la topología de red.
- ✓ Comprobar la conectividad de los dispositivos de la red.

DESARROLLO DE TRABAJO

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

```
IOS Command Line Interface
BOGOTA(config-if)#NO SH
%LINK-5-CHANGED: Interface Serial3/0, changed state to down
BOGOTA(config-if)#
BOGOTA(config-if)#EXIT
BOGOTA(config)#EXIT
BOGOTA#
%SYS-5-CONFIG_I: Configured from console by console

BOGOTA#
BOGOTA#
BOGOTA#SHO IP INTERFACE BRIE
BOGOTA#SHO IP INTERFACE BRIEF
Interface                IP-Address      OK? Method Status
Protocol
FastEthernet0/0          209.165.200.225 YES manual up
down
FastEthernet1/0          unassigned      YES unset
administratively down down
Serial2/0                 172.31.21.1     YES manual down
down
Serial3/0                 172.31.23.1     YES manual down
down
FastEthernet4/0          unassigned      YES unset
administratively down down
FastEthernet5/0          unassigned      YES unset
administratively down down
BOGOTA#
```

Imagen 1. Configuración Direccionamiento Router Bogotá

```
B/MANGA(config)#exit
B/MANGA#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
B/MANGA#sho ip interface brief
Interface          IP-Address      OK? Method Status
Protocol
FastEthernet0/0    unassigned      YES unset
administratively down down
FastEthernet1/0    unassigned      YES unset
administratively down down
Serial2/0           unassigned      YES unset
administratively down down
Serial3/0           172.31.23.2     YES manual up
up
FastEthernet4/0    unassigned      YES unset
administratively down down
FastEthernet5/0    unassigned      YES unset
administratively down down
Loopback4           192.168.4.1     YES manual up
up
Loopback5           192.168.5.1     YES manual up
up |
Loopback6           192.168.6.1     YES manual up
up
B/MANGA#
```

Imagen 2. Configuración Direccionamiento Router Bucaramanga

```
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN(config)#exit
MEDELLIN#
%SYS-5-CONFIG_I: Configured from console by console

MEDELLIN#sho ip interface brief
Interface          IP-Address      OK? Method Status
Protocol
FastEthernet0/0    unassigned      YES unset up
up
FastEthernet0/0.30 192.168.30.1     YES manual up
up
FastEthernet0/0.40 192.168.40.1     YES manual up
up
FastEthernet1/0    unassigned      YES unset
administratively down down
Serial2/0           172.31.21.2     YES manual up
up
Serial3/0           unassigned      YES unset
administratively down down
FastEthernet4/0    unassigned      YES unset
administratively down down
FastEthernet5/0    unassigned      YES unset
administratively down down
MEDELLIN#wr
Building configuration...
[OK]
MEDELLIN#
```

Imagen 3. Configuración Direccionamiento Router Medellin.

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

2.1 Verificar OSPF

2.1.1. Visualizar tablas de enrutamiento y routers conectados por OSPFv2

MEDELLIN#sho 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, 2 subnets
C 172.31.21.0 is directly connected, Serial3/0
O 172.31.23.0 [110/15000] via 172.31.21.1, 00:06:50, Serial3/0
O E2 192.168.4.0/24 [110/20] via 172.31.21.1, 00:11:48, Serial3/0
O E2 192.168.5.0/24 [110/20] via 172.31.21.1, 00:11:48, Serial3/0
O E2 192.168.6.0/24 [110/20] via 172.31.21.1, 00:11:48, Serial3/0
C 192.168.30.0/24 is directly connected, FastEthernet0/0.30
C 192.168.40.0/24 is directly connected, FastEthernet0/0.40
C 192.168.200.0/24 is directly connected, FastEthernet0/0.200
209.165.200.0/29 is subnetted, 1 subnets
O 209.165.200.224 [110/7501] via 172.31.21.1, 00:07:34, Serial3/0

BOGOTA#sho ip rou

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, Serial2/0
C 172.31.23.0 is directly connected, Serial3/0

```
O E2 192.168.4.0/24 [110/20] via 172.31.23.2, 00:13:24, Serial3/0
O E2 192.168.5.0/24 [110/20] via 172.31.23.2, 00:13:24, Serial3/0
O E2 192.168.6.0/24 [110/20] via 172.31.23.2, 00:13:24, Serial3/0
O 192.168.30.0/24 [110/65] via 172.31.21.2, 00:13:24, Serial2/0
O 192.168.40.0/24 [110/65] via 172.31.21.2, 00:13:24, Serial2/0
O 192.168.200.0/24 [110/65] via 172.31.21.2, 00:13:24, Serial2/0
209.165.200.0/29 is subnetted, 1 subnets
C 209.165.200.224 is directly connected, FastEthernet0/0
```

```
B/MANGA#sho 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, 2 subnets
O 172.31.21.0 [110/128] via 172.31.23.1, 00:14:21, Serial3/0
C 172.31.23.0 is directly connected, Serial3/0
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
209.165.200.0/29 is subnetted, 1 subnets
O 209.165.200.224 [110/65] via 172.31.23.1, 00:14:21, Serial3/0
```

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

```
MEDELLIN#sho ip ospf interface serial 3/0
```

```
Serial3/0 is up, line protocol is up
Internet address is 172.31.21.2/30, 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 00:00:08
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 2.2.2.2
Suppress hello for 0 neighbor(s)
MEDELLIN#
```

```
BOGOTA#sho ip ospf interface serial 2/0
```



```
Serial2/0 is up, line protocol is up
Internet address is 172.31.21.1/30, Area 0
Process ID 1, Router ID 2.2.2.2, 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 00:00:05
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1 , Adjacent neighbor count is 1
Adjacent with neighbor 1.1.1.1
Suppress hello for 0 neighbor(s)
BOGOTA#sho ip ospf interface serial 3/0
```

```
Serial3/0 is up, line protocol is up
Internet address is 172.31.23.1/30, 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 00:00:05
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
Suppress hello for 0 neighbor(s)
BOGOTA#
```

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

```
FastEthernet4/0      unassigned      YES unset
administratively down down
FastEthernet5/0      unassigned      YES unset
administratively down down
MEDELLIN#sho ip p
MEDELLIN#sho 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
    192.168.30.0 0.0.0.255 area 0
    192.168.40.0 0.0.0.255 area 0
    192.168.200.0 0.0.0.255 area 0
  Passive Interface(s):
    FastEthernet0/0
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110          00:26:29
    2.2.2.2          110          00:25:45
    3.3.3.3          110          00:00:51
  Distance: (default is 110)

MEDELLIN#
```

Imagen 4. Show ip protocols Router Medellin.

```
Adjacent with neighbor 3.3.3.3
 Suppress hello for 0 neighbor(s)
BOGOTA#
BOGOTA#
BOGOTA#sho ip pro
BOGOTA#sho 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
  It is an autonomous system boundary router
  Redistributing External Routes from,
    connected
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.31.21.0 0.0.0.3 area 0
    172.31.23.0 0.0.0.3 area 0
    209.165.200.224 0.0.0.7 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110          00:00:46
    2.2.2.2          110          00:00:02
    3.3.3.3          110          00:05:09
  Distance: (default is 110)

BOGOTA#
```

Imagen 5. Show ip protocols Router Bogotá.

```
E/MANGA>ena
E/MANGA#sho ip protoco
E/MANGA#sho 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
  It is an autonomous system boundary router
  Redistributing External Routes from,
    connected
  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
  Routing Information Sources:
    Gateway         Distance      Last Update
  1.1.1.1           110          00:54:17
  2.2.2.2           110          00:01:00
  3.3.3.3           110          00:06:07
  Distance: (default is 110)

E/MANGA#
E/MANGA#
E/MANGA#
```

Imagen 6. Show ip protocols Router Bucaramanga.

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

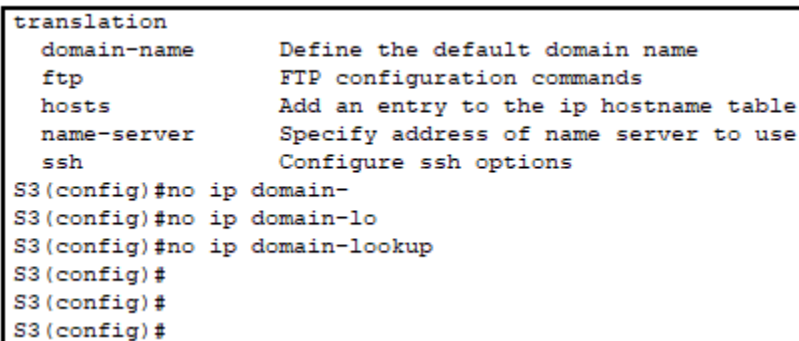
3.1 SWITCH 1

```
ena
conf t
hostname S1
vlan 30
name Administracion
vlan 40
name Mercadeo
vlan 200
name Mantenimiento
interface fa0/24
sw mode trunk
sw trunk allowed vlan all
exit
interface fa0/3
sw mode trunk
sw trunk allowed vlan all
exit
interface vlan 1
no sh
ip add 192.168.99.3 255.255.255.0
exit
interface fa0/1
sw mode access
sw access vlan 30
description PC-A
exit
```

3.2 SWITCH 3

```
ena
conf t
hostname S3
vlan 30
name Administracion
vlan 40
name Mercadeo
vlan 200
name Mantenimiento
interface fa0/24
sw mode trunk
sw trunk allowed vlan all
exit
interface fa0/3
sw mode trunk
sw trunk allowed vlan all
exit
interface vlan 1
no sh
ip add 192.168.99.3 255.255.255.0
exit
interface fa0/1
sw mode access
sw access vlan 40
description PC-C
exit
```

4. En el Switch 3 deshabilitar DNS lookup.



```
translation
 domain-name      Define the default domain name
 ftp              FTP configuration commands
 hosts           Add an entry to the ip hostname table
 name-server     Specify address of name server to use
 ssh            Configure ssh options
S3(config)#no ip domain-
S3(config)#no ip domain-lo
S3(config)#no ip domain-lookup
S3(config)#
S3(config)#
S3(config)#
```

Imagen 7. Deshabilitar DNS lookup S3.

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

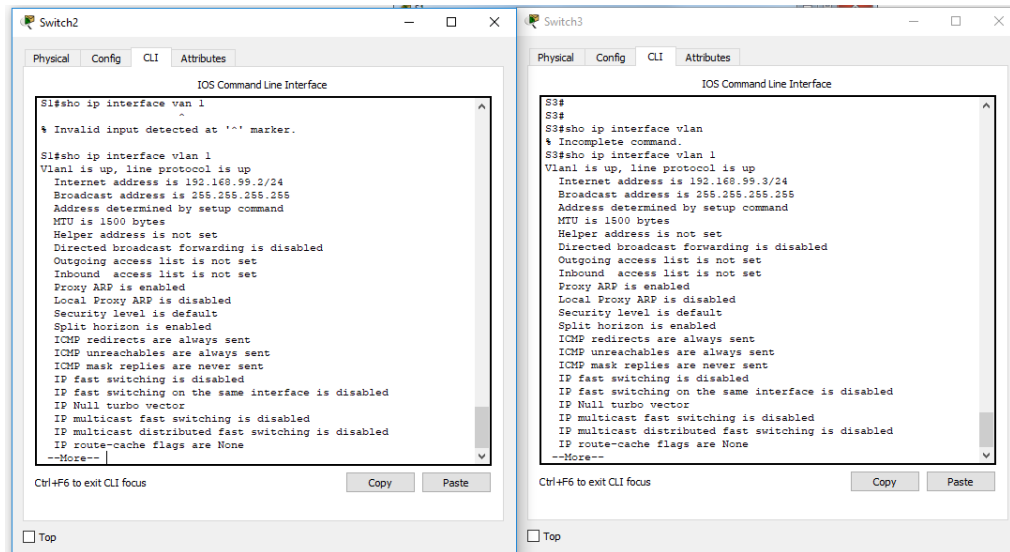


Imagen 8. Show ip interface vlan 1 S1 y S2.

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

```

sho ip interface brief
Interface                IP-Address      OK? Method Status          Protocol
FastEthernet0/1          unassigned      YES manual up              up
FastEthernet0/2          unassigned      YES manual administratively down down
FastEthernet0/3          unassigned      YES manual up              up
FastEthernet0/4          unassigned      YES manual administratively down down
FastEthernet0/5          unassigned      YES manual administratively down down
FastEthernet0/6          unassigned      YES manual administratively down down
FastEthernet0/7          unassigned      YES manual administratively down down
FastEthernet0/8          unassigned      YES manual administratively down down
FastEthernet0/9          unassigned      YES manual administratively down down
FastEthernet0/10         unassigned      YES manual administratively down down
FastEthernet0/11         unassigned      YES manual administratively down down
FastEthernet0/12         unassigned      YES manual administratively down down
FastEthernet0/13         unassigned      YES manual administratively down down
FastEthernet0/14         unassigned      YES manual administratively down down
FastEthernet0/15         unassigned      YES manual administratively down down
FastEthernet0/16         unassigned      YES manual administratively down down
FastEthernet0/17         unassigned      YES manual administratively down down
FastEthernet0/18         unassigned      YES manual administratively down down
FastEthernet0/19         unassigned      YES manual administratively down down
FastEthernet0/20         unassigned      YES manual administratively down down
FastEthernet0/21         unassigned      YES manual administratively down down
FastEthernet0/22         unassigned      YES manual administratively down down
FastEthernet0/23         unassigned      YES manual administratively down down
FastEthernet0/24         unassigned      YES manual administratively down down
GigabitEthernet0/1       unassigned      YES manual down              down
GigabitEthernet0/2       unassigned      YES manual down              down
Vlan1                    192.168.99.2    YES manual up              up

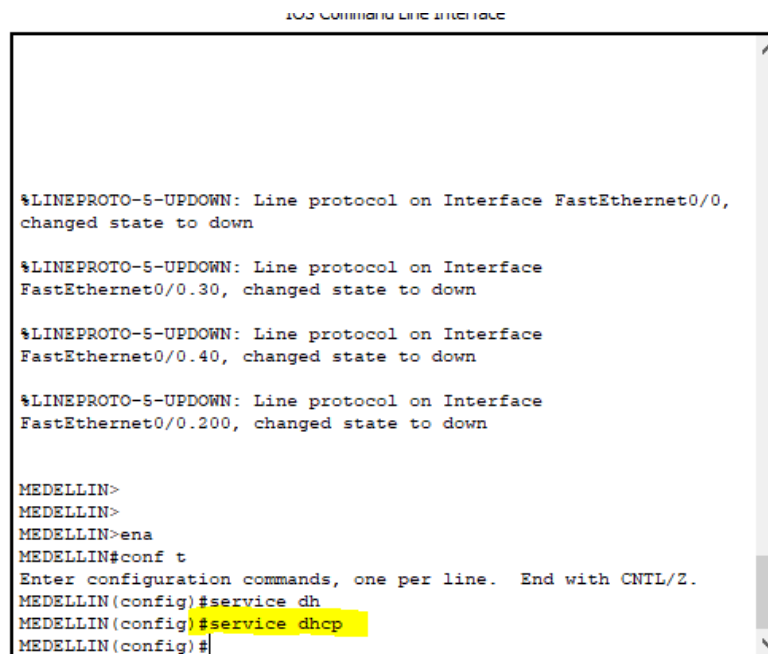
```

Imagen 9. Show ip interface Brief S1.

```
S3#sho ip interface brief
Interface          IP-Address      OK? Method Status      Protocol
FastEthernet0/1    unassigned      YES manual  up          up
FastEthernet0/2    unassigned      YES manual  administratively down down
FastEthernet0/3    unassigned      YES manual  up          up
FastEthernet0/4    unassigned      YES manual  administratively down down
FastEthernet0/5    unassigned      YES manual  administratively down down
FastEthernet0/6    unassigned      YES manual  administratively down down
FastEthernet0/7    unassigned      YES manual  administratively down down
FastEthernet0/8    unassigned      YES manual  administratively down down
FastEthernet0/9    unassigned      YES manual  administratively down down
FastEthernet0/10   unassigned      YES manual  administratively down down
FastEthernet0/11   unassigned      YES manual  administratively down down
FastEthernet0/12   unassigned      YES manual  administratively down down
FastEthernet0/13   unassigned      YES manual  administratively down down
FastEthernet0/14   unassigned      YES manual  administratively down down
FastEthernet0/15   unassigned      YES manual  administratively down down
FastEthernet0/16   unassigned      YES manual  administratively down down
FastEthernet0/17   unassigned      YES manual  administratively down down
FastEthernet0/18   unassigned      YES manual  administratively down down
FastEthernet0/19   unassigned      YES manual  administratively down down
FastEthernet0/20   unassigned      YES manual  administratively down down
FastEthernet0/21   unassigned      YES manual  administratively down down
--More-- |
```

Imagen 10. Show ip interface Brief S3.

7. Implementar DHCP y NAT para IPv4



```
100 Command Line Interface

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

%LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/0.30, changed state to down

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

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

MEDELLIN>
MEDELLIN>
MEDELLIN>ena
MEDELLIN#conf t
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN(config)#service dh
MEDELLIN(config)#service dhcp
MEDELLIN(config)#
```

Imagen 11. Service DHCP Router Medellin.

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

```
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname MEDELLIN
!
!
!
!
ip dhcp excluded-address 192.168.30.1 192.168.30.30
ip dhcp excluded-address 192.168.40.1 192.168.40.30
!
ip dhcp pool red-30
network 192.168.30.0 255.255.255.0
default-router 192.168.30.1
dns-server 10.10.10.11
ip dhcp pool red-40
network 192.168.40.0 255.255.255.0
default-router 192.168.40.1
dns-server 10.10.10.11
!
!
!
ip cef
no ipv6 cef
!
!
```

Imagen 12. Router Medellin como DHCP.

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

```
IOS Command Line Interface
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname MEDELLIN
!
!
!
!
ip dhcp excluded-address 192.168.30.1 192.168.30.30
ip dhcp excluded-address 192.168.40.1 192.168.40.30
!
ip dhcp pool red-30
network 192.168.30.0 255.255.255.0
default-router 192.168.30.1
dns-server 10.10.10.11
ip dhcp pool red-40
network 192.168.40.0 255.255.255.0
default-router 192.168.40.1
dns-server 10.10.10.11
!
!
!
ip cef
no ipv6 cef
!
!
```

Imagen 13. Router Medellin como DHCP, excluyendo 30 primeras IPs.

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

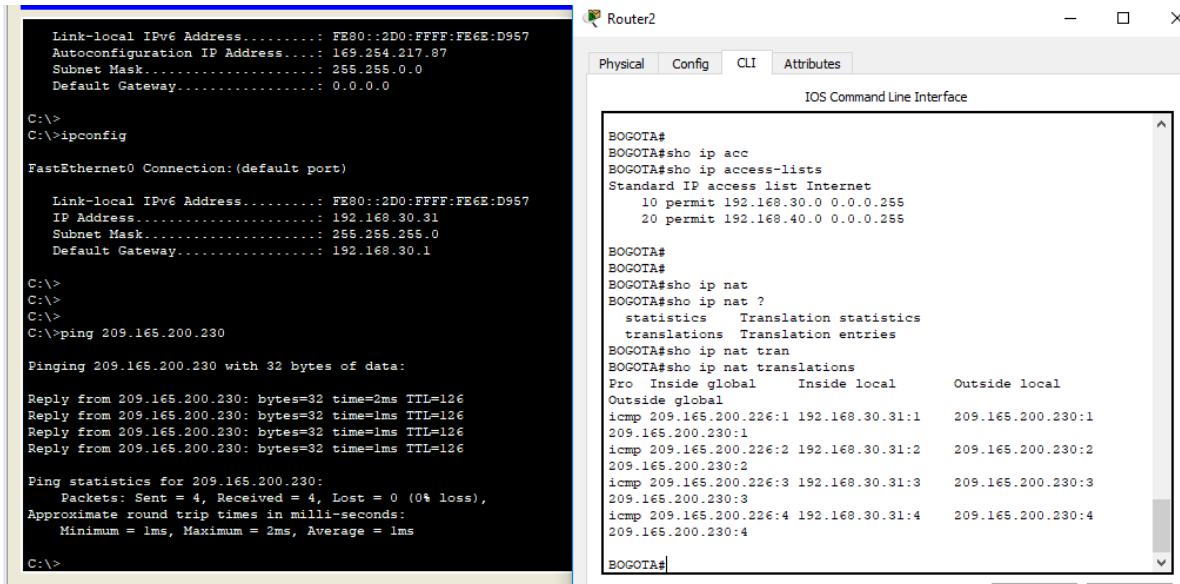


Imagen 14. Prueba de salida a Internet Realizando Nat en Router Bogota.

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

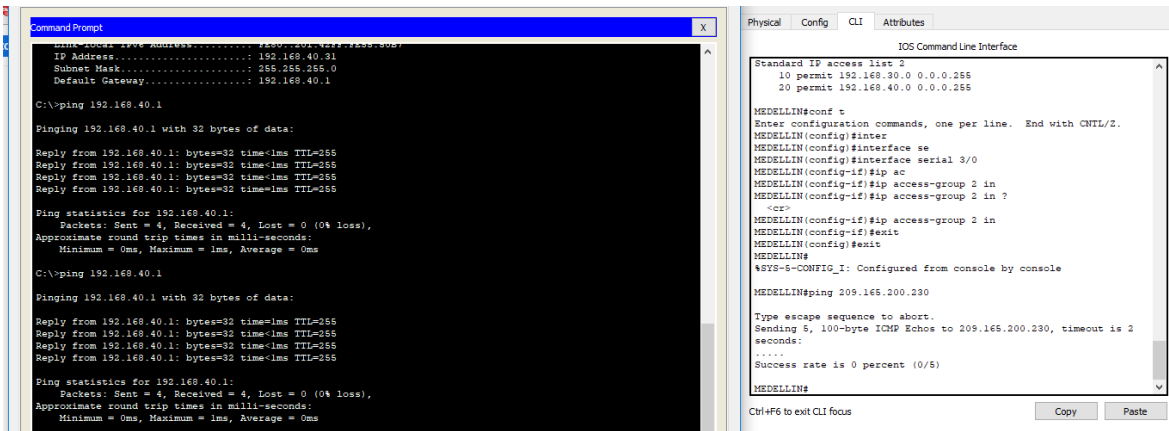


Imagen 15. Lista de acceso de Router 1 a Router 2 solo permite dos segmentos de red.

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

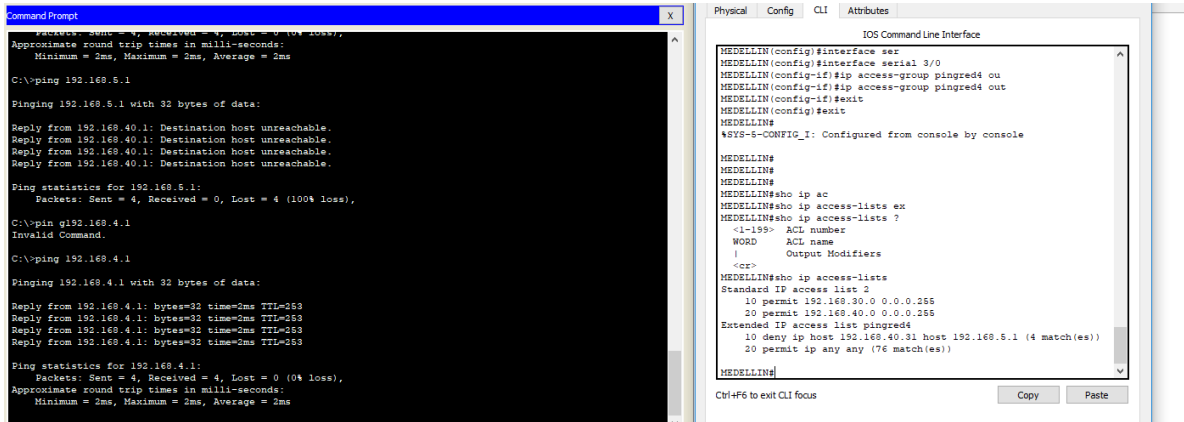


Imagen 16. Lista de acceso de Router 1 a Router 2 solo no permite ping de PC-C a 192.168.4.1

13. Verificar Procesos de comunicación y redireccionamiento de tráfico en los routers mediante el uso de ping y Traceroute.

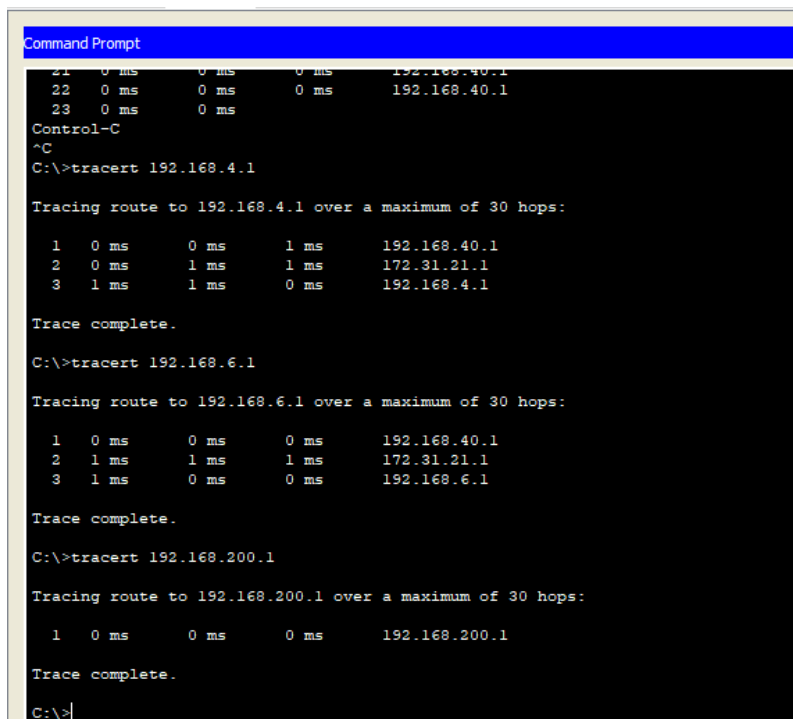


Imagen 17. Trazas de PC-C a Redes B/manga.

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.4.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms

BOGOTA#ping 192.168.5.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.5.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/7 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 = 1/3/7 ms

BOGOTA#ping 192.168.30.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.30.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/7 ms

BOGOTA#ping 192.168.40.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.40.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/8 ms

BOGOTA#ping 192.168.200.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.200.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/5 ms

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 = 1/1/3 ms

BOGOTA#
```

Imagen 18. Ping de Router Bogotá a todas las redes Lan.

CONCLUSIONES

- ✓ El protocolo DHCP está diseñado fundamentalmente para ahorrar tiempo gestionando direcciones IP en una red grande. El servicio DHCP se encuentra activo en un servidor que concentra todas las direcciones IP de la red.
- ✓ Los usuarios al usar DHCP, este agiliza y enseña toda la información que necesita para funcionar incluso dirección IP, el servidor de inicio y la información de configuración de red. Ya que las solicitudes DHCP pueden enviar por subredes, se podría contrarrestar el uso de servidores de inicio en la red cuando se utiliza el inicio de red DHCP.
- ✓ Las NAT consiste en transportar los paquetes de información a través del router sin importar la clase, se consideran el único mecanismo utilizado para intercomunicar redes.
- ✓ El inicio RARP requiere que cada subred tenga un servidor de inicio.

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