



DIPLOMADO DE PROFUNDIZACIÓN CISCO

“(DISEÑO E IMPLEMENTACIÓN DE SOLUCIONES INTEGRADAS LAN / WAN)”

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INGENIERIA DE SISTEMAS  
BOGOTA 2020



## AGRADECIMIENTOS

Este es un reto total para mí, Gracias primeramente a Dios él ha sido fiel, he podido culminar esta meta, a pesar de que fui madre joven, pero no fue un obstáculo para cumplirlas, Después a mis hijos les agradezco el tiempo que les limite por estar atenta en mis trabajos de mi carrera.

Gracias a la UNAD por dar la oportunidad de realizar mi carrera virtual esta es la mejor manera de salir adelante, solo se necesita disciplina, esfuerzo, y limitarse a realizar diferentes actividades, pero el reto vale la pena, ya estoy a poco de iniciar un nuevo proyecto de vida como profesional de Ingeniería de Sistemas.



## CONTENIDO

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## INTRODUCCION

El uso adecuado de la información implica disponer de ella en el lugar y en el momento preciso. Para esto, los sistemas de búsqueda y recuperación de información constituyen una herramienta indispensable en el ejercicio de cualquier actividad de la vida moderna. Con el acelerado desarrollo tecnológico de las últimas décadas, las actuales formas de acceder al conocimiento humano han revolucionado.

Para cualquier profesional, el conocimiento acerca del funcionamiento de las tecnologías de la información y la comunicación, se han convertido en un reto; pero para los profesionales encargados de seleccionar, organizar y brindar acceso a la información a comunidades de usuarios, más que un reto, constituye una obligación.

## DESARROLLO DEL ESCENARIO 1

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

### Parte 1

#### BOGOTA

```
Router(config)#hostname Bogota
Bogota(config)#
Bogota(config)#line console 0
Bogota(config-line)#password 00000
Bogota(config-line)#login

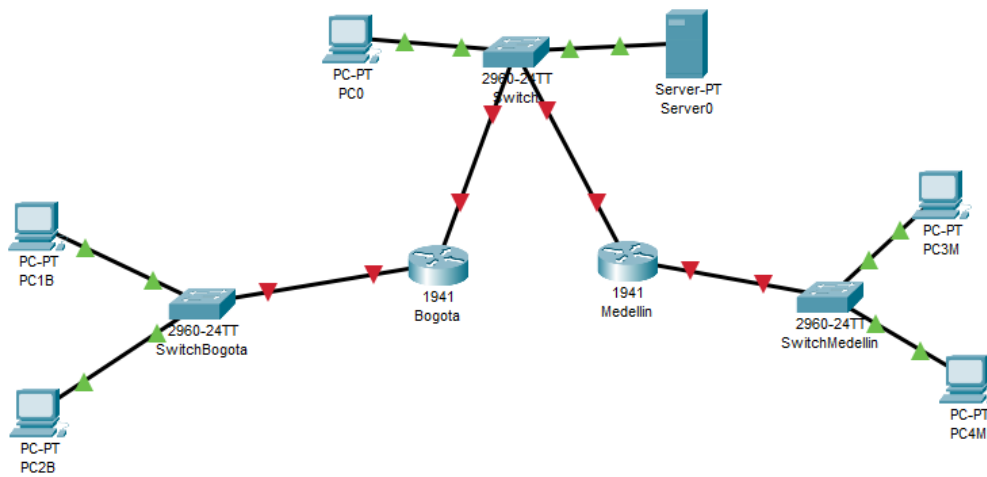
Bogota>en
Bogota#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Bogota(config)#line vty 0 4
Bogota(config-line)#password 00000
Bogota(config-line)#login
Bogota(config-line)#loggin synchronous
Bogota(config-line)#exit
Bogota(config)#
```

#### MEDELLIN

```
Router>enable
Router#configure terminal
Router(config)#hostname Medellin
Medellin(config)#
Medellin(config)#LINE CONSOLE 0
Medellin(config-line)#password 00000
Medellin(config-line)#login
Medellin(config-line)#

Medellin>en
Medellin#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Medellin(config)#line vty 0 4
Medellin(config-line)#password 00000
Medellin(config-line)#loggin synchronous
Medellin(config-line)#exit
Medellin(config)#
```

Se Asigna las direcciones IP, se (Subnetear)



## TOPOLOGIA

- 2 Routers
- 3 Switchs
- 1 Server
- 5 Computadores

**Parte 2**

**CONFIGURACIONES BASICAS**

CONFIGURACIONES	R1	R2
NOMBRE DE HOST	MEDELLIN	BOGOTA
DIRECCION DE IP EN INTERFAZ SERIAL 0/0	192.168.1.99	192.168.1.98
DIRECCION DE IP DE INTERFAZ SERIAL 0/1	192.168.1.0	192.168.1.1
DIRECCION DE INTERFAZ FA 0/0	192.168.1.33	192.168.1.1
PROTOCOLO DE ENRUTAMIENTO	Eigrp	Eigrp
SISTEMA AUTONOMO	200	200
AFIRMACIONES DE RED	192.168.1.0	192.168.1.0

**ENRUTAMIENTO DE ROUTERS Y COMPROBAR REDES Y RUTAS**

**BOGOTA**

```

bogota#show ip route
codes: c - connected, s - static, i - igmp, 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 - egrp
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
192.168.1.0/27 is subnetted, 5 subnets
c 192.168.1.0 is directly connected, fastethernet0/0
s 192.168.1.32 [1/0] via 192.168.1.99
c 192.168.1.96 is directly connected, serial0/0
c 192.168.1.128 is directly connected, serial0/1
    
```

**MEDELLIN**

```

medellin>show ip route
codes: c - connected, s - static, i - igmp, 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 - egrp
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  
192.168.1.0/27 is subnetted, 4 subnets  
s 192.168.1.0 [1/0] via 192.168.1.97  
c 192.168.1.32 is directly connected, fastethernet0/0  
s 192.168.1.64 [1/0] via 192.168.1.97  
c 192.168.1.96 is directly connected, serial0/0

## VERIFICACION DE BALANCEO DE CARGA QUE PRESENTAN LOS ROUTERS

### BOGOTA

```
bogota >enable
bogota#show ip eigrp topology
ip-eigrp topology table for as 1/id(192.168.1.130)
codes: p - passive, a - active, u - update, q - query, r - reply,
r - reply status
p 192.168.1.0/27, 1 successors, fd is 28160
via connected, fastethernet0/0
p 192.168.1.32/27, 1 successors, fd is 2172416
via 192.168.1.99 (2172416/28160), serial0/0
p 192.168.1.64/27, 1 successors, fd is 2172416
p 192.168.1.96/27, 1 successors, fd is 2169856
via connected, serial0/0
p 192.168.1.128/27, 1 successors, fd is 2169856
via connected, serial0/1
```

### MEDELLIN

```
medellin>enable
password:
medellin#show ip eigrp topology
ip-eigrp topology table for as 1/id(192.168.1.99)
codes: p - passive, a - active, u - update, q - query, r - reply,
r - reply status
p 192.168.1.0/27, 1 successors, fd is 2172416
via 192.168.1.98 (2172416/28160), serial0/0
p 192.168.1.32/27, 1 successors, fd is 28160
via connected, fastethernet0/0
p 192.168.1.64/27, 1 successors, fd is 2684416
via 192.168.1.98 (2684416/2172416), serial0/0
p 192.168.1.96/27, 1 successors, fd is 2169856
via connected, serial0/0
p 192.168.1.128/27, 1 successors, fd is 2681856
via 192.168.1.98 (2681856/2169856), serial0/0
```



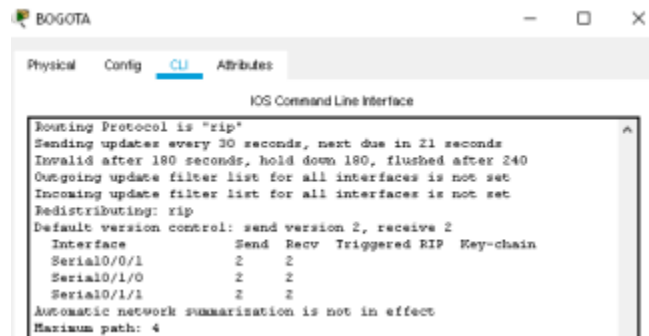
### PARTE 3

## DESHABILITAR LA PROPAGACION DEL PROTOCOL RIP

ROUTER	INTERFAZ
Bogota	SERIAL0/0/1;SERIAL0/1/0;SERIAL0/1/1
Medellin	SERIAL0/0/0;SERIAL0/0/1;SERIAL0/1/0

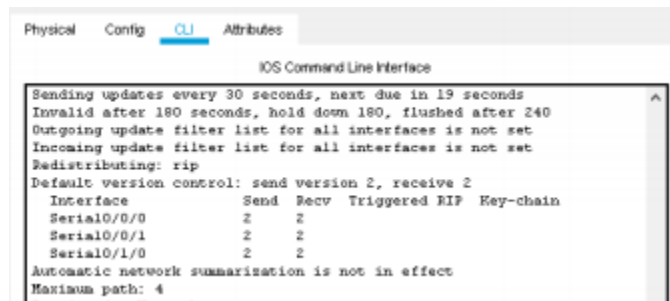
### PARTE 4

## VERIFICACION DEL PROTOCOLO RIP



```

IOS Command Line Interface
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 21 seconds
  Invalid after 180 seconds, hold down 180, flushed after 240
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Redistributing: rip
  Default version control: send version 2, receive 2
  Interface          Send Recv Triggered RIP Key-chain
  Serial0/0/1        2      2
  Serial0/1/0        2      2
  Serial0/1/1        2      2
  Automatic network summarization is not in effect
  Maximum path: 4
  
```



```

IOS Command Line Interface
  Sending updates every 30 seconds, next due in 19 seconds
  Invalid after 180 seconds, hold down 180, flushed after 240
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Redistributing: rip
  Default version control: send version 2, receive 2
  Interface          Send Recv Triggered RIP Key-chain
  Serial0/0/0        2      2
  Serial0/0/1        2      2
  Serial0/1/0        2      2
  Automatic network summarization is not in effect
  Maximum path: 4
  
```



## VERIFICACION DE LA BD DE RIP DE CADA ROUTER

### MEDELLIN

```
Router(config-router)#do show ip route connected
C 192.168.1.0/30 is directly connected, Serial0/0/1
C 192.168.1.8/30 is directly connected, Serial0/1/0
C 192.168.1.12/30 is directly connected, Serial0/1/1
C 200.17.220.0/30 is directly connected, Serial0/0/0
```

### BOGOTA

```
Router(config-router)#do show ip route connected
C 192.168.1.0/30 is directly connected, Serial0/0/0
C 192.168.1.8/30 is directly connected, Serial0/0/1
C 192.168.1.12/30 is directly connected, Serial0/1/0
C 200.17.220.4/30 is directly connected, Serial0/0/0
```

## PARTE 5

### VERIFICACION DEL PROTOCOLO RIP

#### ISP

```
Router>ENABLE
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname ISP
ISP(config)#username MEDELLIN password 00000
ISP(config)#int s0/0/0
ISP(config-if)#encapsulation ppp
ISP(config-if)# %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to down
ISP(config-if)#ppp authentication pap
ISP(config-if)#ppp pap sent-username ISP password cisco
ISP(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
ISP(config-if)#EXIT
ISP(config)#username BOGOTA password 00000
ISP(config)#int s0/0/1
ISP(config-if)#encapsulation ppp
ISP(config-if)# %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to down
ISP(config-if)#ppp authentication chap
```



## PARTE 6 CONFIGURACION DE PAT

### BOGOTA

```
bogota>
bogota>enable
bogota#
bogota#configure terminal
enter configuration commands, one per line. end with cntl/z.
bogota(config)#interface fastethernet0/0
bogota(config-if)#ip address 192.168.1.1 255.255.255.224
bogota(config-if)#
bogota(config-if)#exit
bogota(config)#interface fastethernet0/0
bogota(config-if)#
bogota(config-if)#exit
bogota(config)#interface fastethernet0/0
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 serial0/0
bogota(config-if)#ip address 192.168.1.98 255.255.255.224

bogota(config-if)#no shutdown
%link-5-changed: interface serial0/0, changed state to down
bogota(config-if)#
bogota(config-if)#exit
bogota(config)#interface serial0/0
bogota(config-if)#
bogota(config-if)#exit
bogota(config)#interface serial0/1
bogota(config-if)#ip address 192.168.1.130 255.255.255.224
bogota(config-if)#no shutdown
```



```
bogota#en
bogota#conf t
enter configuration commands, one per line. end with cntl/z.
bogota(config)#ip route 192.168.1.32 255.255.255.224 192.168.1.99
bogota(config)#exit
bogota#
bogota#copy running-config startup-config
destination filename [startup-config]?
building configuration...
[ok]
```

## MEDELLIN

```
medellin>enable
medellin#
medellin#configure terminal
enter configuration commands, one per line. end with cntl/z.
medellin(config)#interface fastethernet0/0
medellin(config-if)#ip address 192.168.1.33 255.255.255.224
medellin(config-if)#no shutdown
medellin(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
medellin(config-if)#exit
medellin(config)#
medellin(config)#interface fastethernet0/0
medellin(config-if)#
medellin(config-if)#exit
medellin(config)#interface serial0/0
medellin(config-if)#ip address 192.168.1.99 255.255.255.224
medellin(config-if)#no shutdown
medellin(config-if)#
%link-5-changed: interface serial0/0, changed state to up

%lineproto-5-updown: line protocol on interface serial0/0, changed state to
up
medellin(config-if)#exit
medellin(config)#ip route 192.168.1.0 255.255.255.224 192.168.1.97
medellin(config)#ip route 192.168.1.64 255.255.255.224 192.168.1.97
medellin(config)#exit
medellin#
%sys-5-config_i: configured from console by console
medellin#copy running-config startup-config
destination filename [startup-config]?
building configuration...
[ok]
medellin#
```

## PARTE 7

### CONFIGURACION DEL SERVICIO DE DHCP

#### BOGOTA

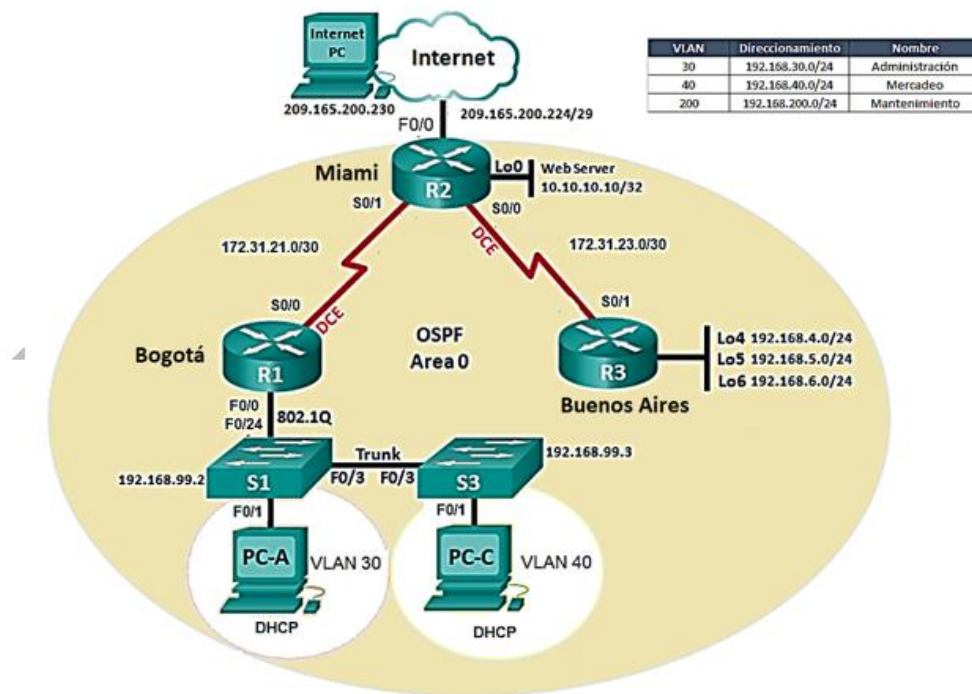
```
router>enable router#conf t
enter configuration commands, one per line. end with cntl/z.
router(config)#ip dhcp excluded-address 192.168.1.98 192.168.1.98
router(config)#ip dhcp excluded-address 192.168.1.98 192.168.1.98
router(config)#ip dhcp pool bogota
router(dhcp-config)#network 192.168.1.98.0 255.255.255.0
router(dhcp-config)#default-router 192.168.1.98
router(dhcp-config)#default-router 192.168.1.98
router(dhcp-config)#dns-server 8.8.8.8
router(dhcp-config)#ip dhcp pool bogota
router(dhcp-config)#network 192.168.1.1 255.255.255.0
router(dhcp-config)#default-router 192.168.1.1
router(dhcp-config)#dns-server 8.8.8.8
router(dhcp-config)#
```

#### MEDELLIN

```
router>enable router#conf t
enter configuration commands, one per line. end with cntl/z.
router(config)#ip dhcp excluded-address 192.168.1.1 192.168.1.5
router(config)#ip dhcp excluded-address 192.168.1.199 192.168.1.199
router(config)#ip dhcp pool medellin
router(dhcp-config)#network 192.168.1.99 255.255.255.128
router(dhcp-config)#default-router 192.168.1.99
router(dhcp-config)#dns-server 8.8.8.8
router(dhcp-config)#exit
router(config)#ip dhcp pool medellin
router(dhcp-config)#network 192.168.1.0 255.255.255.128
router(dhcp-config)#default-router 192.168.1.0
router(dhcp-config)#dns-server 8.8.8.8
router(dhcp-config)#exit
```

## DESARROLLO DEL 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.



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



### ROUTER R1

```
Router>ena Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup Router(config)#hostname R1
R1(config)#enable secret class
R1(config)#line con
0 R1(config-line)#pass cisco
R1(config-line)#login
R1(config-line)#line vty 0 15
R1(config-line)#pass
cisco R1(config-line)#login
R1(config-line)#exit
R1(config)#service password-encryption
R1(config)#banner motd #Acceso solo a personal autorizado#
R1(config)#int s0/0/0
R1(config-if)#ip address 172.31.21.1 255.255.255.252
R1(config-if)#clock rate 128000
R1(config-if)#no shut
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R1(config-if)#
```

### ROUTER R2

```
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup
Router(config)#hostname R2
R2(config)#enable secret class
R2(config)#line con 0

% Invalid input detected at '^' marker.
R2(config)#line con 0
R2(config-line)#pass 00000
R2(config-line)#login
R2(config-line)#line vty 0 15
R2(config-line)#pass cisco
R2(config-line)#login
R2(config-line)#exit
R2(config)#service password- encryption
R2(config)#banner motd #Acceso solo a personal autorizado#
R2(config)#int s0/0/0
R2(config-if)#ip address 172.31.23.1 255.255.255.252
R2(config- if)#clock rate 128000
```



```
R2(config-if)#no shut
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R2(config-if)#int s0/0/1
R2(config-if)#ip address 172.31.21.2 255.255.255.252
R2(config-if)#no shut
R2(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up
R2(config-if)#int f0/0 R2(config-if)#description conexion a ISP
R2(config-if)#ip address 209.165.200.225 255.255.255.248
R2(config-if)#no shut
R2(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
```

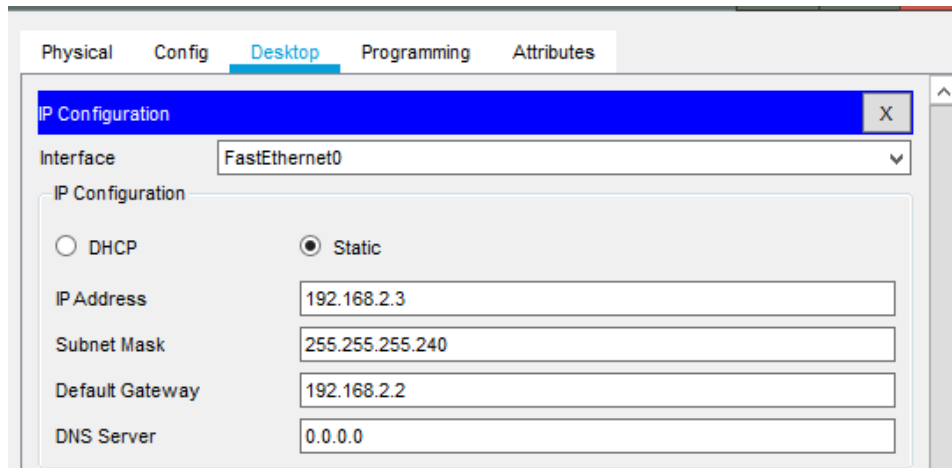
### ROUTER R3

```
Router>cisco
Router#config
Configuring from terminal, memory, or network [terminal]?Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup
Router(config)#hostname R3
R3(config)#enable secret class
R3(config)#line con 0
R3(config-line)#pass cisco
R3(config-line)#login
R3(config-line)#line vty 0 15
R3(config-line)#pass cisco
R3(config-line)#login
R3(config-line)#exit
R3(config)#banner motd #Acceso solo a personal autorizado#
R3(config)#service password-encryption
R3(config)#int s0/0/1
R3(config-if)#ip address 172.31.23.2 255.255.255.252
R3(config-if)#no shut
R3(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up
R3(config)#int lo4
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback4, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback4, changed state to up
R3(config-if)#ip address 192.168.4.1 255.255.255.0 37
```



```

R3(config-if)#no shut R3(config-if)#int lo5
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback5, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback5, changed state to up
R3(config-if)#ip address 192.168.2.2 255.255.255.0
R3(config-if)#no shut
R3(config-if)#int lo6
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback6, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback6, changed state to up
R3(config-if)#ip address 192.168.2.2 255.255.255.0
R3(config-if)#no shut
R3(config-if)#
  
```

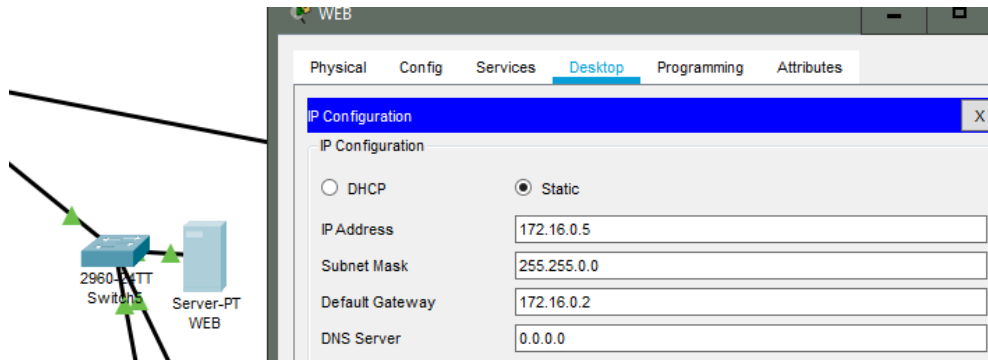


## SWITCH

```

switch>cisco
switch#config t
enter configuration commands, one per line. end with cntl/z.
switch(config)#no ip domain-lookup switch(config)#hostname s1
s1(config)#enable secret class
s1(config)#line con 0
s1 (config-line)#pass cisco
s1(config-line)#login
s1(config-line)#line vty 0
s1(config-line)#pass
cisco s1(config-line)#login
s1(config-line)#exit
s1(config)#service password-encryption
s1(config)#banner motd #acceso solo a personal autorizado#
  
```

```
s1(config)#exit
s1#
%sys-5-config_i: configured from console by console
s1#copy run startup
destination filename [startup-config]?
building configuration...
[ok]
s1#
```



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

**ROUTER R1**

```
R1#config t
enter configuration commands, one per line. end with cntl/z.
R1(config)#router ospf 1
R1(config-router)#router-id 1.1.1.1
R1(config-router)#network
172.31.21.0 0.0.0.3 area 0
R1(config-router)#network 192.168.30.0 0.0.0.3 area 0
R1(config-
router)#network 192.168.40.0 0.0.0.3 area 0
```



```
R1(config-router)#network
192.168.30.0 0.0.0.255 area 0
R1(config-router)#network 192.168.40.0
0.0.0.255 area 0
R1(config-router)#network 192.168.200.0 0.0.0.255 area 0
R1(config-router)#passive-interface f0/1.30
%invalid interface type and number
R1(config-router)#passive-
interface f0/0.30 %invalid interface type and number
R1(config-router)#passive-interface f0/0
R1(config-router)#auto-cost reference-bandwidth 9500
% ospf: reference bandwidth is changed.
please ensure reference bandwidth is consistent across all routers.
R1(config-router)#exit
R1(config)#int s0/0/0
R1(config-if)#bandwidth 256
R1(config-if)#ip ospf cost 9500
R1(config-if)#end
R1#
%sys-5-config_i: configured from console by console
```

## ROUTER R2

```
R2#config t
enter configuration commands, one per line. end with cntl/z.
R2(config)#router ospf 1
R2(config-router)#router-id 5.5.5.5
R2(config-router)#network 172.31.21.0 0.0.0.3 area 0
R2(config-router)#network 172.31.21.0 0.0.0.3 area 0
00:55:46: %ospf-5-adjchg: process 1, nbr 1.1.1.1 on serial0/0/1
from loading to full, lding done
% invalid input detected at '^' marker.
R2(config-router)#network 172.31.23.0 0.0.3 area 0 ^
% invalid input detected at '^' marker.
R2(config-router)#network 172.31.23.0 0.0.0.3 area 0
R2(config-router)#network 10.10.10.0
0.0.0.255 area 0 r2(config-router)#passive-interface f0/0
R2(config-router)#auto-cost reference-bandwidth 9500
% ospf: reference bandwidth is changed.
please ensure reference bandwidth is consistent across all routers.
R2(config-router)#int s0/0/0 r2(config-if)#bandwidth 256 41
R2(config-if)#int s0/0/1
R2(config-if)#bandwidth 256
R2(config-if)#int s0/0/0
R2(config-if)#ip ospf cost 9500
R2(config-if)#exit
R2(config)#
```

## ROUTER R3

```

R3#config
configuring from terminal, memory, or network [terminal]? enter configuration
commands, one per line. end with cntl/z. r3(config)#router ospf 1 r3(config-router)#router-id 8.8.8.8 r3(config-
router)#network
172.31.23.0 0.0.0.3 area 0
R3(config-router)#
01:01:48: %ospf-5-adjchg: process 1, nbr 5.5.5.5 on serial0/0/1 from loading to full, loading done
R3(config-router)#network 192.168.4.0 0.0.3.255 area o ^
% invalid input detected at '^' marker.
R3(config-router)#network 192.168.4.0 0.0.3.255 area 0
R3(config-router)#passive-interface lo4
R3(config-router)#passive-interface lo5
R3(config-router)#passive- interface lo6
R3(config-router)#auto-cost reference-bandwidth 9500
% ospf: reference bandwidth is changed.
please ensure reference bandwidth is consistent across all routers.
R3(config-router)#exit
R3(config)#int s0/0/1
R3(config-if)#bandwidth 256
R3(config-if)#exit
R3(config)#
  
```

## VERIFICAR INFORMACIÓN DE OSPF

Visualizar tablas de enrutamiento y routers conectados por OSPFv2 42

```
R2#show ip ospf neig
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
8.8.8.8	0	FULL/ -	00:00:39	172.31.23.2	Serial0/0/0
1.1.1.1	0	FULL/ -	00:00:38	172.31.21.1	Serial0/0/1

R2#

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

```

1.1.1.1 0 FULL/ - 00:00:32 172.31.23.1 Serial0/0/
R2#show ip ospf interface

Serial0/0/1 is up, line protocol is up
 Internet address is 172.31.21.1/30, Area 0
 Process ID 1, Router ID 5.5.5.5, Network Type POINT-TO-POINT, Cost: 6162
 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 1.1.1.1
 Suppress hello for 0 neighbor(s)
Serial0/0/0 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 00:00:03
 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 1, Adjacent neighbor count is 1
   Adjacent with neighbor 3.3.3.3
 Suppress hello for 0 neighbor(s)
...

```

Visualizar el OSPF Process ID, Router ID, Address summarizations, Routing Networks, and passive interfaces configuradas en cada router. 43

```

!
router ospf 1
 router-id 5.5.5.5
 log-adjacency-changes
 passive-interface FastEthernet0/0
 auto-cost reference-bandwidth 9500
 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
!
ip classless
!

```

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 t
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#vlan 30
S1(config-vlan)#name Administracion
S1(config-vlan)#vlan 40
S1(config-vlan)#name Mercadeo
S1(config-vlan)#vlan 200
S1(config-vlan)#name Mantenimiento
S1(config-vlan)#exit
S1(config)#
S1(config-if)#ip add 192.168.99.2 255.255.255.0
S1(config-if)#no shutdown S1(config-if)#exit
S1(config)#ip default-gateway 192.168.99.1
S1(config)#int f0/3
S1(config-if)#switchport mode trunk
S1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan200, changed state to up
S1(config-if)#switchport trunk native vlan 1
S1(config-if)#int f0/24
S1(config-if)#switchport mode trunk
S1(config-if)#switchport trunk native vlan 1
S1(config-if)#int range f0/2, f0/4-23
S1(config-if-range)#switch mode access
S1(config-if-range)#int f0/1
S1(config-if)#switch mode access
S1(config-if)#switch access vlan
% Incomplete command.
S1(config-if)#switch access vlan 30
S1(config-if)#int range f0/2, f0/4- 23
S1(config-if-range)#shutdown
```

```
R1#config t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#int f0/1.30
R1(config-subif)#encapsulation dot1q 30
R1(config-subif)#ip add 192.168.30.1 255.255.255.0
R1(config-subif)#int f0/1.40
R1(config-subif)#ip add 192.168.40.1 255.255.255.0
```

% Configuring IP routing on a LAN subinterface is only allowed if that subinterface is already configured as part of an IEEE 802.10, IEEE 802.1Q, or ISL vLAN.

```
R1(config-subif)#
R1(config-subif)#int f0/1.40
R1(config-subif)#encapsulation dot1q 40
R1(config-subif)#ip add 192.168.40.1 255.255.255.0
R1(config-subif)#int f0/1.200
R1(config-subif)#encapsulation dot1q 200
R1(config-subif)#ip add 192.168.200.1 255.255.255.0
R1(config-subif)#exit
R1(config)#
```

4. En el Switch 3 deshabilitar DNS lookup Esta configurado desde el inicio
5. Asignar direcciones IP a los Switches acorde a los lineamientos.
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.
9. Reservar las primeras 30 direcciones IP de las VLAN 30 y 40 para configuraciones estáticas.

Configurar DHCP pool para VLAN 30	Name: ADMINISTRACION DNS-Server: 10.10.10.11 Domain-Name: ccna-unad.com Establecer default gateway.
Configurar DHCP pool para VLAN 40	Name: MERCADEO DNS-Server: 10.10.10.11 Domain-Name: ccna-unad.com Establecer default gateway.

```
R1(config)#
R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.30
R1(config)#ip dhcp pool ADMINISTRACION
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#default-router 192.168.30.1
R1(dhcp-config)#network 192.168.30.0 255.255.255.0
R1(dhcp-config)#ip dhcp pool MERCADEO
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#default-router 192.168.40.1
R1(dhcp-config)#network
192.168.40.0 255.255.255.0
R1(dhcp-config)#exit
```

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

```
R2(config)#access-list 1 permit 192.168.30.0 0.0.0.255
R2(config)#access-list 1
permit 192.168.40.0 0.0.0.255
R2(config)#ip nat pool INTERNET 209.165.200.225
209.165.200.228 netmask 255.255.255.248
R2(config)#ip nat inside source list 1 pool INTERNET
R2(config)#exit
R2#
%SYS-5-CONFIG_I: Configured from console by console
R2(config)#ip access-list standard ADMIN_S
R2(config-std-nacl)#permit host 172.31.21.1 R2(config-std-
nacl)#exit R2(config)#line vty 0 4
R2(config-line)#
access-class ADMIN_S in
R2(config-line)#
```

## 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.

```
R2(config)#access-list 101 permit tcp any host 209.165.200.229 eq www
R2(config)#access-list 101 permit icmp any any echo-reply
R2(config)#int f0/0
R2(config-if)#ip access-group 101 in
R2(config-if)#int s0/0/0
R2(config-if)#ip access-group 101 out
R2(config-if)#int s0/0/1
R2(config-if)#ip access-group 101 out
R2(config-if)#int f0/1
R2(config-if)#ip access-group 101 out
R2(config-if)
```

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

```
R2#show access-list
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
Standard IP access list ADMIN_S
 10 permit host 172.31.21.1
Extended IP access list 101
 10 permit tcp any host 209.165.200.229 eq www
 20 permit icmp any any echo-reply
R2#
```



## CONCLUSIONES

1. Se realiza conectividad en el emulador para conocer el proceso de configuraciones y plantear un plan de conectividad de acuerdo a la práctica de habilidades.
2. Cabe resaltar que de esta manera tendremos el conocimiento de escoger una red efectiva y oportuna para cada necesidad.
3. Se realizó la implementación de dos escenarios con varios Routers y realizando la conectividad a cada una de las regiones o países de acuerdo al desarrollo de la guía.

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