DIPLOMADO DE PROFUNDIZACIÓN CISCO (DISEÑO E IMPLEMENTACIÓN DE SOLUCIONES INTEGRADAS LAN / WAN)

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DIPLOMADO DE PROFUNDIZACIÓN CISCO (DISEÑO E IMPLEMENTACIÓN DE SOLUCIONES INTEGRADAS LAN / WAN)

Prueba de habilidades practicas

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CONTENIDO

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INTRODUCCIÓN

En el presente trabajo se evidencia de manera práctica las habilidades adquiridas durante el diplomado de profundización CCNA, respecto a la capacidad de desarrollar diferentes soluciones en el campo de implementación de redes LAN y WLAN.

Por tanto se toman dos escenarios en los cuales se utilizan tablas de direccionamiento para lograr la conexión de terminales en la topología dada, por medio de configuraciones DHCP, OSPF y RIP entre otras, teniendo en cuenta las respectivas interfaces y sus características, con el fin de lograr un correcto enrutamiento con la ayuda de la implementación de las respectivas líneas de código que proporciona CISCO.

Se espera que el contenido de este documento cumpla con las expectativas que solicita el curso y sirva de referente para quienes lo consulten.

WILSON LOZANO MILLÁN.

OBJETIVOS

Objetivo General

Configurar la topología de dos escenarios para lograr crear la conexión de las terminales.

Objetivos Específicos

- Establecer las topologías propuestas.
- Identificar y utilizar las medios necesarios que ofrece Packet Tracer para la configuración de las redes.
- Aplicar correctamente configuraciones DHCP y OSPFv2
- Realizar el direccionamiento de las distintas interfaces.
- Realizar las pruebas de conectividad para verificar la comunicación entre las distintas terminales.

ESCENARIO 1

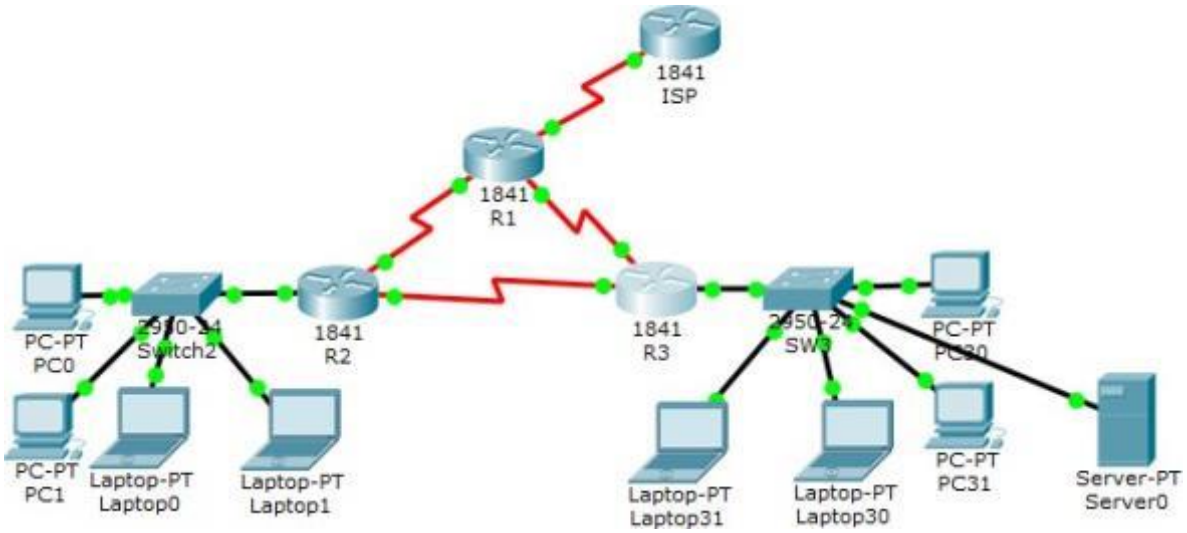


Tabla de direccionamiento

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

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

Situación

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

Descripción de las actividades

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

```
Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname SW2
SW2(config)#vlan 100
SW2(config-vlan)#name LAPTOPS
SW2(config-vlan)#vlan 200
SW2(config-vlan)#name DESTOPS
SW2(config-vlan)#exit
SW2(config)#int range fa0/2-3
SW2(config-if-range)#switchport mode access
SW2(config-if-range)#switchport access vlan 100
SW2(config-if-range)#int range fa0/4-5
SW2(config-if-range)#switchport mode access
SW2(config-if-range)#switchport access vlan 200
SW2(config-if-range)#int fa0/1
```

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

```
SW2(config-if)#switchport mode trunk
SW2(config-if)#int range fa0/6-24
SW2(config-if-range)#shutdown

%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to
administratively down

%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to
administratively down


%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to
administratively down


%LINK-5-CHANGED: Interface FastEthernet0/11, 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 FastEthernet0/17, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/19, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/20, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/21, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/22, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/23, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/24, changed state to administratively down
SW2(config-if-range)#
%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to administratively down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/8, changed state to down

%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to administratively down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/10, changed state to down

%LINK-5-CHANGED: Interface FastEthernet0/12, changed state to administratively down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/12, changed state to down

%LINK-5-CHANGED: Interface FastEthernet0/16, changed state to administratively down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/16, changed state to down

%LINK-5-CHANGED: Interface FastEthernet0/18, changed state to administratively down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/18, changed state to down

SW2(config-if-range)#exit

SW2(config)#

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

INFORMACIÓN R1

```
R1>en
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#int s0/0/0
R1(config-if)#ip address 200.123.211.2 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#int s0/1/0
R1(config-if)#ip address 10.0.0.1 255.255.255.252
R1(config-if)#no shutdown
R1(config-if)#int s0/1/1
R1(config-if)#ip address 10.0.0.5 255.255.255.252
R1(config-if)#no shutdown
```

R1(config-if)#

INFORMACIÓN R2

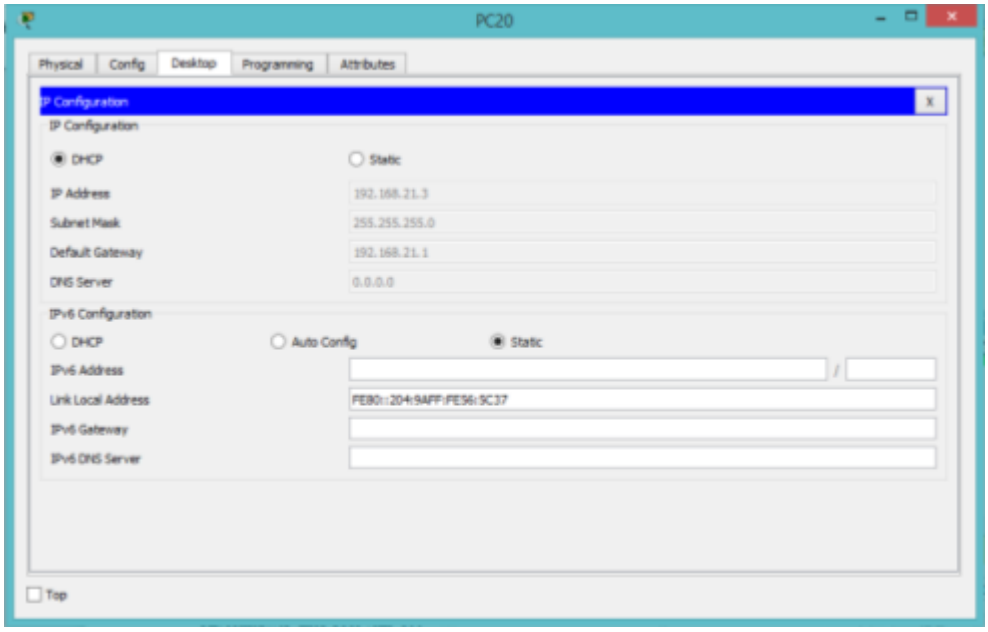
```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R2(config)#int f0/0.100
R2(config-subif)#encapsulation dot1q 100
```

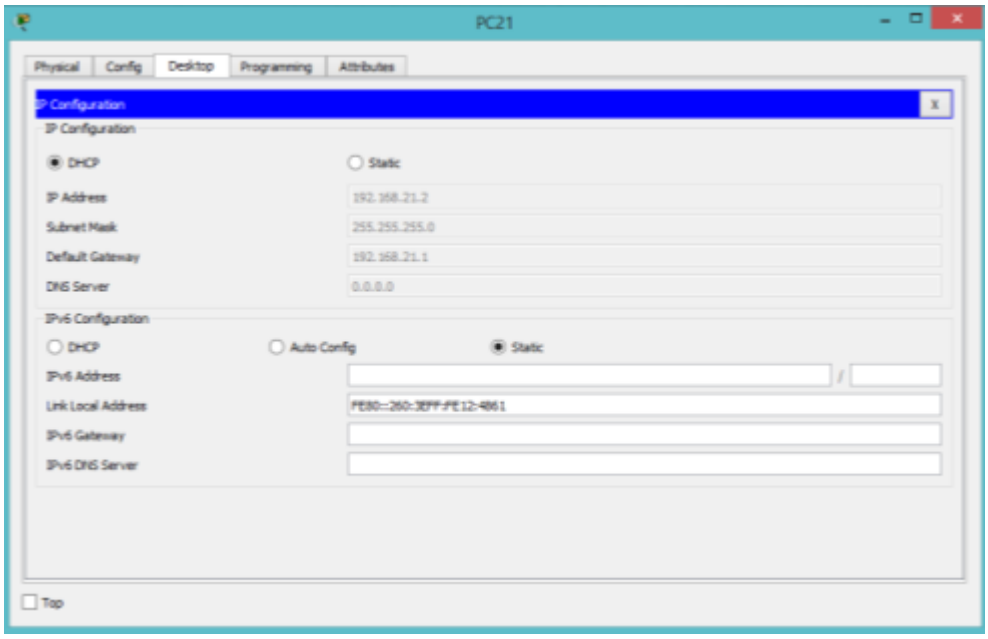
```
R2(config-subif)#ip address 192.168.20.1 255.255.255.0
R2(config-subif)#int f0/0.200
R2(config-subif)#encapsulation dot1q 200
R2(config-subif)#ip address 192.168.21.1 255.255.255.0
R2(config-subif)#int f0/0
R2(config-if)#no shutdown

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

%LINK-5-CHANGED: Interface FastEthernet0/0.100, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.100,
changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0.200, changed state to up

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

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

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R2(config-if)#
R2(config-if)#int s0/0/1
R2(config-if)#ip address 10.0.0.9 255.255.255.252
R2(config-if)#no shutdown

R2(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

R2(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state
to up

        R2(config-if)#
```

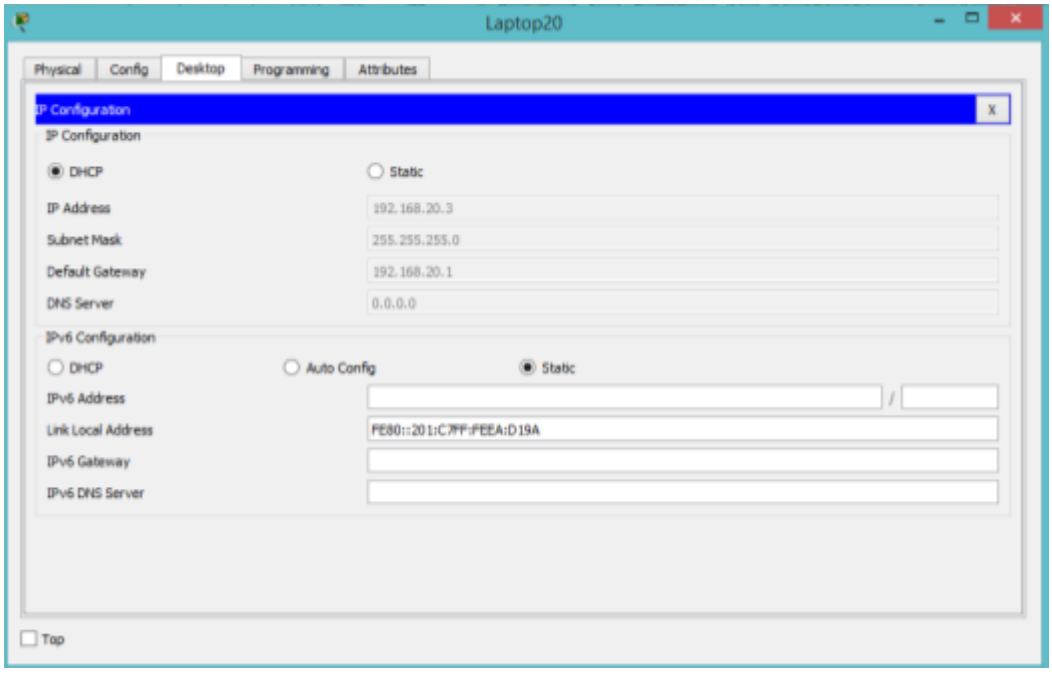
INFORMACION R3

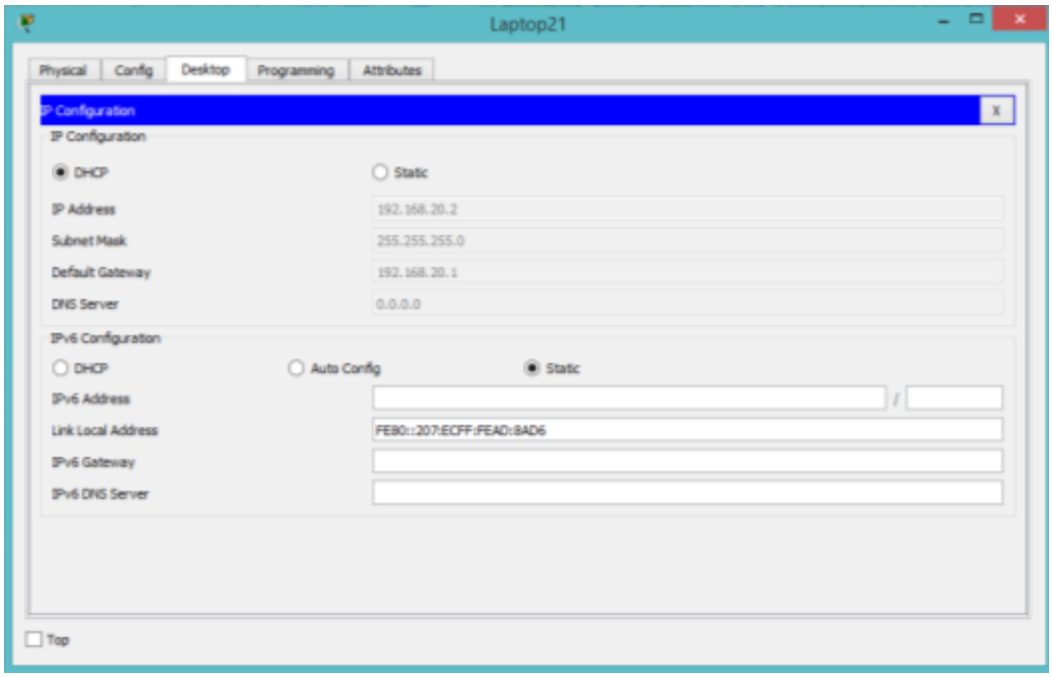
```
R3>en
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#ipv6 unicast-routing
R3(config)#int f0/0
R3(config-if)#ip address 192.168.30.1 255.255.255.0
R3(config-if)#ipv6 address 2001:db8:130::9C0:80F:301/64
R3(config-if)#ipv6 dhcp server vlan_1
R3(config-if)#ipv6 nd other-config-flag
R3(config-if)#no shutdown
R3(config-if)#int s0/0/0
R3(config-if)#ip address 10.0.0.6 255.255.255.252
R3(config-if)#no shutdown
R3(config-if)#int s0/0/1
R3(config-if)#ip address 10.0.0.10 255.255.255.252
R3(config-if)#no shutdown
R3(config-if)#
```

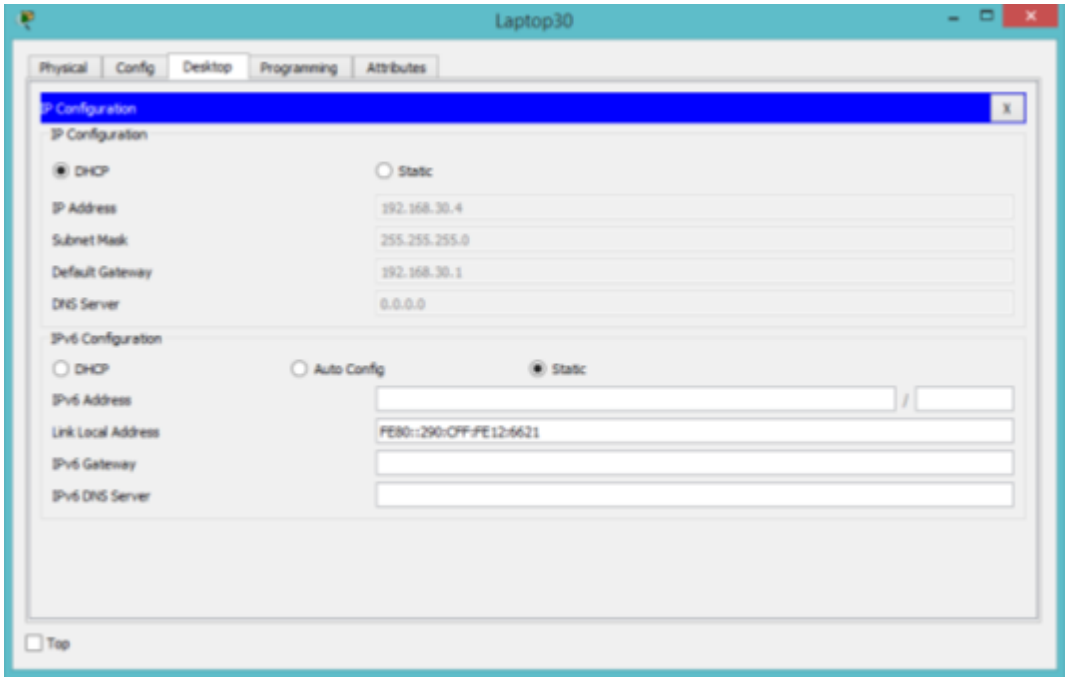
- **Laptop20, Laptop21, PC20, PC21, Laptop30, Laptop31, PC30 y PC31** deben obtener información IPv4 del servidor DHCP.

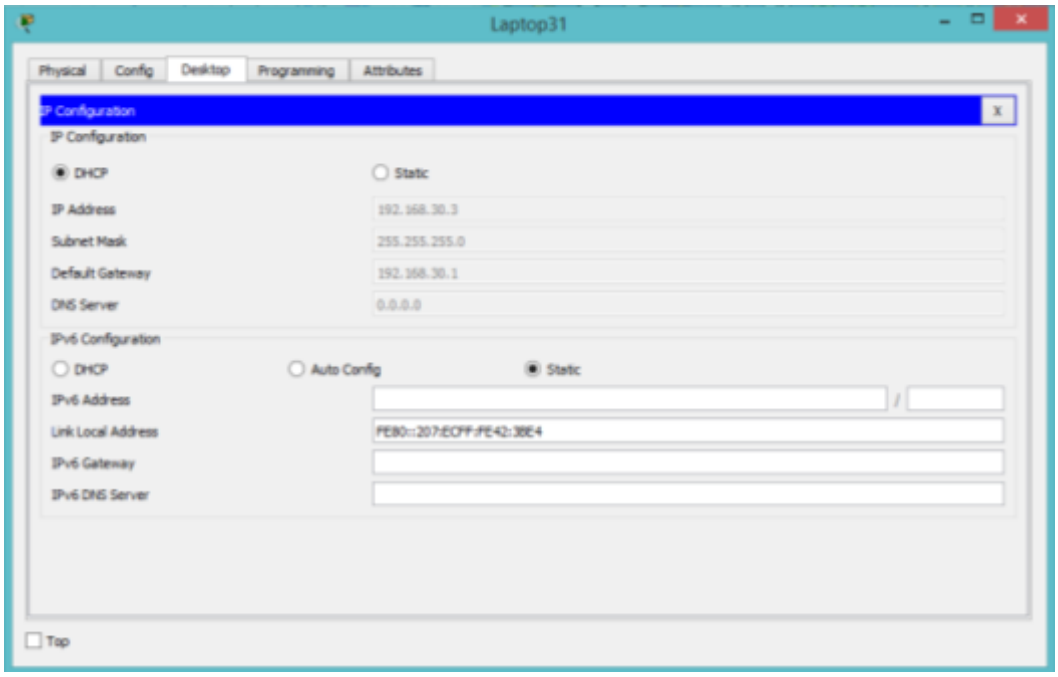


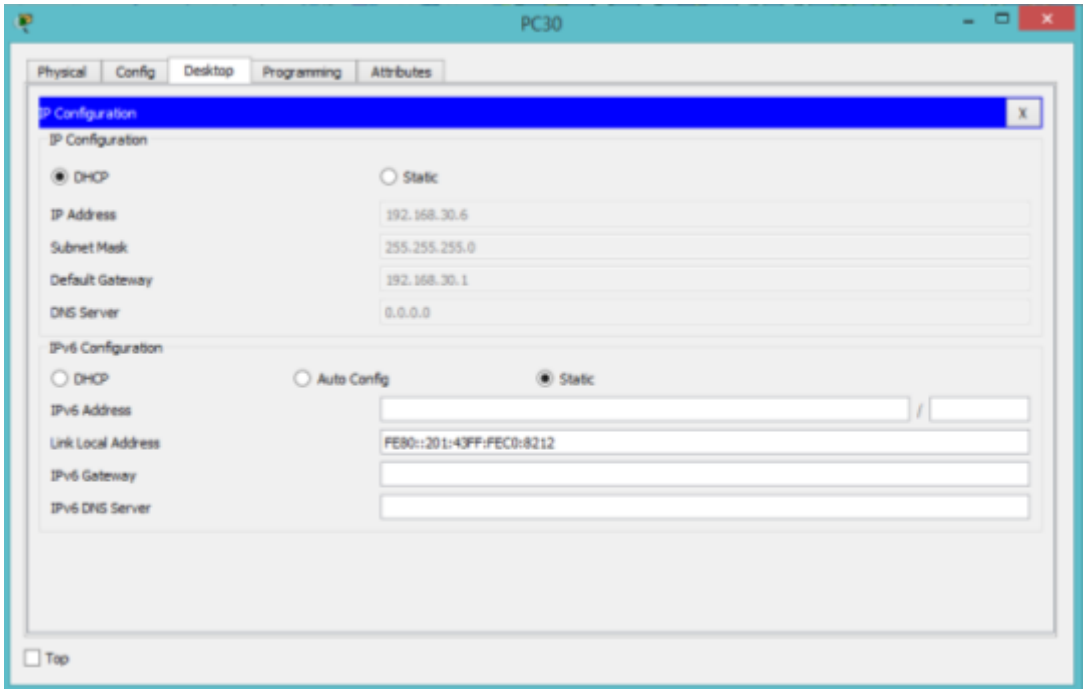

PC21
Physical
Config
Desktop
Programming
Attributes
IP Configuration
IP Configuration
DHCP
Static
IP Address
192.168.21.2
Subnet Mask
255.255.255.0
Default Gateway
192.168.21.1
DNS Server
0.0.0.0
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::260:3EFF:FE12:4861
IPv6 Gateway
IPv6 DNS Server
Top

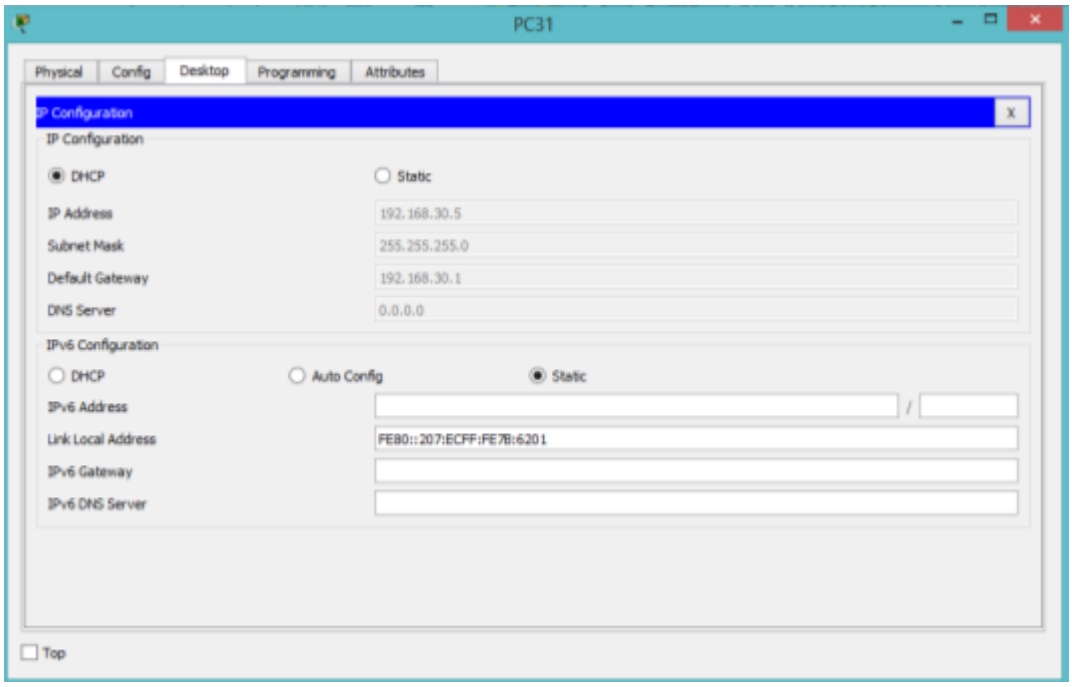

Laptop20
Physical
Config
Desktop
Programming
Attributes
IP Configuration
IP Configuration
DHCP
Static
IP Address
192.168.20.3
Subnet Mask
255.255.255.0
Default Gateway
192.168.20.1
DNS Server
0.0.0.0
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::201:C7FF:FEEA:D19A
IPv6 Gateway
IPv6 DNS Server
Top


Laptop21
Physical
Config
Desktop
Programming
Attributes
IP Configuration
IP Configuration
DHCP
Static
IP Address
192.168.20.2
Subnet Mask
255.255.255.0
Default Gateway
192.168.20.1
DNS Server
0.0.0.0
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::207:ECFF:FEAD:8AD6
IPv6 Gateway
IPv6 DNS Server
Top


Laptop30
Physical
Config
Desktop
Programming
Attributes
IP Configuration
IP Configuration
DHCP
Static
IP Address
192.168.30.4
Subnet Mask
255.255.255.0
Default Gateway
192.168.30.1
DNS Server
0.0.0.0
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::290:CFF:FE12:6621
IPv6 Gateway
IPv6 DNS Server
Top


Laptop31
Physical
Config
Desktop
Programming
Attributes
IP Configuration
IP Configuration
DHCP
Static
IP Address
192.168.30.3
Subnet Mask
255.255.255.0
Default Gateway
192.168.30.1
DNS Server
0.0.0.0
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::207:ECFF:FE42:3BE4
IPv6 Gateway
IPv6 DNS Server
Top


PC30
Physical
Config
Desktop
Programming
Attributes
IP Configuration
IP Configuration
DHCP
Static
IP Address
192.168.30.6
Subnet Mask
255.255.255.0
Default Gateway
192.168.30.1
DNS Server
0.0.0.0
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::201:43FF:FEC0:8212
IPv6 Gateway
IPv6 DNS Server
Top



DIRECCIONAMIENTO DHCP R2

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

R2#

DIRECCIONAMIENTO DHCP R3

```
R3>en
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#ip dhcp pool vlan_1
R3(dhcp-config)#network 192.168.30.1 255.255.255.0
R3(dhcp-config)#default-router 192.168.30.1
R3(dhcp-config)#ipv6 dhcp pool vlan_1
R3(config-dhcpv6)#dns-server 2001:db8:130::
R3(config-dhcpv6)#exit
```

R3(config)#

- **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>en
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip nat pool INSIDE-DEVS 200.123.211.2 200.123.211.128 netmask
255.255.255.0
R1(config)#access-list 1 permit 192.168.0.0 0.0.255.255
R1(config)#access-list 1 permit 10.0.0.0 0.0.0.255
R1(config)#ip nat inside source list 1 int s0/0/0 overload
R1(config)#int s0/1/0
R1(config-if)#ip nat inside
R1(config-if)#int s0/1/1
R1(config-if)#ip nat inside
R1(config-if)#int s0/0/0
R1(config-if)#ip nat outside
R1(config-if)#
```

- **R1** debe tener una ruta estática predeterminada al ISP que se configuró y que incluye esa ruta en **el dominio** RIPv2.
- **R2** es un servidor de DHCP para los dispositivos conectados al puerto FastEthernet0/0.
- **R2** debe, además de enrutamiento a otras partes de la red, ruta entre las VLAN 100 y 200.

CONFIGURACION RIP EN 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)#ip route 0.0.0.0 0.0.0.0 s0/0/0
R1(config)#router rip
R1(config-router)#network 10.0.0.4
R1(config-router)#network 10.0.0.0
R1(config-router)#default-information originate
R1(config-router)#
```

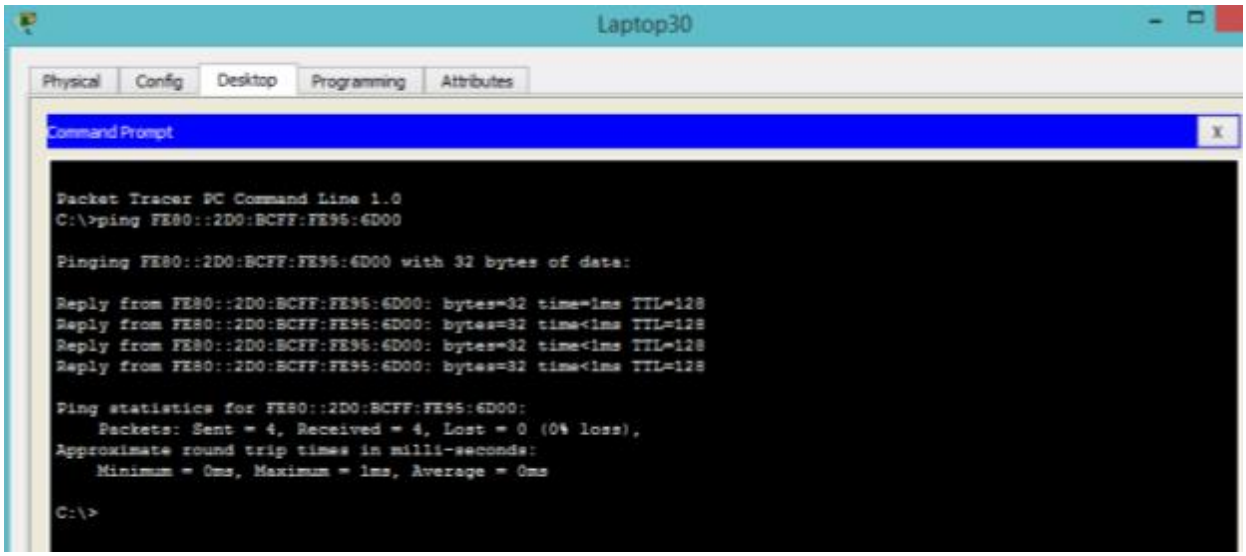
CONFIGURACION RIP EN R2

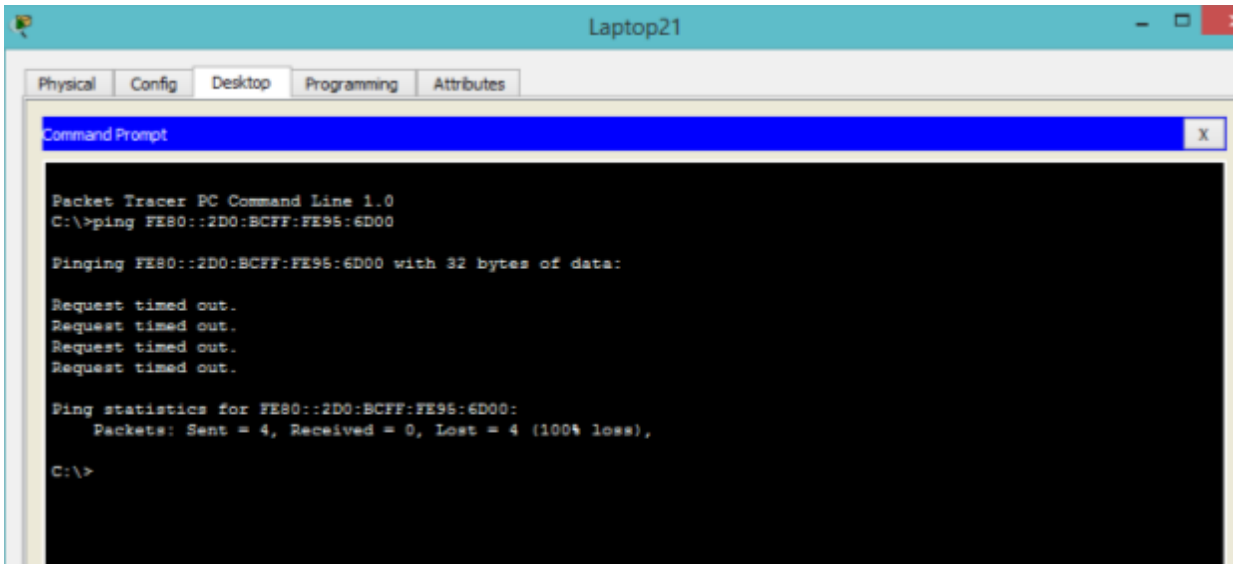
```
R2>en
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router rip
R2(config-router)#version 2
R2(config-router)#network 192.168.20.0
R2(config-router)#network 192.168.21.0
R2(config-router)#network 10.0.0.0
R2(config-router)#network 10.0.0.8
R2(config-router)#
```

CONFIGURACION RIP EN R3

```
R3>en
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router rip
R3(config-router)#version 2
R3(config-router)#network 192.168.30.0
R3(config-router)#network 10.0.0.4
R3(config-router)#network 10.0.0.9
R3(config-router)#exit
```

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

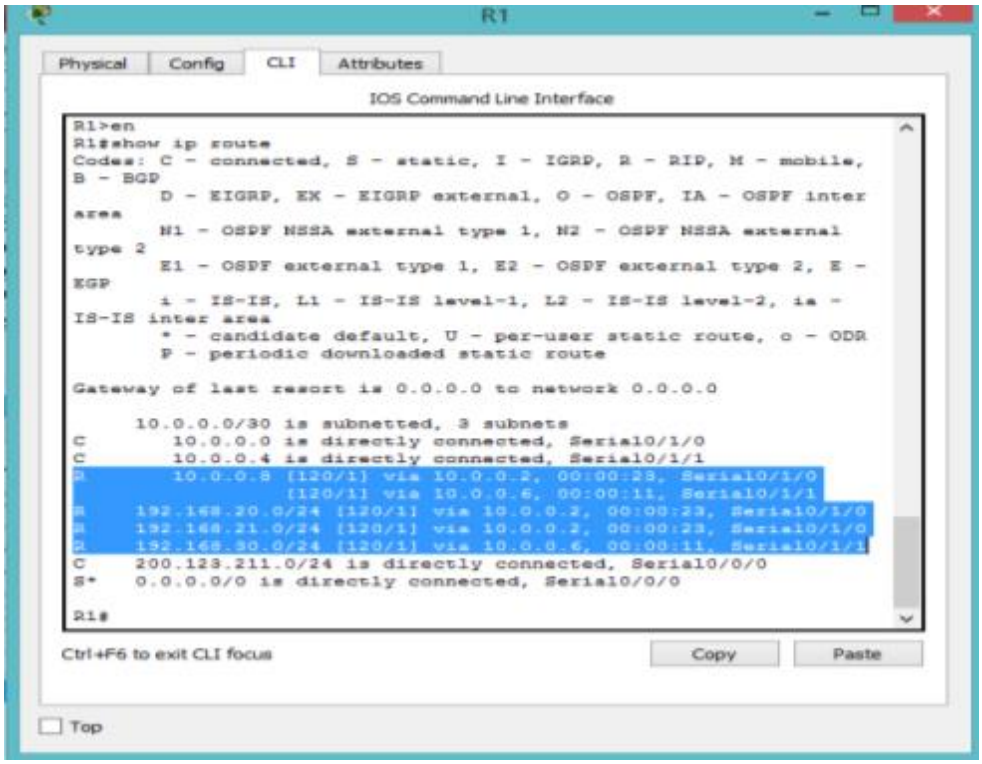


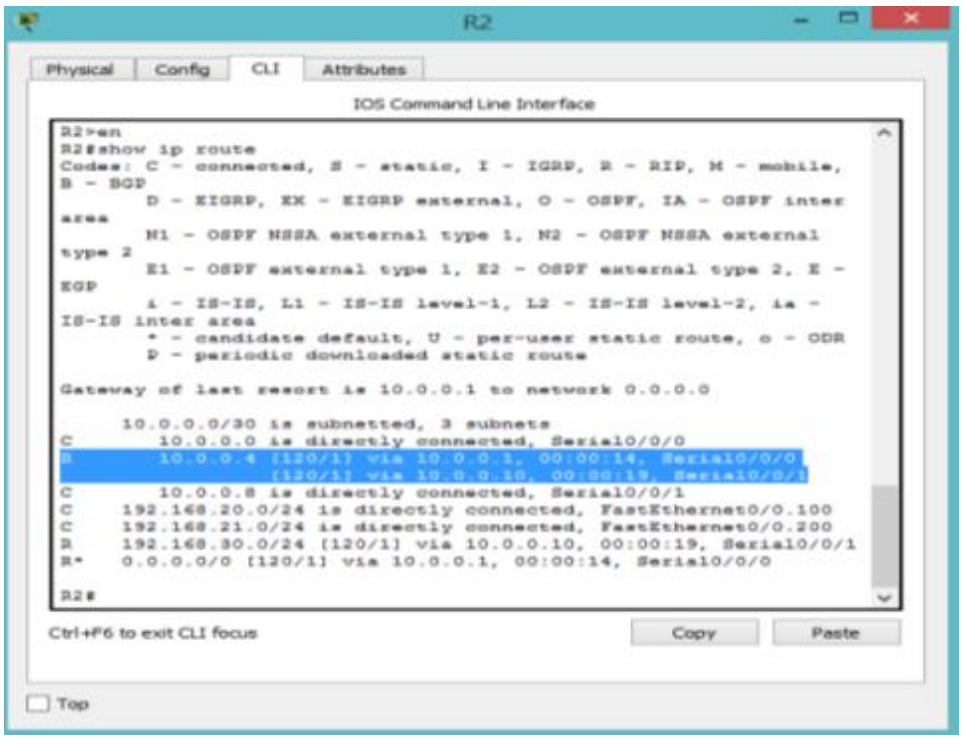


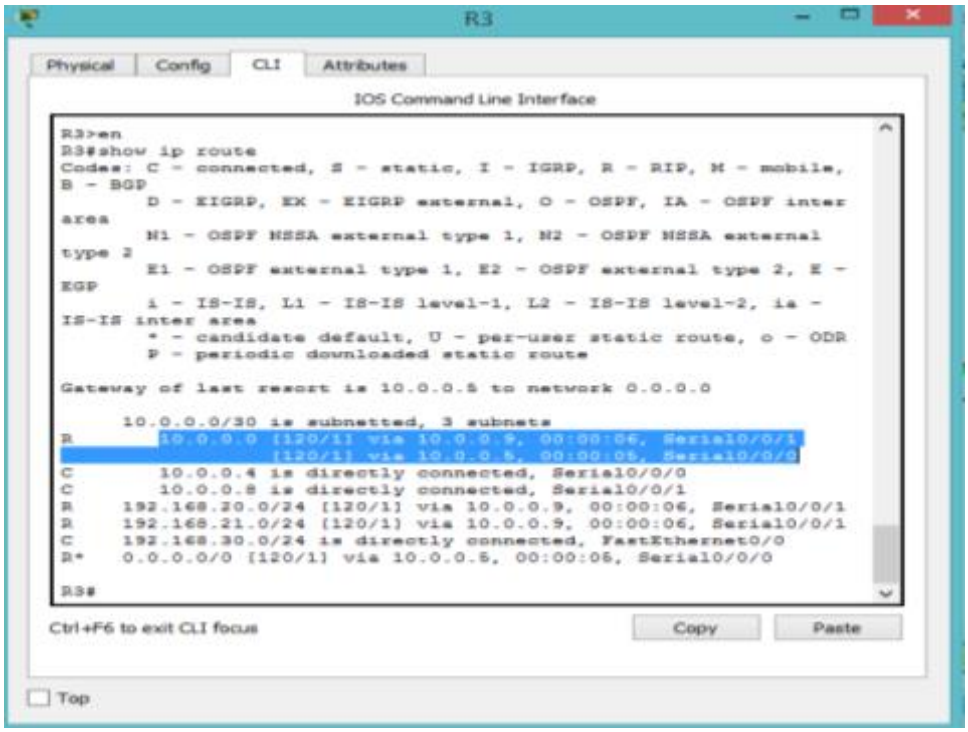
- La NIC instalado en direcciones IPv4 e IPv6 de Laptop30, de Laptop31, de PC30 y obligación de configurados PC31 simultáneas (dual-stack). Las direcciones se deben configurar mediante DHCP y DHCPv6.
- La interfaz FastEthernet 0/0 del R3 también deben tener direcciones IPv4 e IPv6 configuradas (dual- stack).

```
R3>en
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#ipv6 unicast-routing
R3(config)#int fa0/0
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
```

- 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
Physical
Config
CLI
Attributes
IOS Command Line Interface
R1>en
R1#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 0.0.0.0 to network 0.0.0.0
10.0.0.0/30 is subnetted, 3 subnets
C 10.0.0.0 is directly connected, Serial0/1/0
C 10.0.0.4 is directly connected, Serial0/1/1
R 10.0.0.8 [120/1] via 10.0.0.2, 00:00:23, Serial0/1/0
[120/1] via 10.0.0.6, 00:00:11, Serial0/1/1
R 192.168.20.0/24 [120/1] via 10.0.0.2, 00:00:23, Serial0/1/0
R 192.168.21.0/24 [120/1] via 10.0.0.2, 00:00:23, Serial0/1/0
R 192.168.30.0/24 [120/1] via 10.0.0.6, 00:00:11, Serial0/1/1
C 200.123.211.0/24 is directly connected, Serial0/0/0
S* 0.0.0.0/0 is directly connected, Serial0/0/0
R1#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

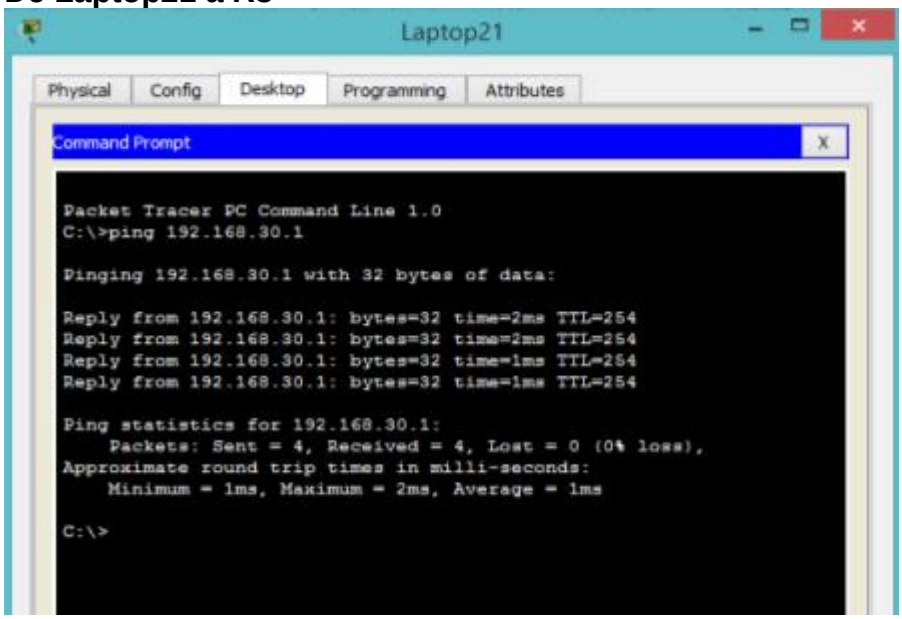

R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
R2>en
R2#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile,
B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter
area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external
type 2
E1 - OSPF external 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 10.0.0.1 to network 0.0.0.0
10.0.0.0/30 is subnetted, 3 subnets
C 10.0.0.0 is directly connected, Serial0/0/0
R 10.0.0.4 [120/1] via 10.0.0.1, 00:00:14, Serial0/0/0
[120/1] via 10.0.0.10, 00:00:19, Serial0/0/1
C 10.0.0.8 is directly connected, Serial0/0/1
C 192.168.20.0/24 is directly connected, FastEthernet0/0.100
C 192.168.21.0/24 is directly connected, FastEthernet0/0.200
R 192.168.30.0/24 [120/1] via 10.0.0.10, 00:00:19, Serial0/0/1
R* 0.0.0.0/0 [120/1] via 10.0.0.1, 00:00:14, Serial0/0/0
R2#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top



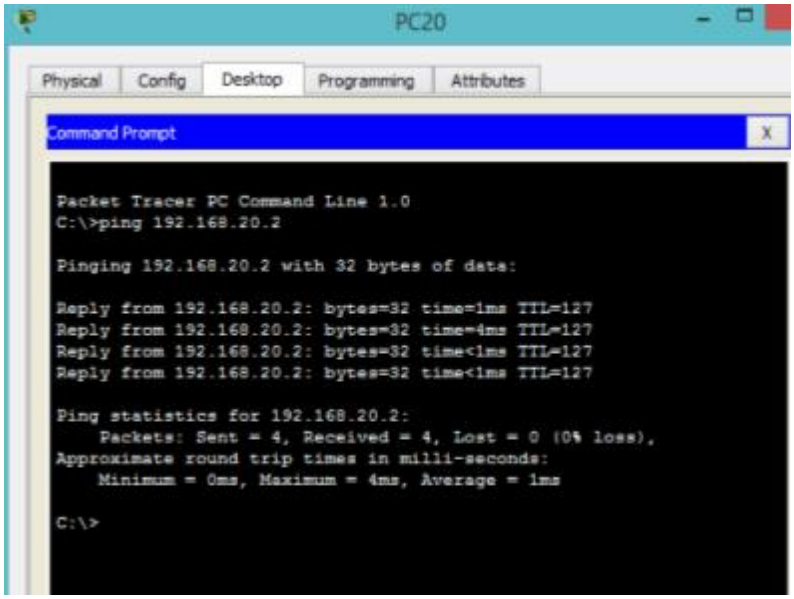
Verifique la conectividad. Todos los terminales deben poder hacer ping entre sí y a la dirección IP del ISP. Los terminales bajo **el R3** deberían poder hacer IPv6-ping entre ellos y el servidor.

PING ENTRE TERMINALES

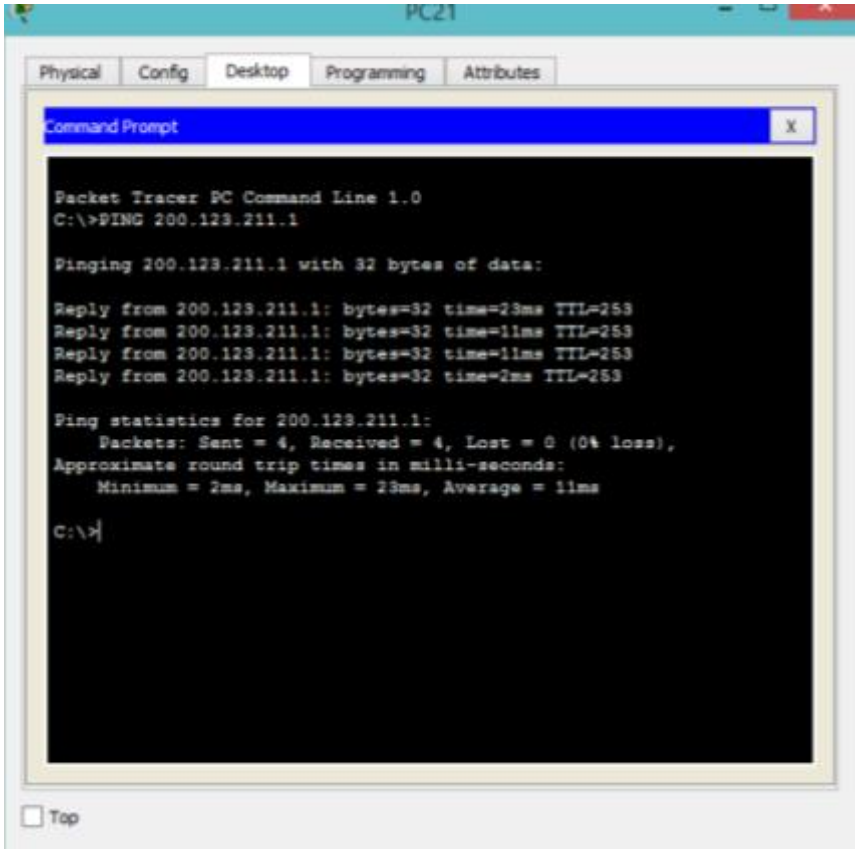
De Laptop21 a R3



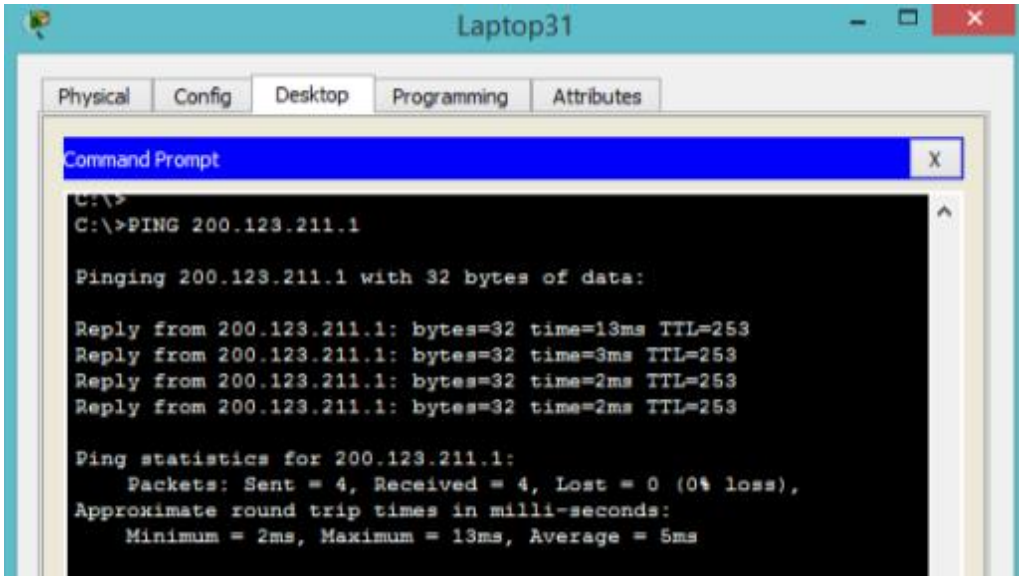
De PC20 a Laptop20



De PC21 a ISP

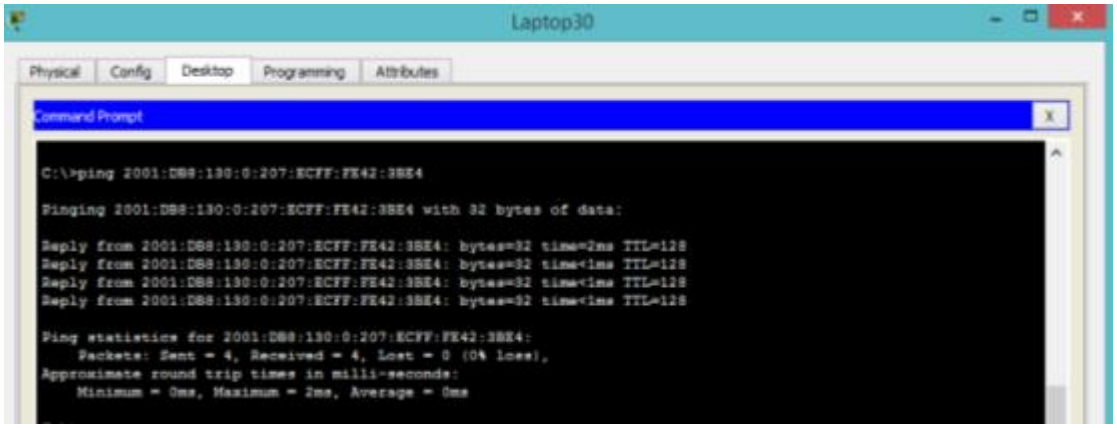


De LAPTOP 31 a ISP

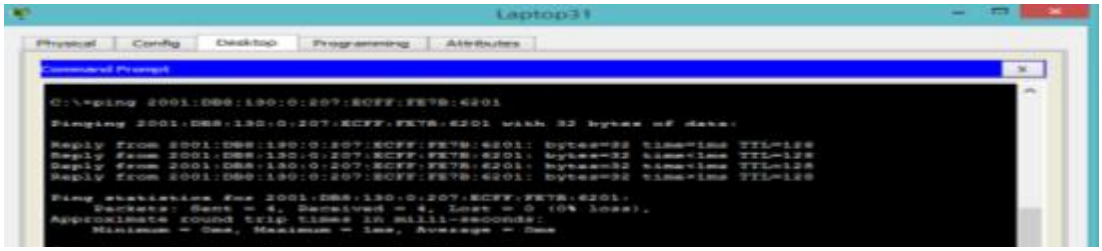


PING IPV6 EN R3

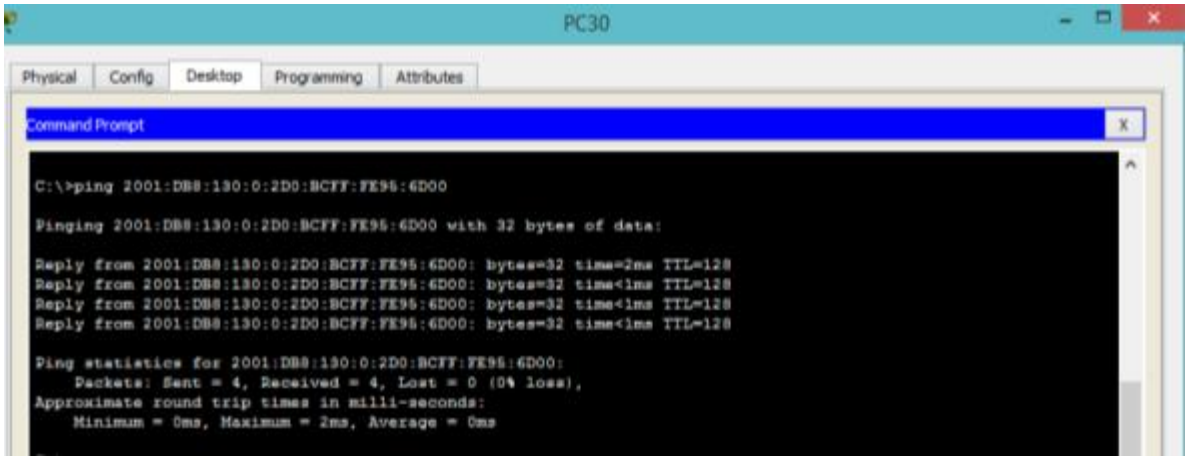
De LAPTOP 30 a LAPTOP 31



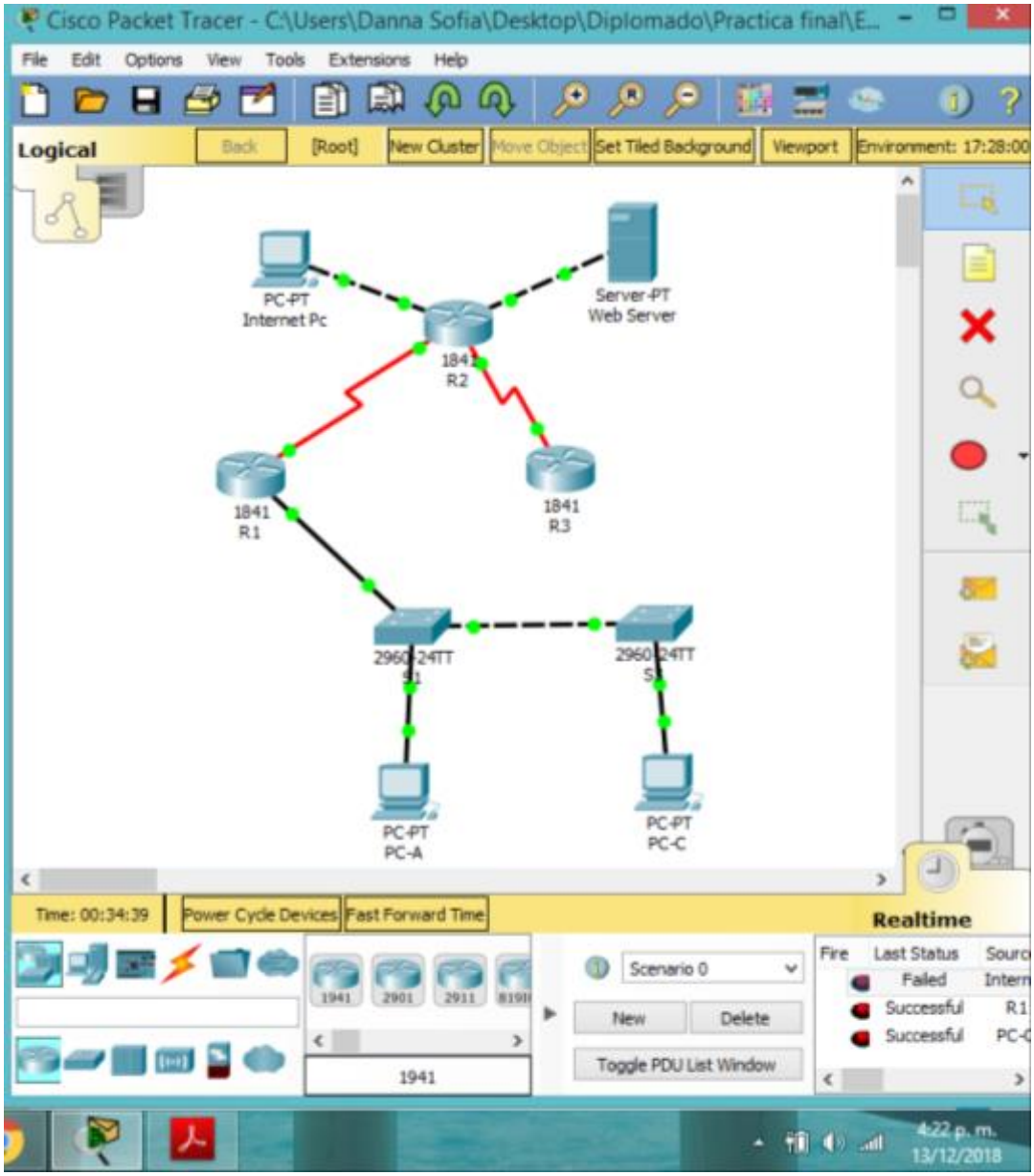
De LAPTOP 31 a PC 31



De PC 30 a SERVIDOR

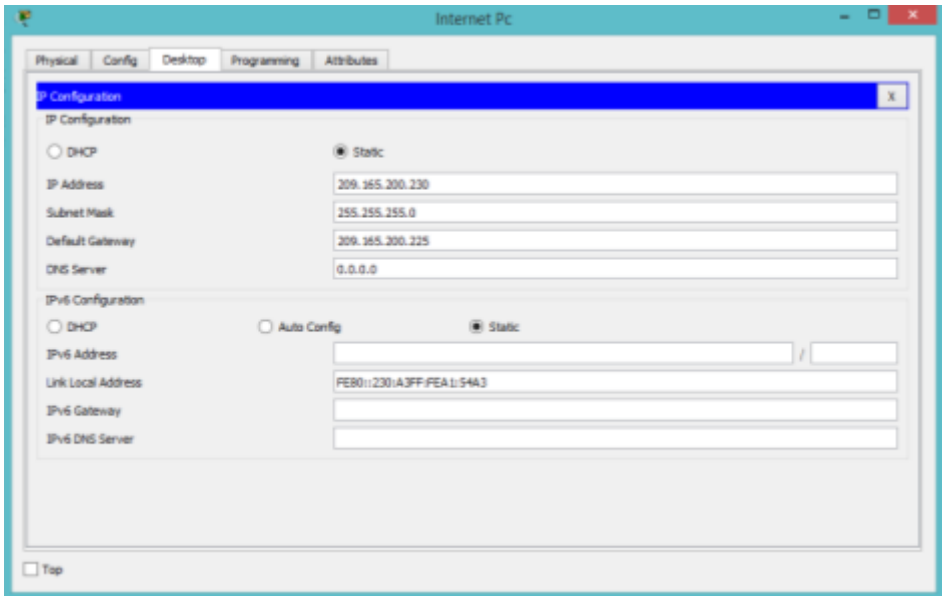


ESCENARIO 2


Cisco Packet Tracer - C:\Users\Danna Sofia\Desktop\Diplomado\Practica final\E...
File Edit Options View Tools Extensions Help
Logical
Back
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Environment: 17:28:00
PC-PT
Internet Pc
Server-PT
Web Server
1841
R2
1841
R1
1841
R3
2960-24TT
2960-24TT
PC-PT
PC-A
PC-PT
PC-C
Time: 00:34:39
Power Cycle Devices
Fast Forward Time
Realtime
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Failed
Successful
Successful
1941
4:22 p. m.
13/12/2018

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

CONFIGURACION IP EN INTERNET PC



Para la configuración de los dispositivos se utilizan las contraseñas usadas a lo largo del curso, además de la configuración basica:

- Contraseña exec privilegiado: **class**
- Contraseña acceso a consola: **cisco**
- Contraseña acceso telnet: **cisco**

CONFIGURACION IP EN R1

R1>en

R1#conf t

Enter configuration commands, one per line. End with CNTL/Z.

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 shutdown

R1(config-if)#exit

R1(config)#ip route 0.0.0.0 0.0.0.0 s0/0/0

CONFIGURACION IP EN R2

R2>en

R2#conf t

Enter configuration commands, one per line. End with CNTL/Z.

R2(config)#interface 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 shutdown

R2(config-if)#interface s0/0/1

R2(config-if)#ip address 172.31.21.2 255.255.255.252

R2(config-if)#no shutdown

R2(config)#int f0/0
R2(config-if)#ip address 209.165.200.225 255.255.255.248
R2(config-if)#no shutdown

R2(config)#int f0/1
R2(config-if)#ip address 10.10.10.1 255.255.255.0
R2(config-if)#no shutdown

R2(config-if)#exit
R2(config)#ip route 0.0.0.0 0.0.0.0 f0/0
R2(config)#exit

CONFIGURACION IP EN R3

Router>en

Router#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname R3

R3(config)#int s0/0/1

R3(config-if)#ip address 172.31.23.2 255.255.255.252

R3(config-if)#no shutdown

R3(config-if)#int lo4

R3(config-if)#ip address 192.168.4.1 255.255.255.0

R3(config-if)#no shutdown

R3(config-if)#int lo5

R3(config-if)#ip address 192.168.5.1 255.255.255.0

R3(config-if)#no shutdown

R3(config-if)#int lo6

R3(config-if)#ip address 192.168.6.1 255.255.255.0

R3(config-if)#no shutdown

R3(config-if)#exit
R3(config)#ip route 0.0.0.0 0.0.0.0 s0/1
R3(config)#exit

CONFIGURACION IP EN S1

Switch>en

Switch#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#hostname S1

S1(config)#exit

S1#

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

S1#copy running-config start

Destination filename [startup-config]?

Building configuration...

[OK]

S1#

CONFIGURACION IP EN S3

Switch>en

Switch#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Switch(config)#hostname S3

S3(config)#exit

S3#

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

S3#copy running-config start

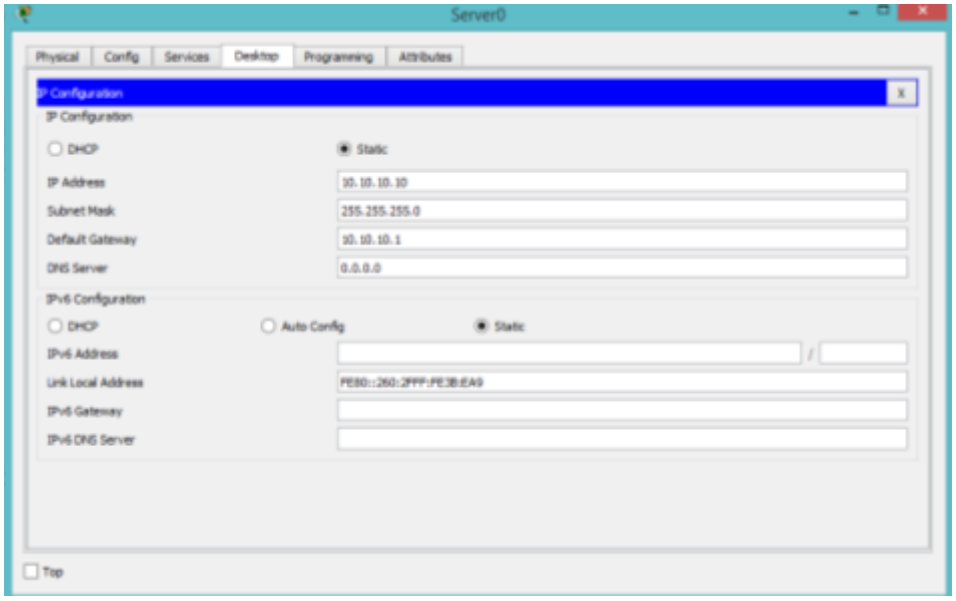
Destination filename [startup-config]?

Building configuration...

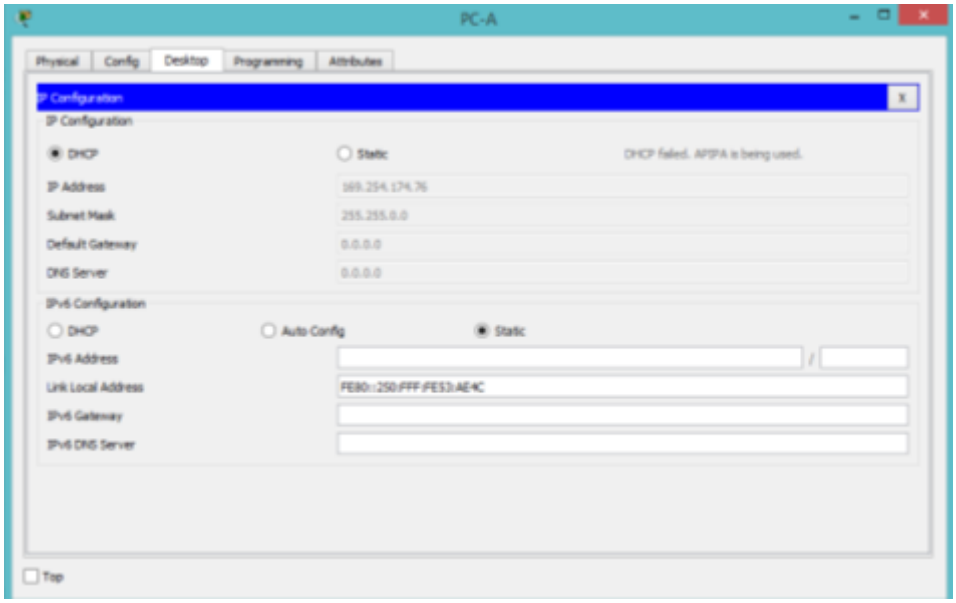
[OK]

S3#

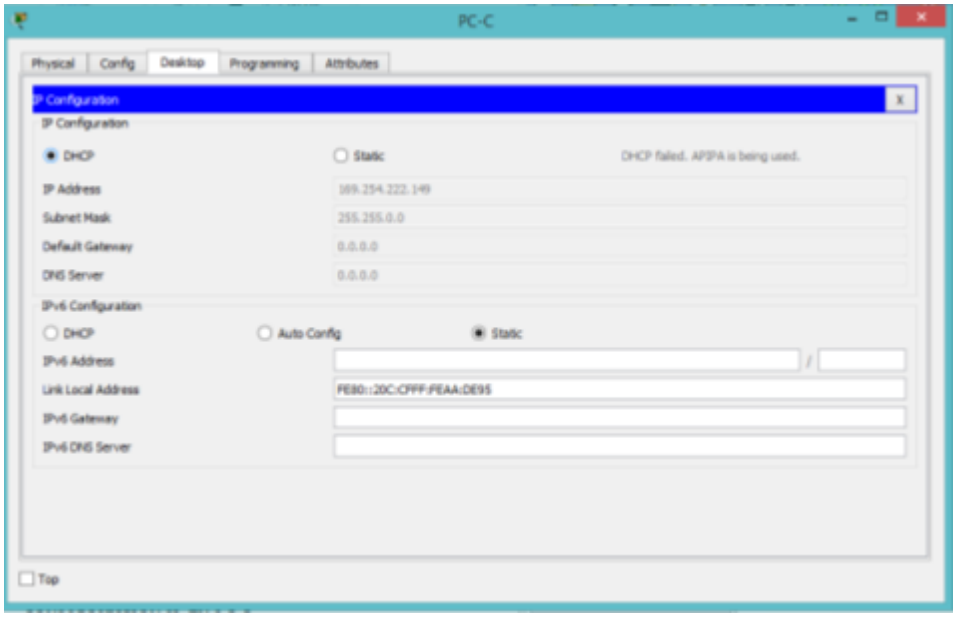
CONFIGURACION IP EN EL SERVIDOR



CONFIGURACION IP EN PC-A



CONFIGURACION IP EN PC-C



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

OSPF EN R1

R1>en

R1#conf 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 0.0.0.255 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)#network 192.168.99.0 0.0.0.255 area 0
R1(config-router)#passive-interface default
R1(config-router)#no passive-interface s0/0/0
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)#exit
```

OSPF EN R2

```
R2>en
R2#conf 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 172.31.23.0 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 fa0/1
R2(config-router)#exit
R2(config)#int s0/0/1
R2(config-if)#bandwidth 256
R2(config-if)#int s0/0/0
R2(config-if)#bandwidth 256
R2(config-if)#ip ospf cost 9500
    R2(config-if)#exit
```

OSPF EN R3

R3>en

R3#conf t

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)#network 192.168.4.0 0.0.3.255 area 0

R3(config-router)#passive-interface lo4

R3(config-router)#passive-interface lo5

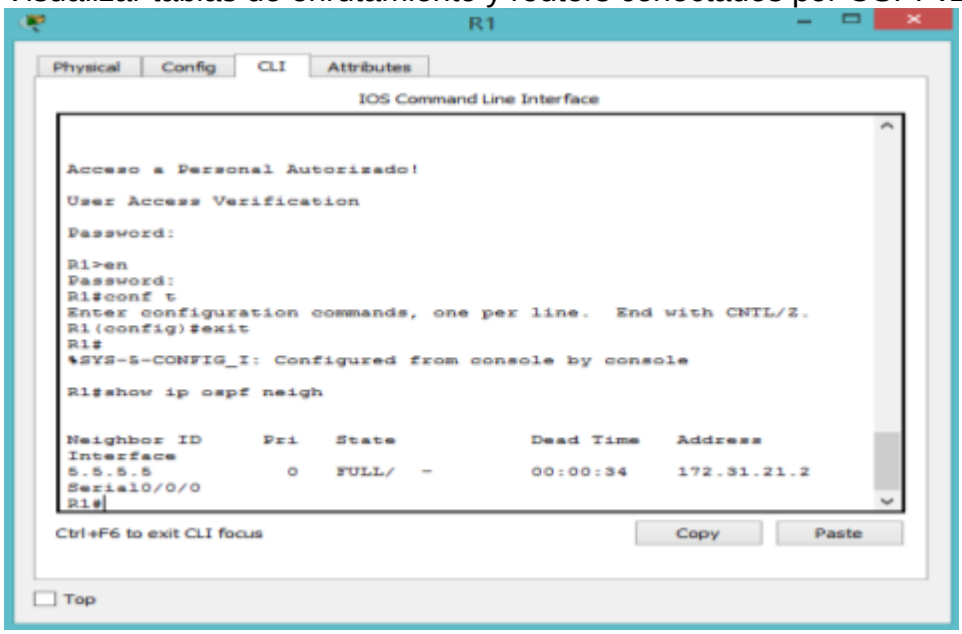
R3(config-router)#passive-interface lo6

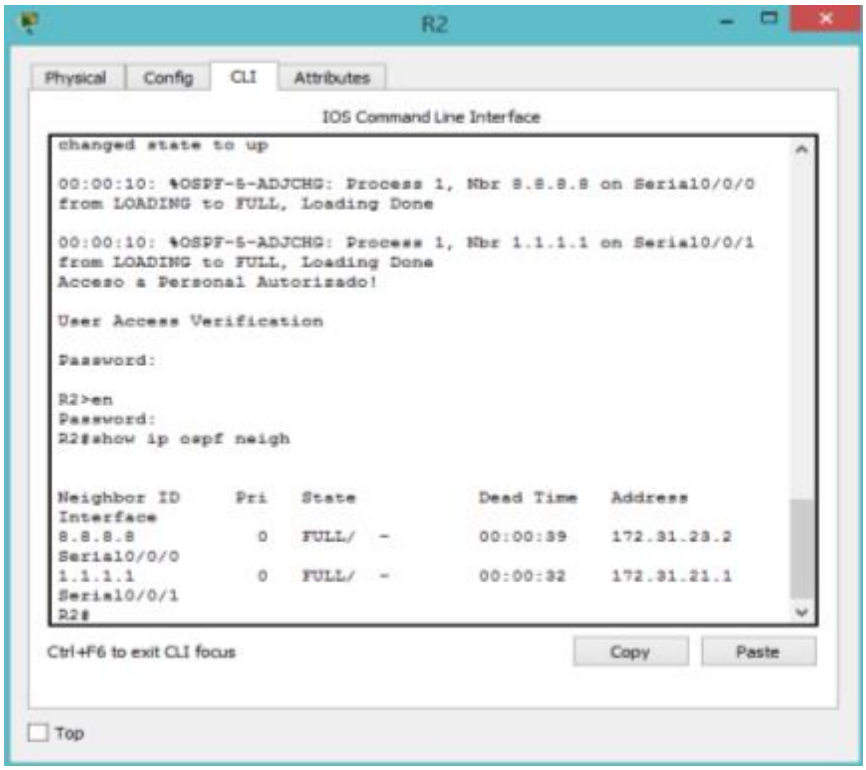
R3(config-router)#exit
R3(config)#int s0/0/1
R3(config-if)#bandwidth 256

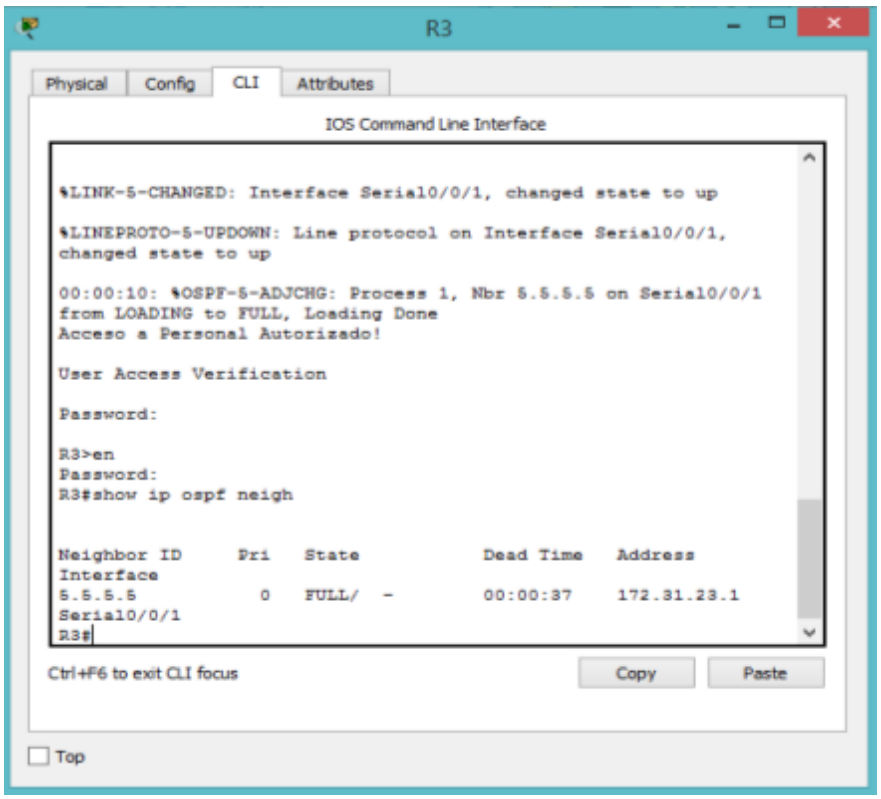
R3(config-if)#exit

Verificar información de OSPF

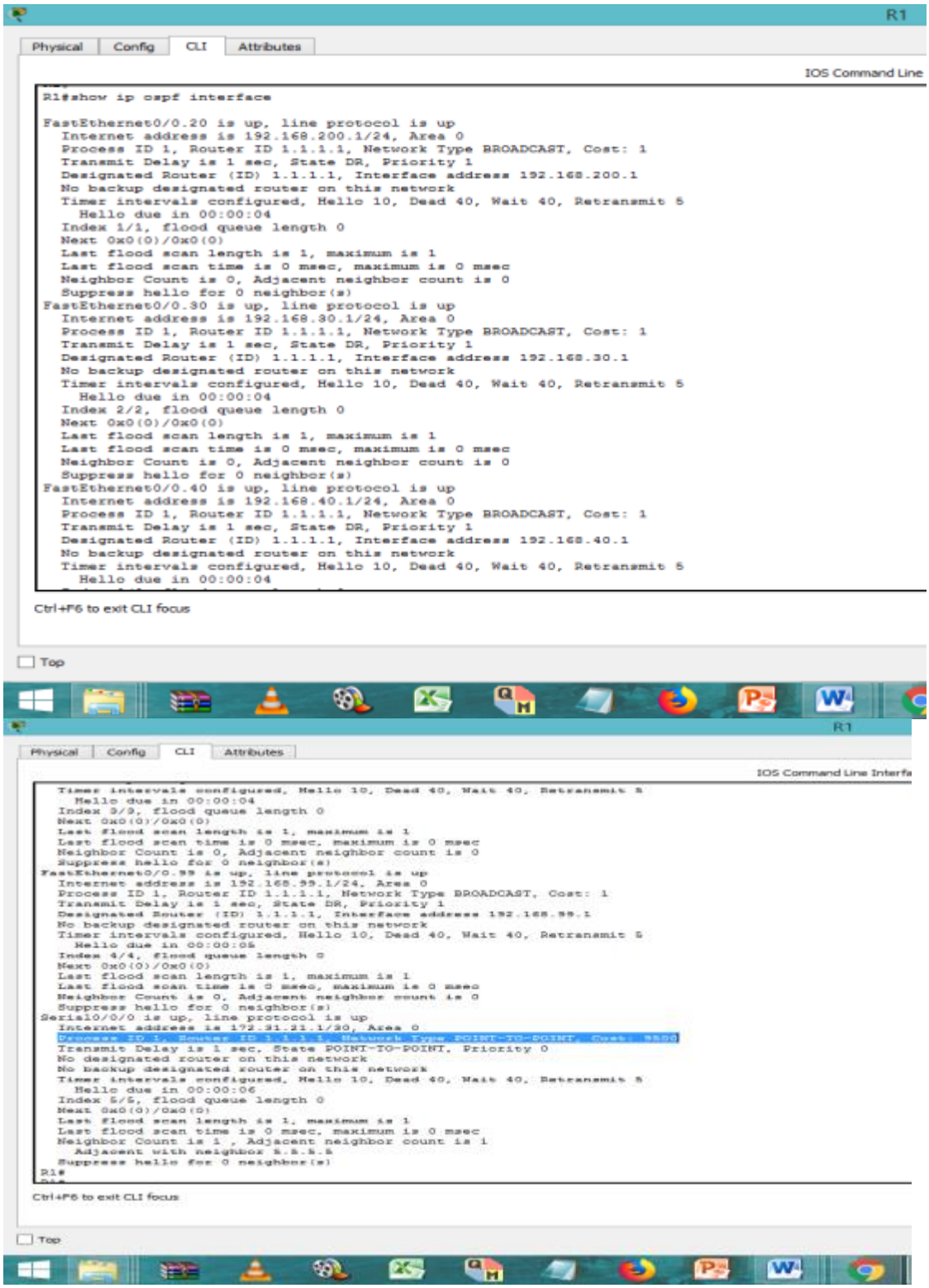
- Visualizar tablas de enrutamiento y routers conectados por OSPFv2

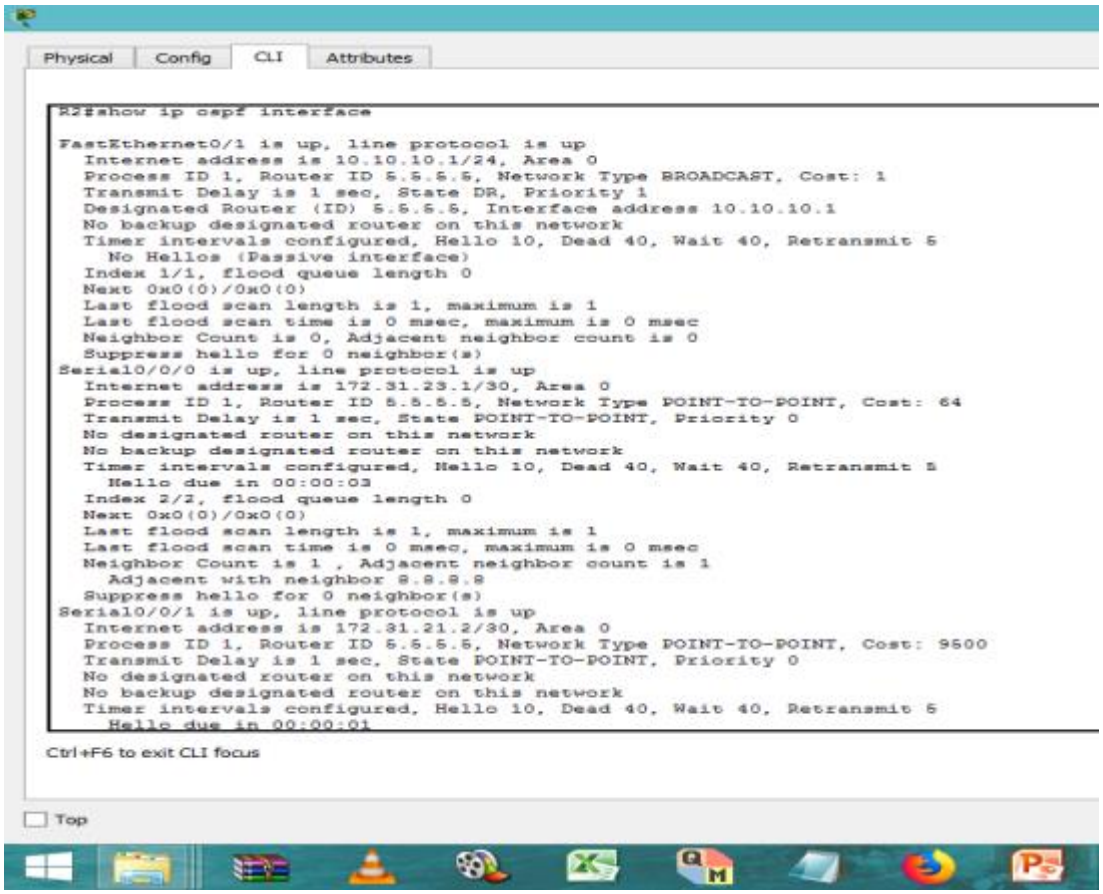


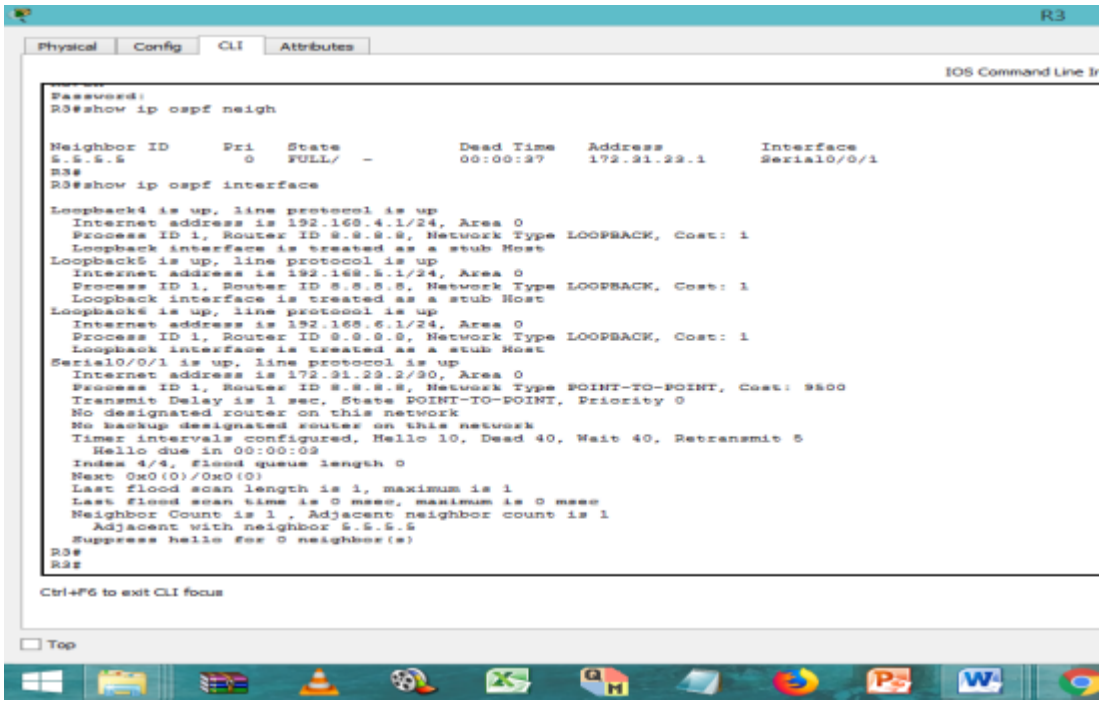

R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
changed state to up
00:00:10: %OSPF-5-ADJCHG: Process 1, Nbr 8.8.8.8 on Serial0/0/0 from LOADING to FULL, Loading Done
00:00:10: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial0/0/1 from LOADING to FULL, Loading Done
Acceso a Personal Autorizado!
User Access Verification
Password:
R2>en
Password:
R2#show ip ospf neigh
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/ - 00:00:32 172.31.21.1 Serial0/0/1
R2#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
%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
00:00:10: %OSPF-5-ADJCHG: Process 1, Nbr 5.5.5.5 on Serial0/0/1 from LOADING to FULL, Loading Done
Acceso a Personal Autorizado!
User Access Verification
Password:
R3>en
Password:
R3#show ip ospf neigh
Neighbor ID Pri State Dead Time Address Interface
5.5.5.5 0 FULL/ - 00:00:37 172.31.23.1 Serial0/0/1
R3#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

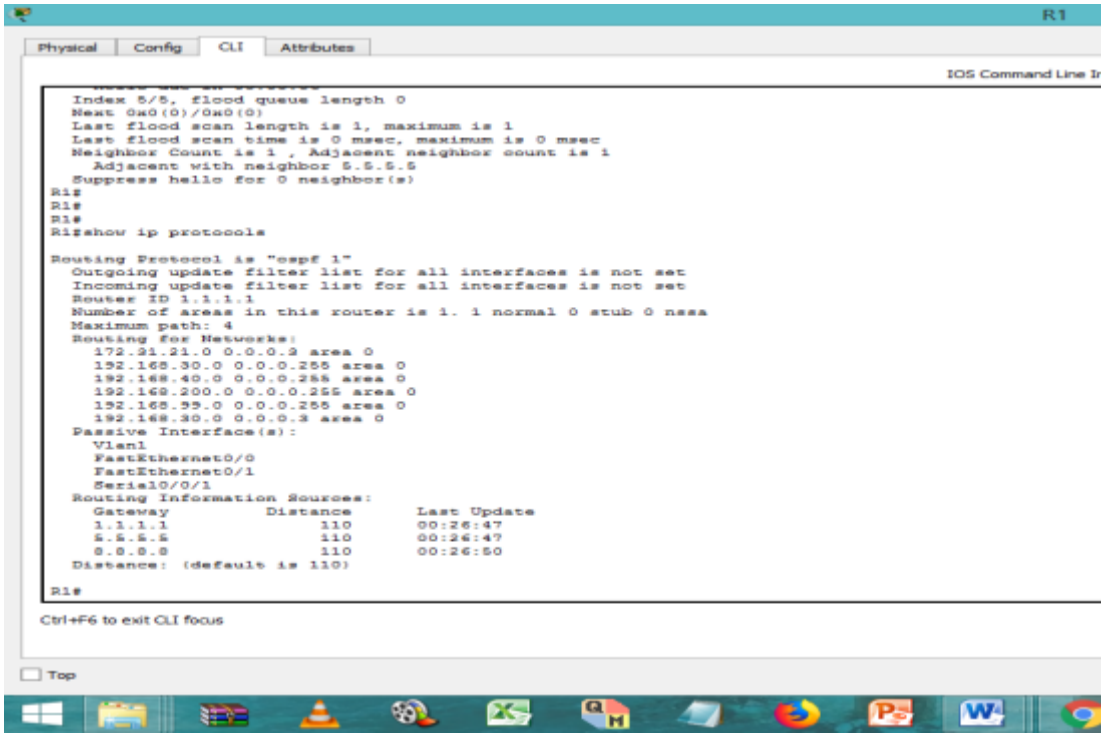
- Visualizar lista resumida de interfaces por OSPF en donde se ilustre el costo de cada interface

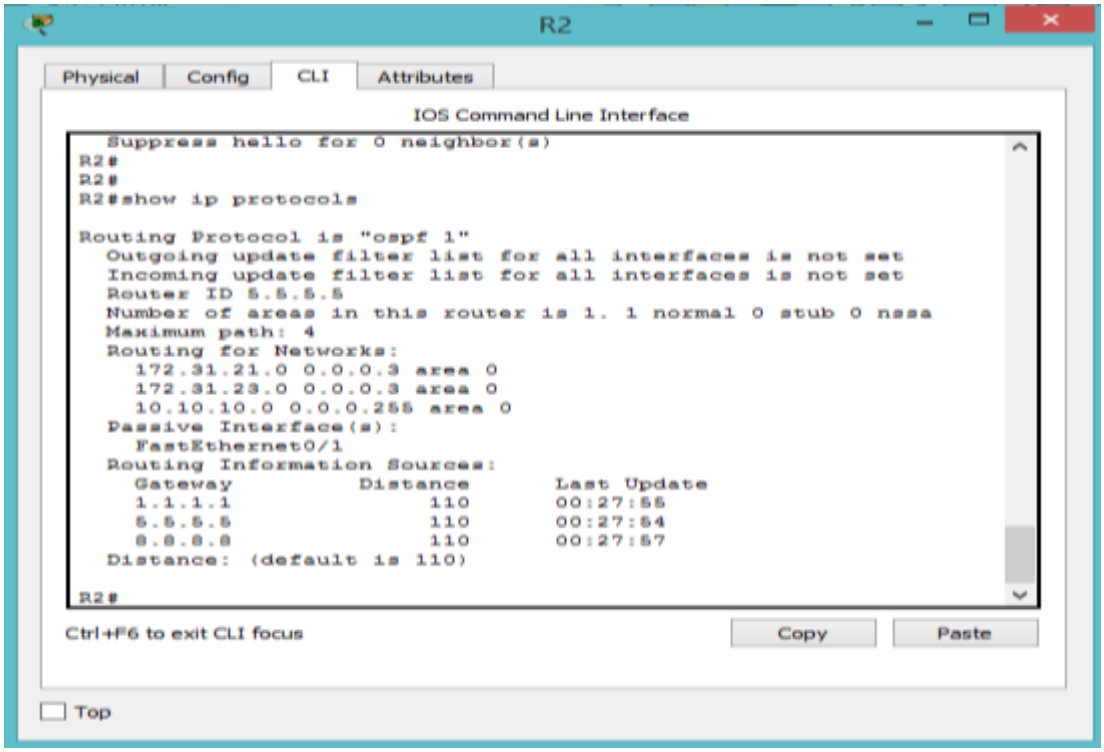


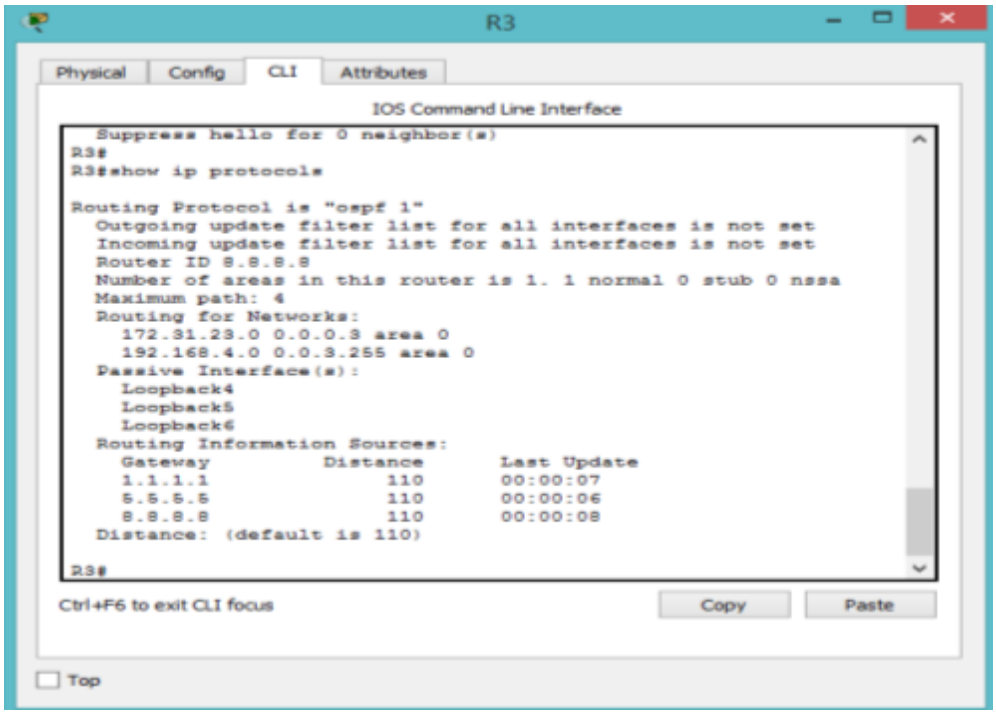

Physical
Config
CLI
Attributes
R2#show ip ospf interface
FastEthernet0/1 is up, line protocol is up
Internet address is 10.10.10.1/24, Area 0
Process ID 1, Router ID 5.5.5.5, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 5.5.5.5, Interface address 10.10.10.1
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
No Hellos (Passive interface)
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 0, Adjacent neighbor count is 0
Suppress hello for 0 neighbor(s)
Serial0/0/0 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: 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 00:00:03
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 8.8.8.8
Suppress hello for 0 neighbor(s)
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: 9600
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 00:00:01
Ctrl+F6 to exit CLI focus
Top


R3
Physical
Config
CLI
Attributes
IOS Command Line In
Password:
R3#show ip ospf neigh
Neighbor ID Pri State Dead Time Address Interface
5.5.5.5 0 FULL/ - 00:00:37 172.31.23.1 Serial0/0/1
R3#
R3#show ip ospf interface
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
Loopback6 is up, line protocol is up
Internet address is 192.168.6.1/24, Area 0
Process ID 1, Router ID 8.8.8.8, Network Type LOOPBACK, Cost: 1
Loopback interface is treated as a stub Host
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: 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 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 1 , Adjacent neighbor count is 1
Adjacent with neighbor 5.5.5.5
Suppress hello for 0 neighbor(s)
R3#
R3#
Ctrl+F6 to exit CLI focus
Top

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







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

4. En el Switch 3 deshabilitar DNS lookup

S3>en

S3#conf t

Enter configuration commands, one per line. End with CNTL/Z.

S3(config)#no ip domain lookup

S3(config)#exit

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

S1

NOTA: se utiliza la vlan de administracion 99

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)#vlan 99
S1(config-vlan)#name LAN_S1_S3
S1(config-vlan)#exit
S1(config)#int vlan 99
S1(config-if)#ip address 192.168.99.2 255.255.255.0
S1(config-if)#no shut
S1(config-if)#exit

S1(config)#ip default-gateway 192.168.30.1

S1(config-vlan)#int fa0/3

S1(config-if)#switchport mode trunk

S1(config-if)#switchport trunk native vlan 1

S1(config-if)#exit

S1(config-if)#int fa0/24

S1(config)#switchport mode trunk

S1(config-if)#switchport trunk native vlan 1

S1(config-if)#exit

S1(config)#int range f0/1-2, f0/4-23, g0/1-2
S1(config-if-range)#switchport mode access
S1(config)#int f0/1
S1(config-if)#switchport mode access
S1(config-if)#switchport access vlan 30
S1(config-if)#int range f0/2, f0/4-23, g0/1-2
S1(config-if)#shutdown

S1(config-if)#exit
```

S3

```
S3#config t
S3(config)#vlan 30
S3(config-vlan)#name Administracion
S3(config-vlan)#vlan 40
S3(config-vlan)#name Mercadeo
```

```
S3(config-vlan)#vlan 200
S3(config-vlan)#name Mantenimiento
S3(config-vlan)#vlan 99
S3(config-vlan)#name LAN_S1_S3
S3(config-vlan)#exit
S3(config)#int vlan 99
S3(config-if)#ip address 192.168.99.3 255.255.255.0
S3(config-if)#no shut
S3(config-if)#exit
S3(config)#ip default-gateway 192.168.40.1
S3(config)#int fa0/3
S3(config-if)#switchport mode trunk
S3(config-if)#switchport trunk native vlan 1
S3(config)#int range f0/1-2, f0/4-24, g0/1-2
S3(config-if-range)#switchport mode access
S3(config-if-range)#shut
S3(config-if-range)#exit
S3(config)#int fa0/1
S3(config-if)#no shutdown
S3(config-if)#switchport mode access
S3(config-if)#switchport access vlan 40
    S3(config-if)#exit
```

R1

```
R1#config t
R1(config)#int f0/0.30
R1(config-subif)#encapsulation dot1q 30
R1(config-subif)#ip add 192.168.30.1 255.255.255.0
R1(config-subif)#exit
R1(config)#int f0/0.40
R1(config-subif)#encapsulation dot1q 40
R1(config-subif)#ip add 192.168.40.1 255.255.255.0
R1(config-subif)#exit
R1(config)#int f0/0.200
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)#int f0/0.99
R1(config-subif)#encapsulation dot1q 99
R1(config-subif)#ip add 192.168.99.1 255.255.255.0
R1(config-subif)#exit
R1(config)#int f0/0
R1(config-if)#no shut
R1(config-subif)#exit
R1(config)#
```

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

S1

S1(config)#int range fa0/2, fa0/4-23, g0/1-2

S1(config-if-range)#shutdown

%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/12, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/13, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/14, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/15, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/16, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/17, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/18, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/19, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/20, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/21, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/22, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/23, changed state to administratively down

%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to administratively down

%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to administratively down

S1(config-if-range)#exit

S1(config)#

S3

S3(config)#int range fa0/2, fa0/4-24, g0/1-2

S3(config-if-range)#shutdown

%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/7, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/8, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/9, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/10, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/12, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/13, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/14, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/15, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/16, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/17, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/18, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/19, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/20, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/21, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/22, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/23, changed state to administratively down

%LINK-5-CHANGED: Interface FastEthernet0/24, changed state to administratively down

%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to administratively down

%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to administratively down

S3(config-if-range)#exit

S3(config)#

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>en
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
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)#domain-name ccna-unad.com
R1(dhcp-config)#default-router 192.168.30.1
R1(dhcp-config)#network 192.168.30.0 255.255.255.0
R1(dhcp-config)#exit
R1(dhcp-config)#ip dhcp pool MERCADEO
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#domain-name ccna-unad.com
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
R1(config)#
```

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

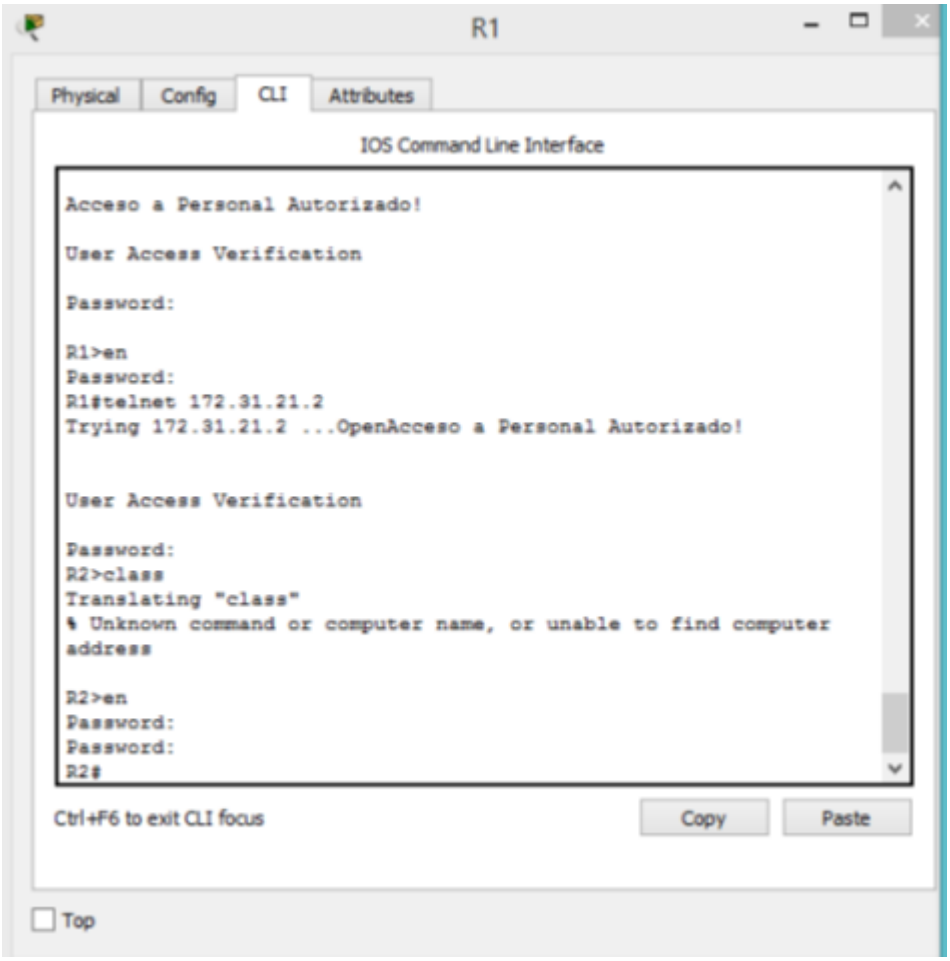
```
R2>en
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip http server
R2(config)#ip http authentication local
R2(config)#ip nat inside source static 10.10.10.10 209.165.200.229
R2(config)#int fa0/0
R2(config-if)#ip nat outside
R2(config-if)#int fa0/1
R2(config-if)#ip nat inside
R2(config-if)#exit
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)#access-list 1 permit 192.168.4.0 0.0.3.255
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)#
```

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 t
R2(config)#ip access-list standard ADMIN-UNAD
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-UNAD in
        R2(config-line)#exit
```

PRUEBA EN R1



PRUEBA EN R3

Password:

R3>en

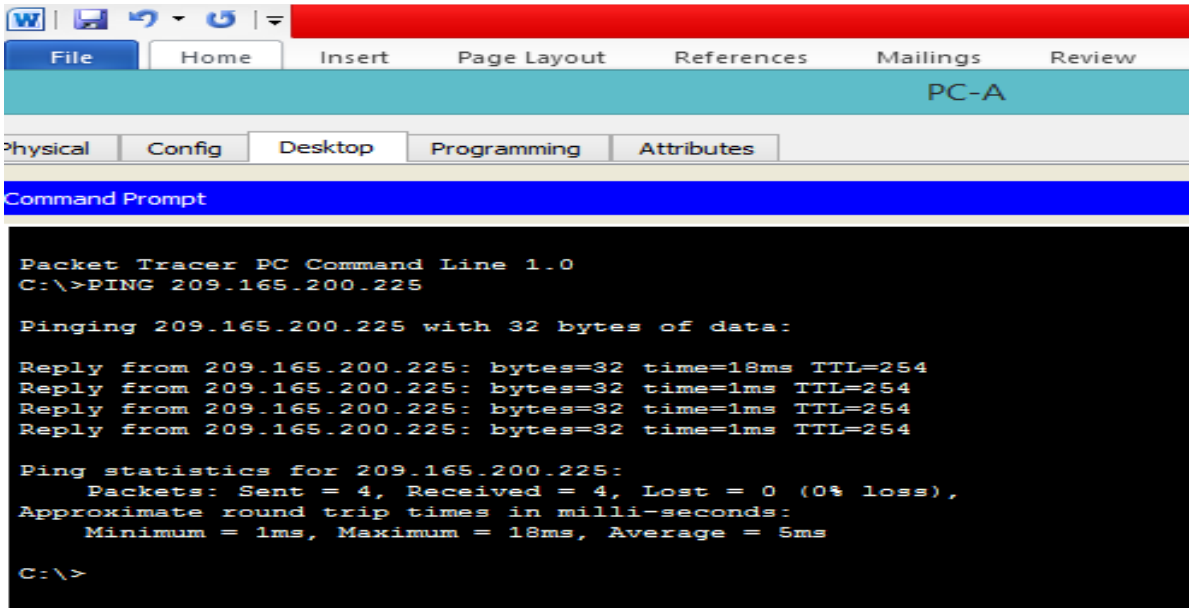
Password:

R3#telnet 172.31.23.2

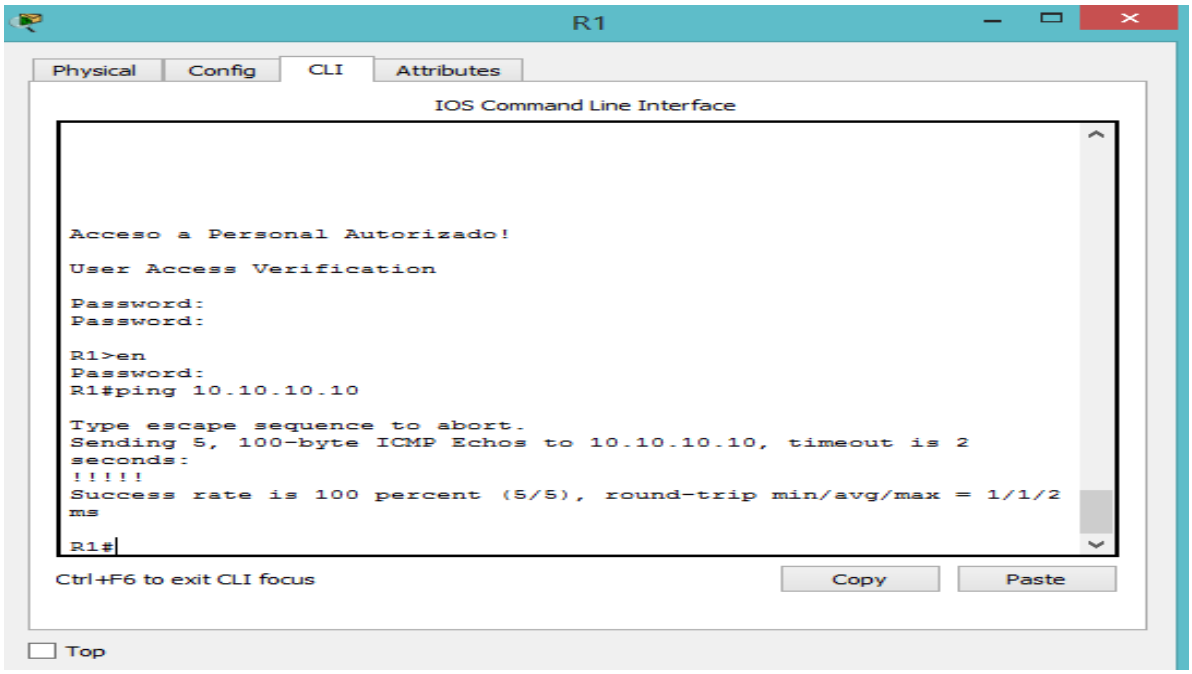
Trying 172.31.23.2 ...OpenAcceso a Personal Autorizado!

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

PING DE PC-A a R2



PING DE R1 al WEB SERVER



TRACEROUTE DE R3 a PC-A

R3#traceroute 192.168.30.31

Type escape sequence to abort.

Tracing the route to 192.168.30.31

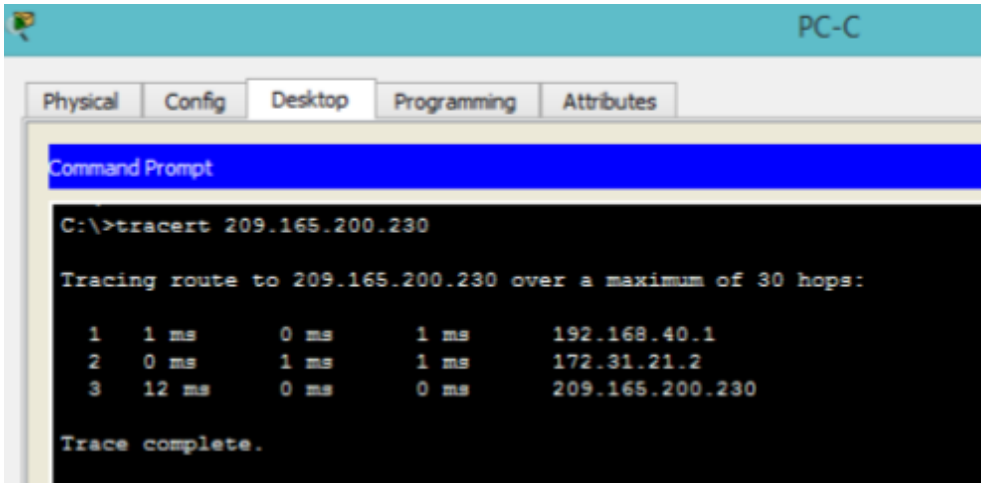
1 172.31.23.1 13 msec 1 msec 1 msec

2 172.31.21.1 1 msec 0 msec 1 msec

3 192.168.30.31 2 msec 2 msec 1 msec

R3#

TRACERT DE PC-C a InternetPC



TRACEROUTE DE R2 a PC-A

R2#Traceroute 192.168.30.31
Type escape sequence to abort.
Tracing the route to 192.168.30.31

1 172.31.21.1 1 msec 1 msec 1 msec
2 192.168.30.31 0 msec 3 msec 1 msec
R2#

CONCLUSIONES

A la hora de realizar topologías en packet tracer es indispensable dominar los comandos de configuración necesarios para poder interconectar las terminales, teniendo en cuenta la correcta configuración de terminales, reconociendo la jerarquía de las direcciones IP y logrando identificar las máscaras y subredes que se deben utilizar en cada una.

También es necesario utilizar los comandos que permiten identificar la correcta conexión comunicación, para poder identificar las posibles fallas dentro de la red y así mismo ejecutar las correcciones pertinentes.

REFERENCIAS

(2017). Retrieved from https://staticcourseassets.s3.amazonaws.com/RSE503/es/index.html#11.0

CCNA - PT Practice Skills Exam (2015). [Motion Picture]. Retrieved from https://www.youtube.com/watch?v=YE3gC_XTQAs

SANCHEZ REYES, L. C. (2018). Obtenido de https://repository.unad.edu.co/bitstream/10596/18880/3/1055273746.pdf

Segui, F. B. (2015). Retrieved from Configuración DHCP en routers CISCO.

Teare, D. V. (2015). *CISCO*. Obtenido de https://1drv.ms/b/s!AmlJYei=NT1llnMfy2rhPZHwEoWx