

EVALUACIÓN – PRUEBA DE HABILIDADES PRÁCTICAS CCNA

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UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA UNAD
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INGENIERÍA DE SISTEMAS
SOGAMOSO
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Diplomado de profundización para optar al título de Ingeniero de Sistemas

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Jurado

Jurado

Sogamoso 12 de diciembre de 2018

Tabla de contenido

GLOSARIO	- 7 -
RESUMEN	- 8 -
INTRODUCCIÓN	- 9 -
ESCENARIO 1	- 10 -
Situación.....	- 10 -
1. Configuramos las Vlan 100 y 200 y asignamos los puertos de acuerdo al cuadro de asignación	- 11 -
Switch SW2	- 11 -
2. Asignación de dirección de acuerdo a la tabla 1.....	- 12 -
PC ISP	- 12 -
Router R2	- 12 -
Router R1	- 13 -
Router R3	- 13 -
3. Configuración del DHCP para direccionamiento y servidor IPv6	- 14 -
Router R2	- 14 -
Router R3	- 14 -
4. Configuración del NAT en R1	- 14 -
Router R1	- 14 -
5. Configuramos el RIP en cada Router	- 15 -
Router R2	- 15 -
Router R1	- 15 -
Router R3	- 15 -
6. Las direcciones se deben configurar mediante DHCP y DHCPv6.	- 16 -
7. Verifique la conectividad. Todos los terminales deben poder hacer ping entre sí y a la dirección IP del ISP.....	- 16 -
Ping de Lapto31 a ISP.....	- 16 -
Ping de PC1 a ISP.....	- 17 -
Ping de PC0 a PC20.....	- 17 -
ESCENARIO 2.....	- 19 -
Situación.....	- 19 -

1. Configurar el direccionamiento IP acorde con la topología de red para cada uno de los dispositivos que forman parte del escenario.	- 20 -
Configuración Router R1	- 20 -
Configuración Router R2	- 20 -
Configuración Router R3	- 21 -
Configuración Internet PC.....	- 22 -
Configuración Switch S1	- 22 -
Configuración Switch S3.....	- 22 -
2. Configurar el protocolo de enrutamiento OSPFv2 bajo los siguientes criterios:.....	- 23 -
Router ID R1	- 23 -
Router ID R2.....	- 25 -
Router ID R3.....	- 26 -
Verificar información de OSPF	- 27 -
3. Configurar VLANs, Puertos troncales, puertos de acceso, encapsulamiento, Inter-VLAN Routing y Seguridad en los Switches acorde a la topología de red establecida.	- 33 -
Switch S1	- 33 -
Switch S3.....	- 34 -
Router R1	- 35 -
4. Deshabilitamos el DNS Lookup en S3	- 36 -
5. Asignar direcciones IP a los Switches acorde a los lineamientos.	- 36 -
Switch S1	- 36 -
Switch S3.....	- 36 -
6. Desactivar todas las interfaces que no sean utilizadas en el esquema de red. - 37 -	
Switch S1	- 37 -
Switch S3.....	- 37 -
7. Implementación DHCP y NAT para IPv4, configuración R1 como servidor DHCP para las VLANs 30 y 40 y reservar las primeras 30 direcciones IP de las VLAN 30 y 40 para configuraciones estáticas.	- 38 -
Configuramos R1	- 38 -
Configuramos PC-A	- 39 -
Configuramos PC-C.....	- 40 -

8. Configurar NAT en R2 para permitir que los host puedan salir a internet... - 40 -	
Verificamos la ip nat..... - 41 -	
Verificamos la configuración NAT en R2 mediante el comando show ip nat statistics..... - 41 -	
9. 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..... - 42 -	
Se configura la ACL 2 la cual rechaza el acceso de los hosts de la red 192.168.4.0..... - 42 -	
Se configura la ACL 3 la cual permite el acceso a los hosts de la red 192.168.30.0..... - 42 -	
10. 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 - 42 -	
Se configura la ACL ACCESO VTY la cual rechaza el acceso por telnet a R2 desde el host 192.168.40.31 (PC-C)..... - 43 -	
Verificamos el rechazo de acceso por telnet al R2 desde el PC-C..... - 43 -	
Se configuro la ACL 100 la cual permite enviar solicitudes a los puertos 80 y 443 (http y https) La ACL 101 permite recibir respuestas de http y https establecidas..... - 44 -	
11. Verificar procesos de comunicación y redireccionamiento de tráfico en los routers mediante el uso de Ping y Traceroute..... - 44 -	
Verificamos conexión desde PC-A a todos los dispositivos de la red..... - 44 -	
Verificamos conexión desde PC-C a todos los dispositivos de la red..... - 46 -	
Verificamos conexión desde Router R2 a todos los dispositivos de la red mediante Traceroute..... - 48 -	
CONCLUSIONES - 49 -	
BIBLIOGRAFIA - 50 -	

GLOSARIO

SWITCH: o conmutador es un dispositivo de interconexión utilizado para conectar equipos en red formando lo que se conoce como una red de área local (LAN) y cuyas especificaciones técnicas siguen el estándar conocido como Ethernet (o técnicamente IEEE 802.3).

NAT: o Traducción de Direcciones de Red es un mecanismo que permite que múltiples dispositivos compartan una sola dirección IP pública de Internet, ahorrando así millones de direcciones públicas.

ROUTER: es un dispositivo de hardware que permite la interconexión de ordenadores en red. El router o enrutador es un dispositivo que opera en capa tres de nivel de 3. Así, permite que varias redes u ordenadores se conecten entre sí y, por ejemplo, compartan una misma conexión de Internet.

OSPF: El protocolo Open Shortest Path First (OSPF) es un protocolo en enrutamiento abierto — no propietario — del tipo Link State. Este fue desarrollado por la organización IETF como un Interior Gateway Protocol (IGP) con el objetivo de reemplazar al protocolo RIP.

ENRUTAMIENTO: Es el proceso que emplea un router para reenviar paquetes hacia la red de destino. Un router toma decisiones en base a la dirección IP de destino del paquete. Para tomar la decisión correcta, los routers deben aprender la ENRUTAMIENTO dirección de las redes remotas.

DHCP: es un protocolo de red de tipo cliente/servidor mediante el cual un servidor DHCP asigna dinámicamente una dirección IP y otros parámetros de configuración de red a cada dispositivo en una red para que puedan comunicarse con otras redes IP.

VLAN: acrónimo de virtual LAN (red de área local virtual), es un método para crear redes lógicas independientes dentro de una misma red física. Varias VLAN pueden coexistir en un único conmutador físico o en una única red física.

RESUMEN

Dan a conocer dos situaciones de topologías de red, las cuales se ejecutan las diferentes configuraciones de los elementos de hardware como son los routers, switches y PC, obteniendo la conexión de cada uno de estos elementos para así componer una red, por ende se logran crear redes Vlan, con sus respectivos puertos de acceso, encapsulamiento y por último la configuración y puesta en marcha de la seguridad en cada uno de los routers y switches, implementando enrutamiento DHCP y NAT para IPv4 dentro de los lineamiento de listas de acceso.

INTRODUCCIÓN

El mundo de la tecnología avanza a pasos agigantados y las redes no pueden quedarse atrás. Este informe da a conocer los conocimientos obtenidos en cada una de las practicas del diplomado de profundización CISCO, donde se practica y pone a prueba las configuraciones básicas de cada uno de los dispositivos que contiene una red, tales como los Router, Switch y Laptop. Esto encaminado a realizar configuraciones de IP estáticas como también de establecer las direcciones mediante el protocolo DHCP, incluyendo la configuración de redes VLANs con sus respectivas listas de accesos y NAT.

ESCENARIO 1

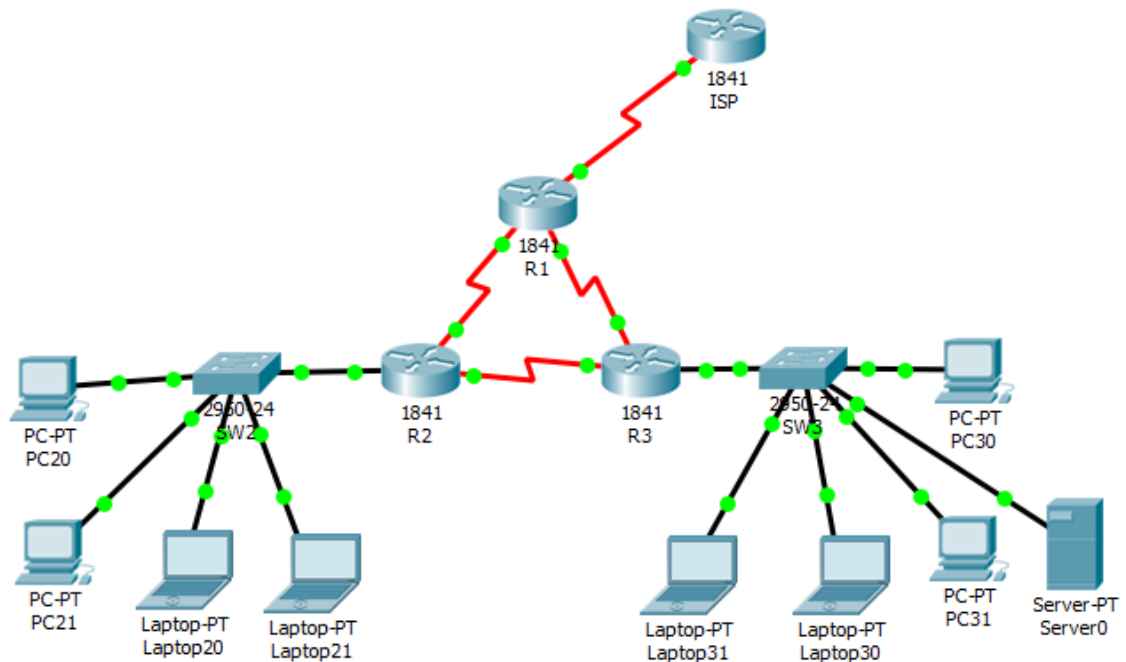


Tabla de asignación de VLAN y de puertos

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.

1. Configuramos las Vlan 100 y 200 y asignamos los puertos de acuerdo al cuadro de asignación

Switch SW2

```
Switch>ena
Switch#config
Configuring from terminal, memory, or network [terminal]?
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 DESKTOPS
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
SW2(config-if)#switchport mode trunk
SW2(config-if)#int range fa0/6-24
SW2(config-if-range)#shutdown
```

Tabla 1.

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

2. Asignación de dirección de acuerdo a la tabla 1.

PC ISP

```
Router>enable
Router#config ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname ISP
ISP(config)#int s0/0/0
ISP(config-if)#ip add 200.123.211.1 255.255.255.0
ISP(config-if)#no shutdown
ISP(config-if)#
```

Router R2

```
Router>enable
Router#config terminal
Router(config)#hostname R2
R2(config)#int f0/0.100
R2(config-subif)#encapsulation dot1Q 100
R2(config-subif)#ip add 192.168.20.1 255.255.255.0
R2(config-subif)#no shutdown

R2(config-subif)#int f0/0.200
R2(config-subif)#encapsulation dot1Q 200
R2(config-subif)#ip add 192.168.21.1 255.255.255.0
R2(config-subif)#no shutdown

R2(config-subif)#int f0/0
R2(config-if)#no shutdown

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

R2(config-if)#int s0/0/1
R2(config-if)#ip add 10.0.0.9 255.255.255.252
R2(config-if)#no shutdown
```

Router R1

```
Router>enable
Router#config ter
Router(config)#hostname R1
R1(config)#int s0/0/0
R1(config-if)#ip add 200.123.211.2 255.255.255.0
R1(config-if)#no shutdown

R1(config-if)#int s0/1/0
R1(config-if)#ip add 10.0.0.1 255.255.255.252
R1(config-if)#no shutdown

R1(config-if)#int s0/1/1
R1(config-if)#ip add 10.0.0.5 255.255.255.252
R1(config-if)#no shutdown
```

Router R3

```
Router>enable
Router#config ter
Router(config)#hostname R3
R3(config)#ipv6 unicast-routing
R3(config)#int f0/0
R3(config-if)#ip add 192.168.30.1 255.255.255.0
R3(config-if)#ipv6 add 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
```

3. Configuración del DHCP para direccionamiento y servidor IPv6

Router R2

```
R2#config ter
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)#
```

Router R3

```
R3#config ter
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)#
```

4. Configuración del NAT en R1

Router R1

```
R1#config ter
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip access-list standard INSIDE-DEVS
R1(config-std-nacl)#permit 192.168.20.0 0.0.0.255
R1(config-std-nacl)#permit 192.168.21.0 0.0.0.255
R1(config-std-nacl)#permit 192.168.30.0 0.0.0.255
R1(config-std-nacl)#exit
R1(config)#ip nat inside source list INSIDE-DEVS int s0/0/0 overload
R1(config)#int s0/0/0
R1(config-if)#ip nat outside
R1(config-if)#exit
R1(config)#int s0/1/0
R1(config-if)#ip nat inside
R1(config-if)#exit
R1(config)#int s0/1/1
R1(config-if)#ip nat inside
R1(config-if)#exit
R1(config)#
```

5. Configuramos el RIP en cada Router

Router R2

```
R2(config)#router rip
R2(config-router)#version 2
R2(config-router)#network 192.168.30.0
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)#
```

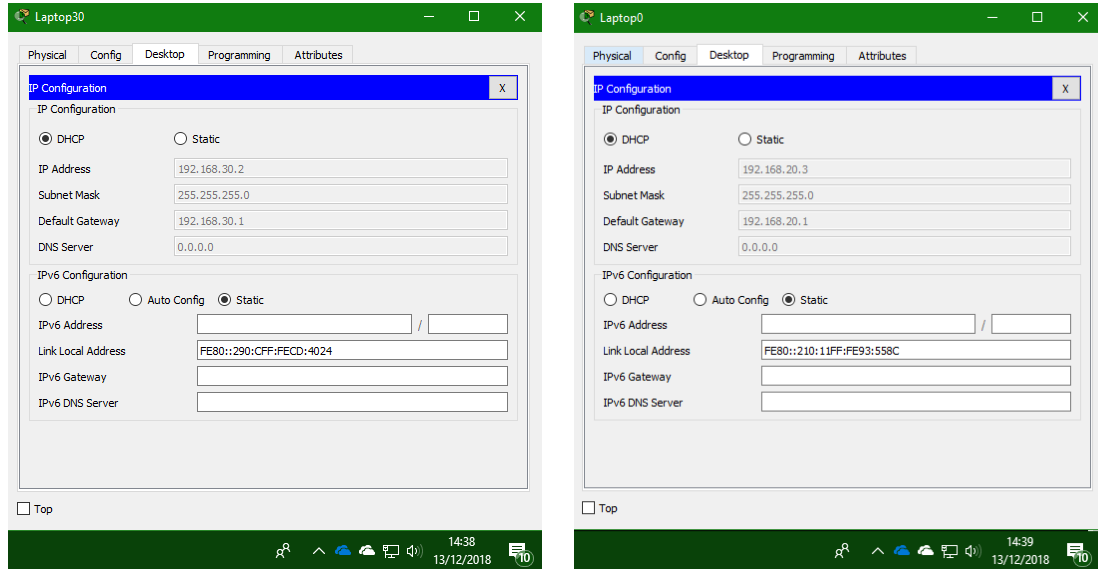
Router R1

```
R1>enable
R1#config ter
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)#
```

Router R3

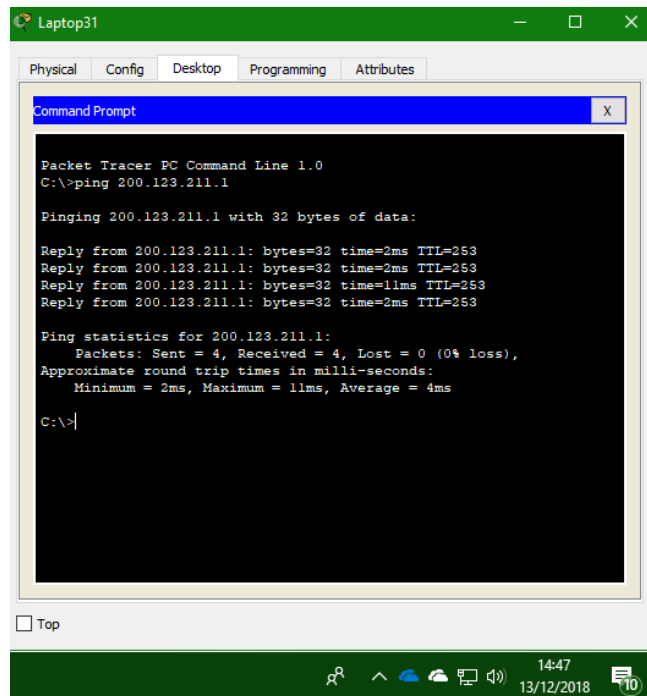
```
R3#config ter
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router rip
R3(config-router)#version 2
R3(config-router)#network 192.168.30.0
R3(config-router)#network 10.0.0.8
R3(config-router)#network 10.0.0.4
R3(config-router)#exit
R3(config)#
```

6. Las direcciones se deben configurar mediante DHCP y DHCPv6.

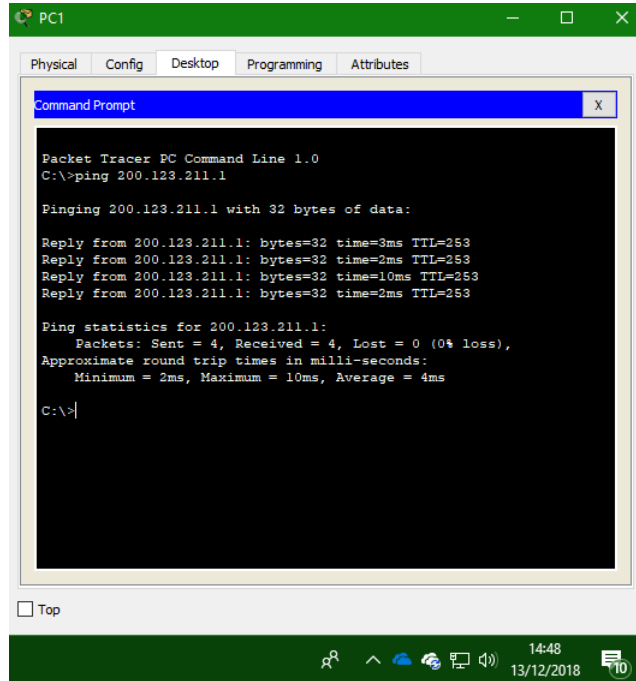


7. Verifique la conectividad. Todos los terminales deben poder hacer ping entre sí y a la dirección IP del ISP

Ping de Lapto31 a ISP



Ping de PC1 a ISP



```
PC1
Physical Config Desktop Programming Attributes
Command Prompt
Packet Tracer PC Command Line 1.0
C:\>ping 200.123.211.1

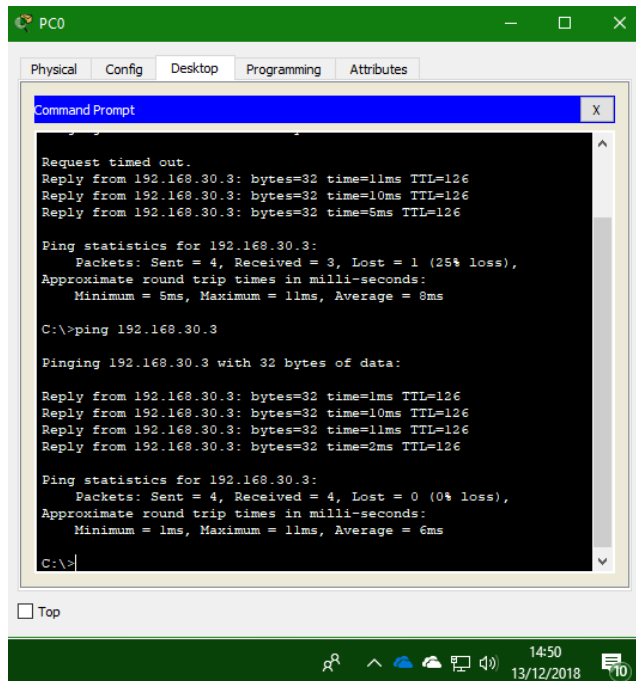
Pinging 200.123.211.1 with 32 bytes of data:

Reply from 200.123.211.1: bytes=32 time=3ms TTL=253
Reply from 200.123.211.1: bytes=32 time=2ms TTL=253
Reply from 200.123.211.1: bytes=32 time=10ms TTL=253
Reply from 200.123.211.1: bytes=32 time=2ms TTL=253

Ping statistics for 200.123.211.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 10ms, Average = 4ms

C:\>
```

Ping de PC0 a PC20



```
PC0
Physical Config Desktop Programming Attributes
Command Prompt
Request timed out.
Reply from 192.168.30.3: bytes=32 time=11ms TTL=126
Reply from 192.168.30.3: bytes=32 time=10ms TTL=126
Reply from 192.168.30.3: bytes=32 time=5ms TTL=126

Ping statistics for 192.168.30.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 5ms, Maximum = 11ms, Average = 8ms

C:\>ping 192.168.30.3

Pinging 192.168.30.3 with 32 bytes of data:

Reply from 192.168.30.3: bytes=32 time=1ms TTL=126
Reply from 192.168.30.3: bytes=32 time=10ms TTL=126
Reply from 192.168.30.3: bytes=32 time=11ms TTL=126
Reply from 192.168.30.3: bytes=32 time=2ms TTL=126

Ping statistics for 192.168.30.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 11ms, Average = 6ms

C:\>
```

Cisco Packet Tracer - C:\Users\ronal\OneDrive\Universidad\2018\Segundo 2018\Diplomado Cisco Networking\Prueba...

File Edit Options View Tools Extensions Help

Logical Back [Root] New Cluster Move Object Set Tiled Background Viewport Environment: 14:51:00

PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit
	Successful	PC20	ISP	ICMP		0.000	N	0	(edit)
	Successful	PC0	ISP	ICMP		0.000	N	1	(edit)
	Successful	PC0	PC1	ICMP		0.000	N	2	(edit)
	Successful	Laptop0	R2	ICMP		0.000	N	3	(edit)
	Successful	PC31	R3	ICMP		0.000	N	4	(edit)
	Successful	Laptop30	PC20	ICMP		0.000	N	5	(edit)
	Successful	R3	Laptop0	ICMP		0.000	N	6	(edit)
	Successful	R1	Laptop31	ICMP		0.000	N	7	(edit)

Time: 00:29:18 Power Cycle Devices Fast Forward Time Realtime

Scenario 0

New Delete

Toggle PDU List Window

1941 2901 2911 8191OX 819HGW

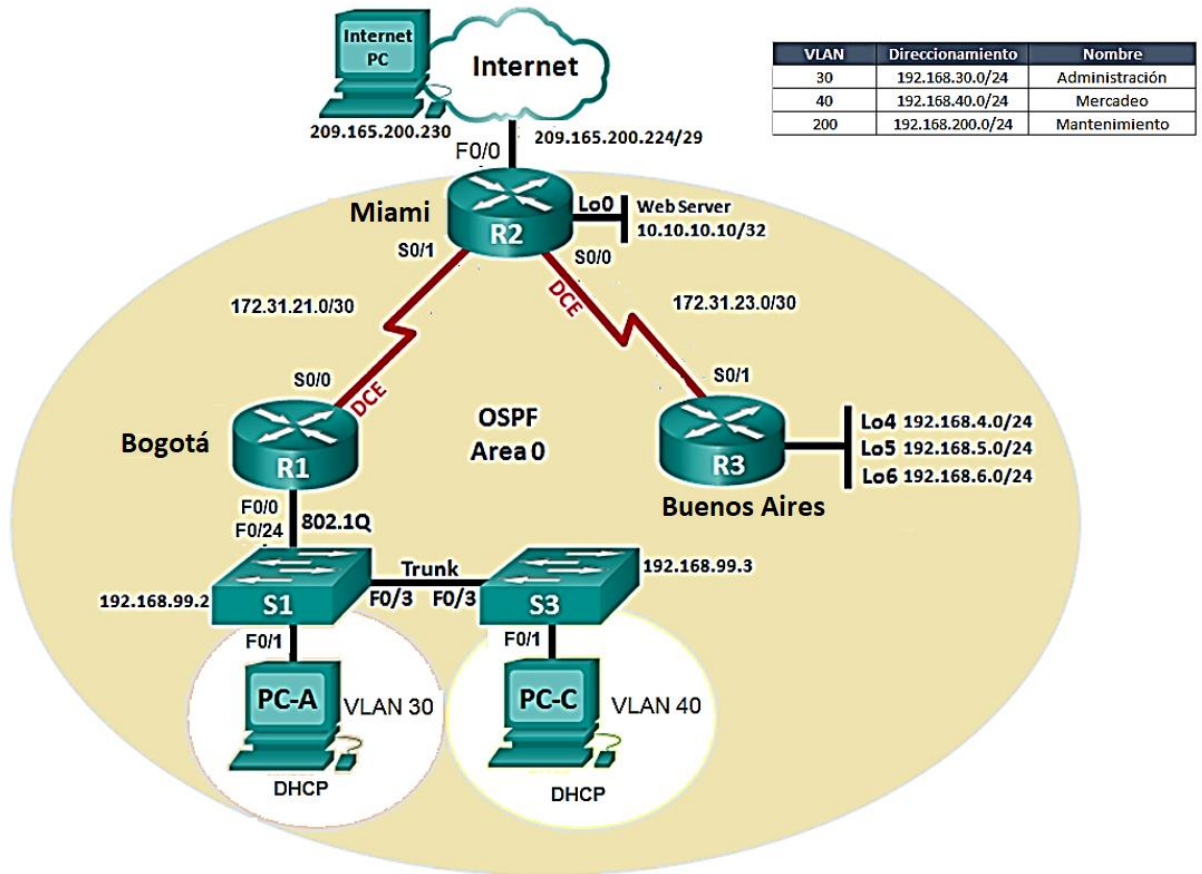
CGR1240

14:54 13/12/2018

ESCENARIO 2

Situación

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.**

Configuración Router R1

```
Router>enable
Router#config ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R1

R1(config)#int s0/0/0
R1(config-if)#ip address 172.31.21.1 255.255.255.252
R1(config-if)#description to Serial R2
R1(config-if)#no shutdown

R1(config-if)#clock rate 128000
R1(config-if)#end
R1#config terminal

R1(config)#interface g0/0.1
R1(config-subif)#encapsulation dot1q 1
R1(config-subif)#ip address 192.168.99.1 255.255.255.0
R1(config-subif)#exit

R1(config)#int g0/0
R1(config-if)#no shutdown
R1#exit
```

Configuración Router R2

```
Router>enable
Router#config t
Router(config)#hostname R2

R2(config)#interface s0/0/0
R2(config-if)#ip address 172.31.23.1 255.255.255.252
R2(config-if)#description to Serial R3
R2(config-if)#no shutdown

R2(config-if)#clock rate 128000
R2(config-if)#exit
R2(config)#int g0/0
```

```
R2(config-if)#ip address 209.165.200.225 255.255.255.248
R2(config-if)#description Internet PC
R2(config-if)#no shutdown
```

```
R2(config-if)#int loopback 0
R2(config-if)#ip address 10.10.10.10 255.255.255.255
R2(config-if)#interface s0/0/0
R2(config-if)#clock rate 128000
R2(config-if)#int s0/0/1
R2(config-if)#ip address 172.31.21.2 255.255.255.252
R2(config-if)#description Serial R1
R2(config-if)#no shutdown
R2(config-if)#end
```

Configuración Router R3

```
Router>ena
Router#config t
Router(config)#hostname R3
R3(config)#int s0/0/1
R3(config-if)#ip add 172.31.23.2 255.255.255.252
R3(config-if)#description Serial R2
R3(config-if)#no shutdown

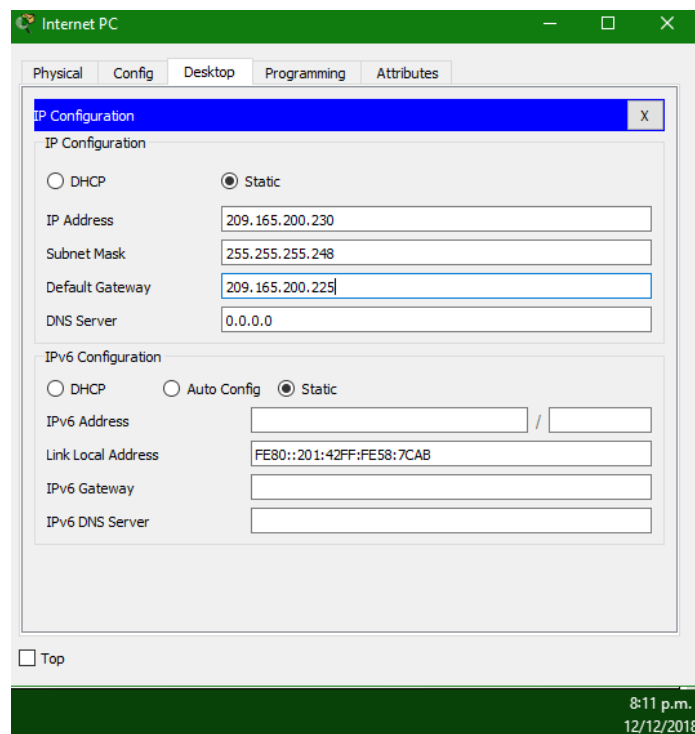
R3(config-if)#exit
R3(config)#interface loopback 4
R3(config-if)#ip add 192.168.4.1 255.255.255.0

R3(config-if)#exit
R3(config)#int loopback 5
R3(config-if)#ip add 192.168.5.1 255.255.255.0

R3(config-if)#exit
R3(config)#int loopback 6

R3(config-if)#ip add 192.168.6.1 255.255.255.0
R3(config-if)#exit
R3(config)#end
```

Configuración Internet PC



Configuración Switch S1

```
Switch>enable
Switch#config ter
Switch(config)#hostname S1
S1(config)#int vlan1
S1(config-if)#ip address 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)#
```

Configuración Switch S3

```
Switch>enable
Switch#config ter
Switch(config)#hostname S3
S3(config)#interface vlan1
S3(config-if)#ip add 192.168.99.3 255.255.255.0
S3(config-if)#no shutdown
```

```

S3(config-if)#exit
S3(config)#ip default-gateway 192.168.99.1
S3(config)#end
S3#

```

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

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 ID R1

```

R1>enable
R1#config ter
R1(config)#router ospf 1
R1(config-router)#network 172.31.21.0 0.0.0.3 area 0
R1(config-router)#network 192.168.99.0 0.0.0.255 area 0
R1(config-router)#router-id 1.1.1.1
R1(config-router)#Reload or use "clear ip ospf process" command, for
this to take effect
R1(config-router)#end
R1#clear ip ospf process
Reset ALL OSPF processes? [no]: yes
R1#

```

Verificamos el Router ID en R1

```
R1#show ip protocols

Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 1.1.1.1
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.31.21.0 0.0.0.3 area 0
    192.168.99.0 0.0.0.255 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
  Distance: (default is 110)
R1#
```

Interface pasiva para G0/0 y G0/0.1 en R1 -----

```
R1#config ter
R1(config)#router ospf 1
R1(config-router)#passive-interface g0/0
R1(config-router)#passive-interface g0/0.1
R1(config-router)#end
R1#
```

Verificamos la creación de la interface G0/0.1 en R1

```
R1#show ip ospf interface g0/0.1

GigabitEthernet0/0.1 is up, line protocol is up
  Internet address is 192.168.99.1/24, Area 0
  Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost:
  1
  Transmit Delay is 1 sec, State WAITING, Priority 1
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  No Hellos (Passive interface)
  Index 2/2, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 0, Adjacent neighbor count is 0
```



```
Suppress hello for 0 neighbor(s)
R1#
```

Ancho de banda y costo para interface s0/0/0 en R1

```
R1#config ter
R1(config)#interface s0/0/0
R1(config-if)#bandwidth 256
R1(config-if)#ip ospf cost 9500
R1(config-if)#
```

Router ID R2

```
R2>enable
R2#config t
R2(config)#router ospf 1
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 209.165.200.224 0.0.0.7 area 0
R2(config-router)#network 10.10.10.10 0.0.0.0 area 0
R2(config-router)#router-id 5.5.5.5
R2(config-router)#Reload or use "clear ip ospf process" command, for
this to take effect
R2(config-router)#exit
R2(config)#end
R2#clear ip ospf process
Reset ALL OSPF processes? [no]: yes
R2#
```

Interface pasiva para G0/0 y lo0 en R1 y configuración ancho y costo de banda para interface s0/0/0 en R2

```
R2>enable
R2#config ter
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router ospf 1
R2(config-router)#passive-interface g0/0
R2(config-router)#passive-interface lo0
R2(config-router)#exit
R2(config)#int s0/0/1
R2(config-if)#bandwidth 256
R2(config-if)#exit
R2(config)#interface s0/0/0
R2(config-if)#bandwidth 256
R2(config-if)#ip ospf cost 9500
R2(config-if)#end
```

R2#

Router ID R3

```
R3>enable
R3#config ter
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#network 172.31.23.0 0.0.0.3 area 0
01:12:37: %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 0.0.0.255 area 0
R3(config-router)#network 192.168.5.0 0.0.0.255 area 0
R3(config-router)#network 192.168.6.0 0.0.0.255 area 0
R3(config-router)#router-id 8.8.8.8
R3(config-router)#Reload or use "clear ip ospf process" command, for
this to take effect
R3(config-router)#end
R3#clear ip ospf process
Reset ALL OSPF processes? [no]: yes
R3#
```

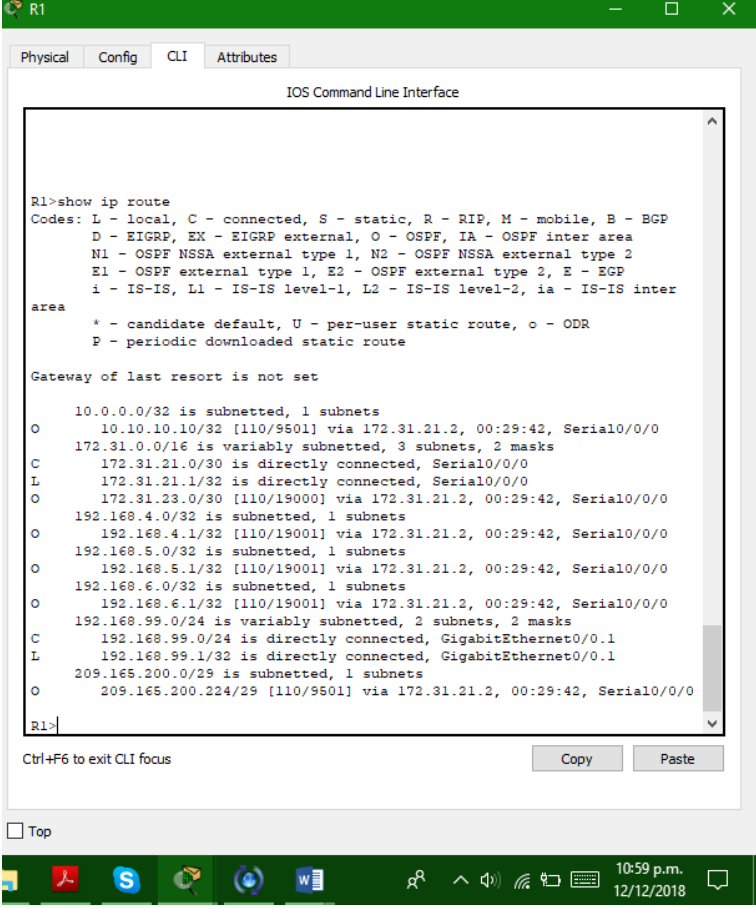
Interface pasiva lo4, lo5 y lo6 y configuración del ancho de banda para interface s0/0/1 en R3

```
R3#config ter
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#passive-interface lo4
R3(config-router)#passive-interface lo5
R3(config-router)#passive-interface lo6
R3(config-router)#exit
R3(config)#interface s0/0/1
R3(config-if)#bandwidth 256
R3(config-if)#exit
R3(config)#exit
R3#
```

Verificar información de OSPF

Visualizar tablas de enrutamiento y routers conectados por OSPFv2

Tabla Router R1



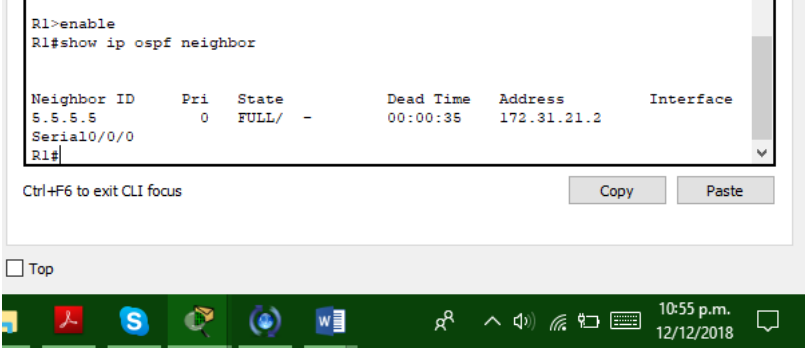
```
R1>show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter
       area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

 10.0.0.0/32 is subnetted, 1 subnets
O    10.10.10.10/32 [110/9501] via 172.31.21.2, 00:29:42, Serial0/0/0
 172.31.0.0/16 is variably subnetted, 3 subnets, 2 masks
C    172.31.21.0/30 is directly connected, Serial0/0/0
L    172.31.21.1/32 is directly connected, Serial0/0/0
O    172.31.23.0/30 [110/19000] via 172.31.21.2, 00:29:42, Serial0/0/0
 192.168.4.0/32 is subnetted, 1 subnets
O    192.168.4.1/32 [110/19001] via 172.31.21.2, 00:29:42, Serial0/0/0
 192.168.5.0/32 is subnetted, 1 subnets
O    192.168.5.1/32 [110/19001] via 172.31.21.2, 00:29:42, Serial0/0/0
 192.168.6.0/32 is subnetted, 1 subnets
O    192.168.6.1/32 [110/19001] via 172.31.21.2, 00:29:42, Serial0/0/0
 192.168.99.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.168.99.0/24 is directly connected, GigabitEthernet0/0.1
L    192.168.99.1/32 is directly connected, GigabitEthernet0/0.1
 209.165.200.0/29 is subnetted, 1 subnets
O    209.165.200.224/29 [110/9501] via 172.31.21.2, 00:29:42, Serial0/0/0

R1>
```

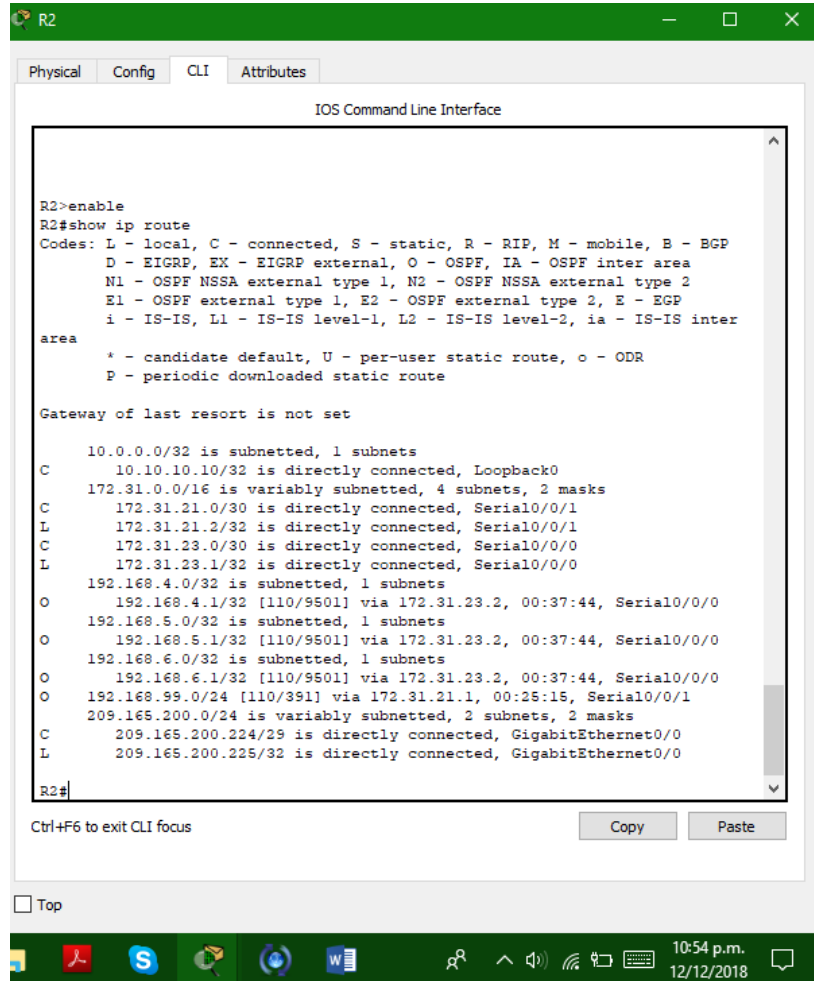
Routers Conectados a R1



```
R1>enable
R1#show ip ospf neighbor

Neighbor ID    Pri   State           Dead Time   Address        Interface
5.5.5.5        0    FULL/ -         00:00:35   172.31.21.2   Serial0/0/0
R1#
```

Tabla Router R2



```
R2>enable
R2#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter
       area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

    10.0.0.0/32 is subnetted, 1 subnets
C       10.10.10.10/32 is directly connected, Loopback0
    172.31.0.0/16 is variably subnetted, 4 subnets, 2 masks
C       172.31.21.0/30 is directly connected, Serial0/0/1
L       172.31.21.2/32 is directly connected, Serial0/0/1
C       172.31.23.0/30 is directly connected, Serial0/0/0
L       172.31.23.1/32 is directly connected, Serial0/0/0
    192.168.4.0/32 is subnetted, 1 subnets
O       192.168.4.1/32 [110/9501] via 172.31.23.2, 00:37:44, Serial0/0/0
    192.168.5.0/32 is subnetted, 1 subnets
O       192.168.5.1/32 [110/9501] via 172.31.23.2, 00:37:44, Serial0/0/0
    192.168.6.0/32 is subnetted, 1 subnets
O       192.168.6.1/32 [110/9501] via 172.31.23.2, 00:37:44, Serial0/0/0
O       192.168.99.0/24 [110/391] via 172.31.21.1, 00:25:15, Serial0/0/1
    209.165.200.0/24 is variably subnetted, 2 subnets, 2 masks
C       209.165.200.224/29 is directly connected, GigabitEthernet0/0
L       209.165.200.225/32 is directly connected, GigabitEthernet0/0

R2#
```

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Top

10:54 p.m.
12/12/2018

Routers Conectados a R2

```
R2#show ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
8.8.8.8	0	FULL/ -	00:00:32	172.31.23.2	Serial10/0/0
1.1.1.1	0	FULL/ -	00:00:34	172.31.21.1	Serial10/0/1

```
R2#
```

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Top

10:56 p.m.
12/12/2018

Tabla Router R3

```
R3
```

Physical Config CLI Attributes

IOS Command Line Interface

```
R3>ena
R3#show ip route
```

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

Gateway of last resort is not set

```
10.0.0.0/32 is subnetted, 1 subnets
O 10.10.10.10/32 [110/391] via 172.31.23.1, 00:40:33, Serial10/0/1
172.31.0.0/16 is variably subnetted, 3 subnets, 2 masks
O 172.31.21.0/30 [110/780] via 172.31.23.1, 00:27:59, Serial10/0/1
C 172.31.23.0/30 is directly connected, Serial10/0/1
L 172.31.23.2/32 is directly connected, Serial10/0/1
192.168.4.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.4.0/24 is directly connected, Loopback4
L 192.168.4.1/32 is directly connected, Loopback4
192.168.5.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.5.0/24 is directly connected, Loopback5
L 192.168.5.1/32 is directly connected, Loopback5
192.168.6.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.6.0/24 is directly connected, Loopback6
L 192.168.6.1/32 is directly connected, Loopback6
O 192.168.99.0/24 [110/781] via 172.31.23.1, 00:27:59, Serial10/0/1
209.165.200.0/29 is subnetted, 1 subnets
O 209.165.200.224/29 [110/391] via 172.31.23.1, 00:40:33, Serial10/0/1
```

```
R3#
```

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Top

10:57 p.m.
12/12/2018

Routers Conectados a R3

```
R3#show ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
5.5.5.5	0	FULL/ -	00:00:34	172.31.23.1	Serial0/0/1

```
R3#
```

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Top

10:58 p.m.
12/12/2018

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

Router R1

```
R1
```

Physical Config CLI Attributes

IOS Command Line Interface

```
R1>en
R1#show ip ospf interface
```

Serial0/0/0 is up, line protocol is up
Internet address is 172.31.21.1/30, Area 0
Process ID 1, Router ID 1.1.1.1, Network Type POINT-TO-POINT, Cost: 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 00:00:05
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 5.5.5.5
Suppress hello for 0 neighbor(s)

GigabitEthernet0/0.1 is up, line protocol is up
Internet address is 192.168.99.1/24, Area 0
Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State WAITING, Priority 1
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
No Hellos (Passive interface)
Index 2/2, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 0, Adjacent neighbor count is 0
Suppress hello for 0 neighbor(s)

```
R1#
R1#
R1#
```

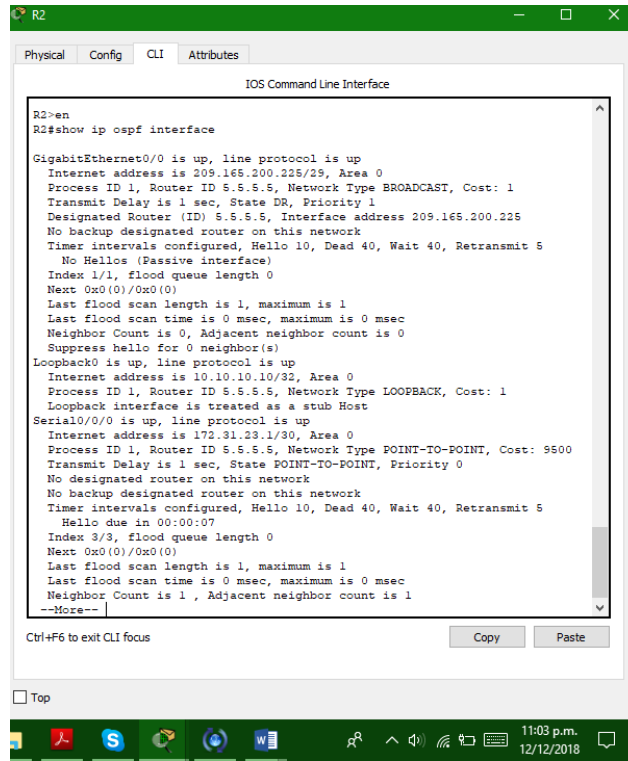
Ctrl+F6 to exit CLI focus

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Top

11:01 p.m.
12/12/2018

Router R2



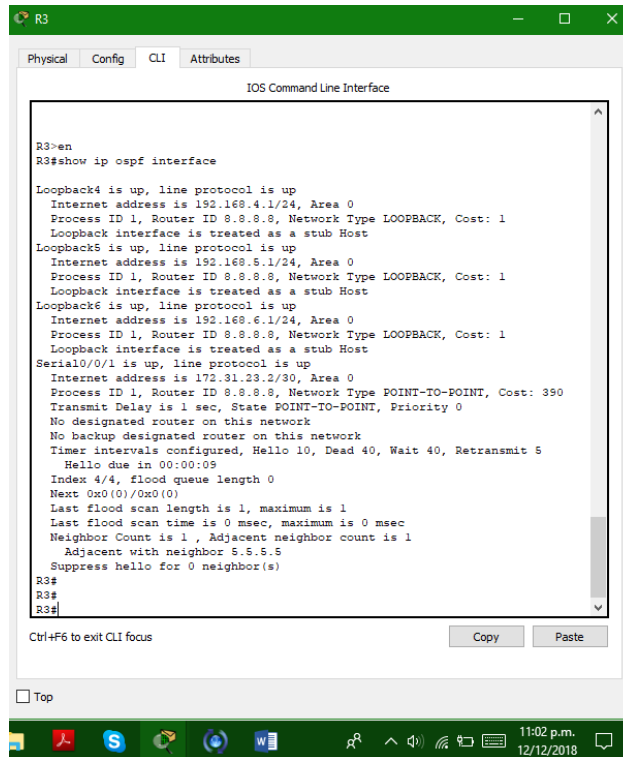
```
R2>en
R2#show ip ospf interface

GigabitEthernet0/0 is up, line protocol is up
 Internet address is 209.165.200.225/29, 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 209.165.200.225
 No backup designated router on this network
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  No Hellos (Passive interface)
 Index 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)

Loopback0 is up, line protocol is up
 Internet address is 10.10.10.10/32, Area 0
 Process ID 1, Router ID 5.5.5.5, Network Type LOOPBACK, Cost: 1
 Loopback interface is treated as a stub Host

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 00:00:07
 Index 3/3, flood queue length 0
 Next 0x0(0)/0x0(0)
 Last flood scan length is 1, maximum is 1
 Last flood scan time is 0 msec, maximum is 0 msec
 Neighbor Count is 1, Adjacent neighbor count is 1
 --More--
```

Router R3



```
R3>en
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: 390
 Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
 No designated router on this network
 No backup designated router on this network
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
 Hello due in 00:00:09
 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#
R3#
```

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

Router R1

```
R1>en
R1#show ip protocol

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
    192.168.99.0 0.0.0.255 area 0
  Passive Interface(s):
    GigabitEthernet0/0
    GigabitEthernet0/0.1
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110          00:06:04
    5.5.5.5          110          00:06:04
    8.8.8.8          110          00:18:31
  Distance: (default is 110)

R1#
```

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Top

11:06 p.m. 12/12/2018

Router R2

```
R2>en
R2#show ip protocol

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 5.5.5.5
  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
    209.165.200.224 0.0.0.7 area 0
    10.10.10.10 0.0.0.0 area 0
    172.31.21.0 0.0.0.3 area 0
  Passive Interface(s):
    GigabitEthernet0/0
    Loopback0
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110          00:08:33
    5.5.5.5          110          00:08:32
    8.8.8.8          110          00:21:00
  Distance: (default is 110)

R2#
```

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Top

11:08 p.m. 12/12/2018

Router R3

```
R3>en
R3#show ip protocol

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 8.8.8.8
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.31.23.0 0.0.0.3 area 0
    192.168.4.0 0.0.0.255 area 0
    192.168.5.0 0.0.0.255 area 0
    192.168.6.0 0.0.0.255 area 0
  Passive Interface(s):
    Loopback4
    Loopback5
    Loopback6
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110          00:07:42
    5.5.5.5          110          00:07:41
    8.8.8.8          110          00:20:08
  Distance: (default is 110)

R3#
```

Ctrl+F6 to exit CLI focus

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Top

11:07 p.m.
12/12/2018

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

Switch S1

```
S1>enable
S1#config ter
S1(config)#vlan 30
S1(config-vlan)#name Administracion
S1(config-vlan)#exit
S1(config)#vlan 40
S1(config-vlan)#name Mercadeo
S1(config-vlan)#exit
S1(config)#vlan 200
S1(config-vlan)#name Mantenimiento
S1(config-vlan)#exit
S1(config)#int f0/24
S1(config-if)#switchport mode trunk

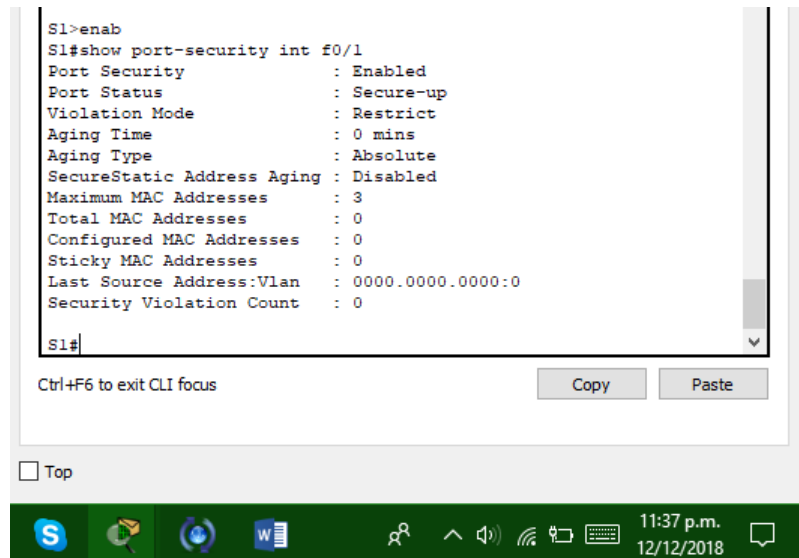
S1(config-if)#exit
S1(config)#int f0/3
S1(config-if)#switchport mode trunk
```

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

Configuracion de Seguridad S1

```
S1(config)#int f0/1
S1(config-if)#switchport port-security
S1(config-if)#switchport port-security mac-address sticky
S1(config-if)#switchport port-security violation restrict
S1(config-if)#switchport port-security maximum 3
S1(config-if)#
```

Verificación de seguridad en S1



```
S1>enab
S1#show port-security int f0/1
Port Security           : Enabled
Port Status             : Secure-up
Violation Mode          : Restrict
Aging Time              : 0 mins
Aging Type              : Absolute
SecureStatic Address Aging : Disabled
Maximum MAC Addresses  : 3
Total MAC Addresses    : 0
Configured MAC Addresses : 0
Sticky MAC Addresses   : 0
Last Source Address:Vlan : 0000.0000.0000:0
Security Violation Count : 0

S1#
```

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Top

11:37 p.m.
12/12/2018

Switch S3

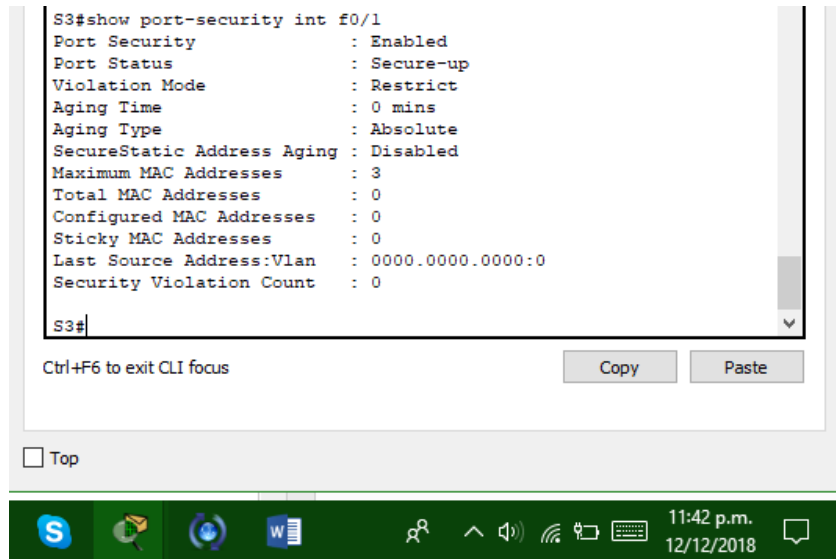
```
S3>enable
S3#config ter
S3(config)#vlan 30
S3(config-vlan)#name Administracion
S3(config-vlan)#exit
S3(config)#vlan 40
S3(config-vlan)#name Mercadeo
S3(config-vlan)#exit
S3(config)#vlan 200
S3(config-vlan)#name Mantenimiento
S3(config-vlan)#exit
```

```
S3(config)#int f0/3
S3(config-if)#switchport mode trunk
S3(config-if)#exit
S3(config)#int f0/1
S3(config-if)#switchport mode access
S3(config-if)#switchport access vlan 40
S3(config-if)#end
S3#
```

Configuración de Seguridad S3

```
S3(config)#int f0/1
S3(config-if)#switchport port-security
S3(config-if)#switchport port-security mac-address sticky
S3(config-if)#switchport port-security violation restrict
S3(config-if)#switchport port-security maximum 3
S3(config-if)#
```

Verificación de seguridad en S3



```
S3#show port-security int f0/1
Port Security           : Enabled
Port Status             : Secure-up
Violation Mode          : Restrict
Aging Time              : 0 mins
Aging Type              : Absolute
SecureStatic Address Aging : Disabled
Maximum MAC Addresses   : 3
Total MAC Addresses     : 0
Configured MAC Addresses : 0
Sticky MAC Addresses    : 0
Last Source Address:Vlan : 0000.0000.0000:0
Security Violation Count : 0

S3#
```

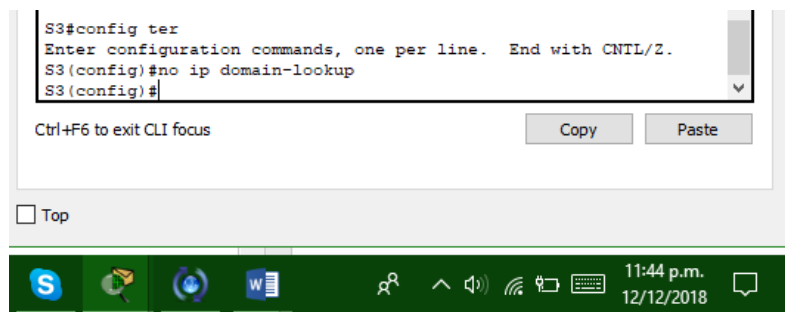
Router R1

```
R1>enable
R1#config terminal
R1(config)#int g0/0.30
R1(config-subif)#encapsulation dot1q 30
R1(config-subif)#ip address 192.168.30.1 255.255.255.0
R1(config-subif)#exit
```

```
R1(config)#int g0/0.40
R1(config-subif)#encapsulation dot1q 40
R1(config-subif)#ip address 192.168.40.1 255.255.255.0
R1(config-subif)#exit
```

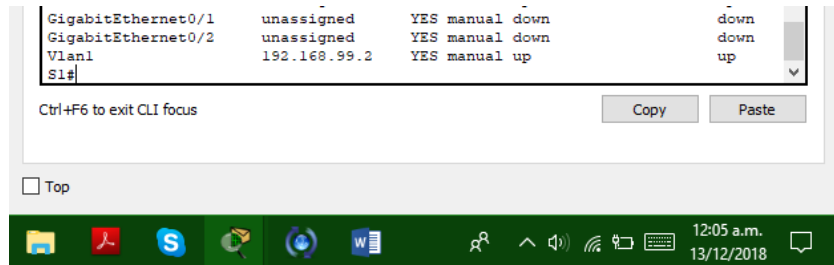
```
R1(config)#int g0/0.200
R1(config-subif)#encapsulation dot1q 200
R1(config-subif)#ip address 192.168.200.1 255.255.255.0
R1(config-subif)#end
```

4. Deshabilitamos el DNS Lookup en S3

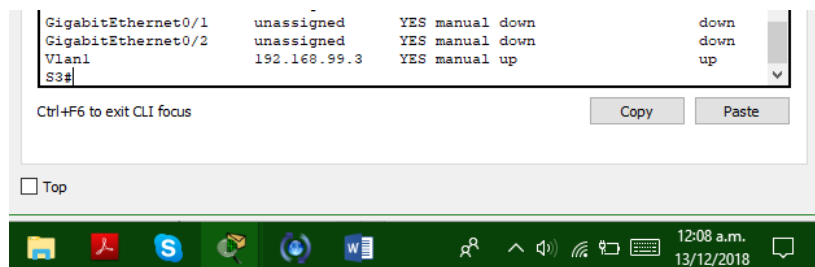


5. Asignar direcciones IP a los Switches acorde a los lineamientos.

Switch S1



Switch S3



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

Switch S1

Verificamos el estado de las interfaces del S1

```
S1#show vlan brief
```

VLAN Name	Status	Ports
1 default	active	Fa0/2, Fa0/4, Fa0/5, Fa0/6 Fa0/7, Fa0/8, Fa0/9, Fa0/10 Fa0/11, Fa0/12, Fa0/13, Fa0/14 Fa0/15, Fa0/16, Fa0/17, Fa0/18 Fa0/19, Fa0/20, Fa0/21, Fa0/22 Fa0/23, Gig0/1, Gig0/2
30 Administracion	active	Fa0/1
40 Mercadeo	active	
200 Mantenimiento	active	
1002 fddi-default	active	
1003 token-ring-default	active	
1004 fddinet-default	active	
1005 trnet-default	active	

S1#

Ctrl+F6 to exit CLI focus

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Top

12:10 a.m.
13/12/2018

```
S1#config ter  
S1(config)#int range f0/2,f0/4-23  
S1(config-if-range)#shutdown
```

Switch S3

Verificamos el estado de las interfaces del S1

```
S3#show vlan brief
```

VLAN Name	Status	Ports
1 default	active	Fa0/2, Fa0/4, Fa0/5, Fa0/6 Fa0/7, Fa0/8, Fa0/9, Fa0/10 Fa0/11, Fa0/12, Fa0/13, Fa0/14 Fa0/15, Fa0/16, Fa0/17, Fa0/18 Fa0/19, Fa0/20, Fa0/21, Fa0/22 Fa0/23, Fa0/24, Gig0/1, Gig0/2
30 Administracion	active	
40 Mercadeo	active	Fa0/1
200 Mantenimiento	active	
1002 fddi-default	active	
1003 token-ring-default	active	
1004 fddinet-default	active	
1005 trnet-default	active	

S3#

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Top

12:13 a.m.
13/12/2018

```
S3#config ter  
S3(config)#int range f0/2,f0/4-23  
S3(config-if-range)#shutdown
```

7. Implementación DHCP y NAT para IPv4, configuración R1 como servidor DHCP para las VLANs 30 y 40 y reservar las primeras 30 direcciones IP de las VLAN 30 y 40 para configuraciones estáticas.

Configuramos R1

```
R1#config terminal
R1(config)#ip dhcp pool ADMINISTRACION
R1(dhcp-config)#network 192.168.30.0 255.255.255.0
R1(dhcp-config)#default-router 192.168.30.1
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#exit
```

```
R1(config)#ip dhcp pool MERCADEO
R1(dhcp-config)#network 192.168.40.0 255.255.255.0
R1(dhcp-config)#default-router 192.168.40.1
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#exit
```

```
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)#
```

Configuramos subredes para las Vlan30, 40 y 200 en R1

```
R1(config)#router ospf 1
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)#
```

Configuramos interfaces pasivas para Vlan30, 40 y 200 en R1

```
R1(config-router)#passive-interface g0/0.30
R1(config-router)#passive-interface g0/0.40
R1(config-router)#passive-interface g0/0.200
R1(config-router)#
```

Verificación de la configuración de protocolos en R1 mediante el comando Show ip protocol

```
R1#show ip protocol


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
    192.168.99.0 0.0.0.255 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):
    GigabitEthernet0/0
    GigabitEthernet0/0.1
    GigabitEthernet0/0.30
    GigabitEthernet0/0.40
    GigabitEthernet0/0.200
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110          00:04:19
    5.5.5.5          110          00:16:32
    8.8.8.8          110          00:16:32
  Distance: (default is 110)

R1#
```

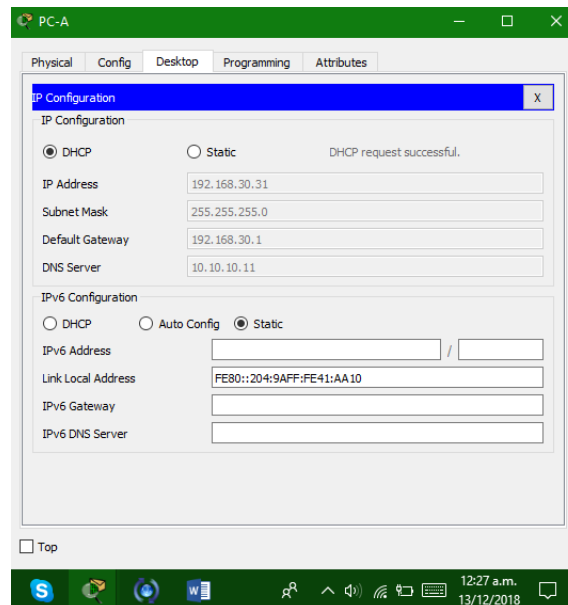
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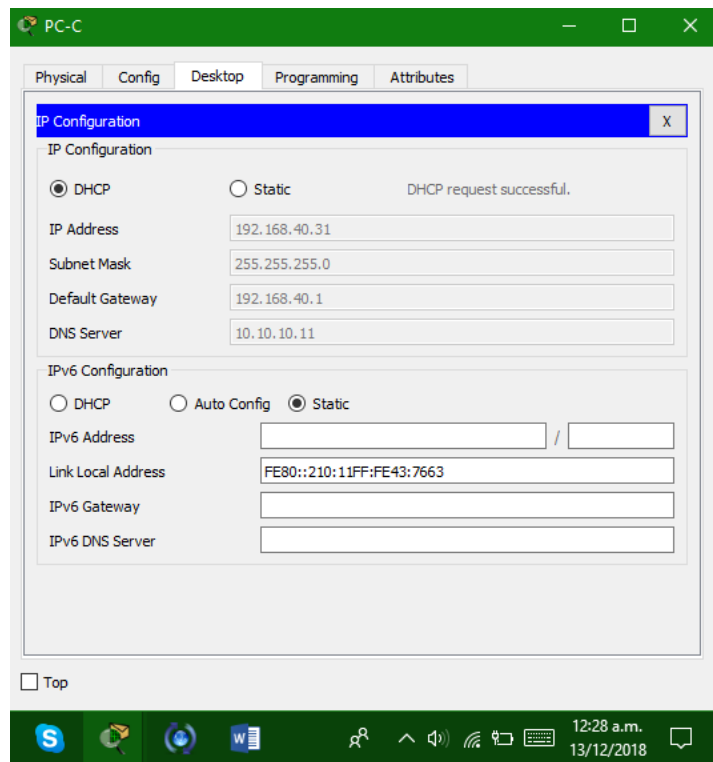
Top



Configuramos PC-A



Configuramos PC-C



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

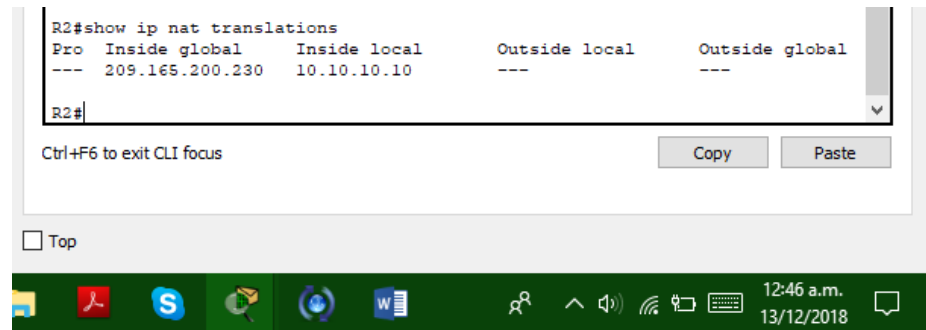
```
R2>enab
R2#config ter
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip nat inside source static 10.10.10.10 209.165.200.230
R2(config)#int lo0
R2(config-if)#ip nat inside
R2(config-if)#exit
R2(config)#int g0/0
R2(config-if)#ip nat outside
R2(config-if)#exit
R2(config)#exit

R2(config)#ip nat pool INTERNET 209.165.200.226 209.165.200.229
netmask 255.255.255.248
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 192.168.99.0 0.0.0.255
```



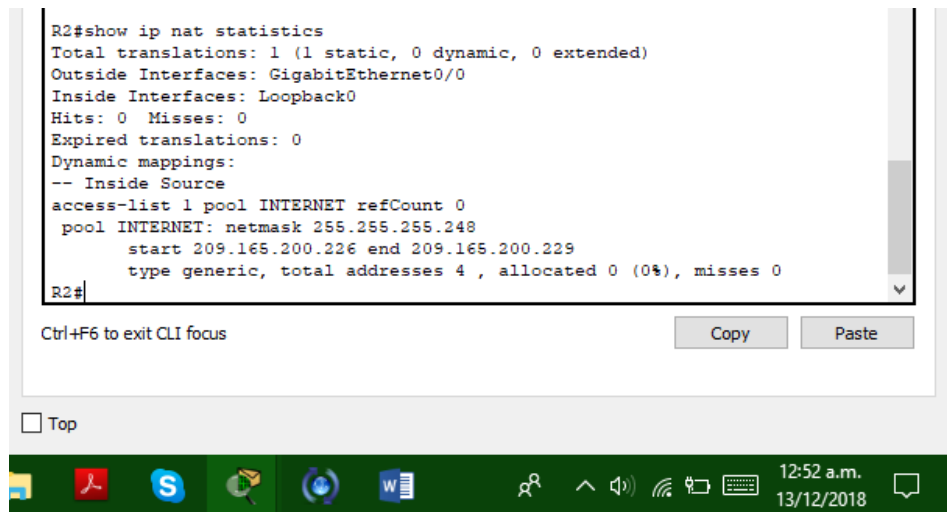
```
R2(config)#access-list 1 permit 192.168.200.0 0.0.0.255
R2(config)#access-list 1 permit 192.168.4.0 0.0.0.255
R2(config)#access-list 1 permit 192.168.5.0 0.0.0.255
R2(config)#access-list 1 permit 192.168.6.0 0.0.0.255
R2(config)#ip nat inside source list 1 pool INTERNET
R2(config)#
```

Verificamos la ip nat



```
R2#show ip nat translations
Pro  Inside global  Inside local  Outside local  Outside global
---  209.165.200.230  10.10.10.10  ---           ---
R2#
```

Verificamos la configuración NAT en R2 mediante el comando show ip nat statistics



```
R2#show ip nat statistics
Total translations: 1 (1 static, 0 dynamic, 0 extended)
Outside Interfaces: GigabitEthernet0/0
Inside Interfaces: Loopback0
Hits: 0 Misses: 0
Expired translations: 0
Dynamic mappings:
-- Inside Source
access-list 1 pool INTERNET refCount 0
pool INTERNET: netmask 255.255.255.248
start 209.165.200.226 end 209.165.200.229
type generic, total addresses 4 , allocated 0 (0%), misses 0
R2#
```

9. 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.

Se configura la ACL 2 la cual rechaza el acceso de los hosts de la red 192.168.4.0

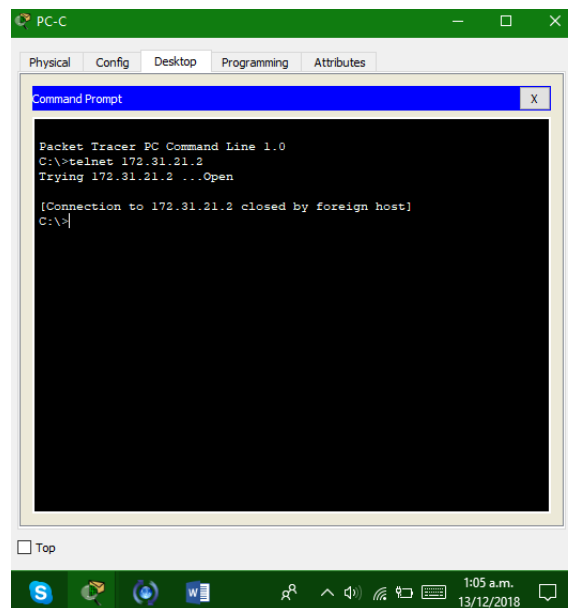
```
R2>enable
R2#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#access-list 2 deny 192.168.4.0 0.0.0.255
R2(config)#access-list 2 permit any
R2(config)#int lo0
R2(config-if)#ip access-group 2 out
R2(config-if)#exit
R2(config)#
```

Se configura la ACL 3 la cual permite el acceso a los hosts de la red 192.168.30.0

```
R2(config)#access-list 3 remark permit hosts from the 192.168.30.0
LAN
R2(config)#access-list 3 permit 192.168.30.0 0.0.0.255
R2(config)#
```

10. 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

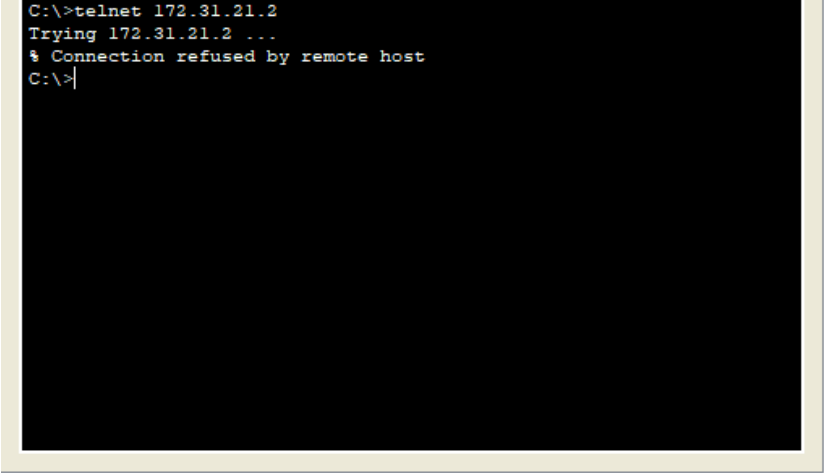
Verificamos el acceso por telnet al R2 desde el host 192.168.40.31 (PC-C)



Se configura la ACL ACCESO VTY la cual rechaza el acceso por telnet a R2 desde el host 192.168.40.31 (PC-C)

```
R2(config)#access-list 3 remark permit hots from the 192.168.30.0
LAN
R2(config)#access-list 3 permit 192.168.30.0 0.0.0.255
R2(config)#ip access-list standard ACCESO_VTY
R2(config-std-nacl)#deny host 192.168.40.31
R2(config-std-nacl)#permit any
R2(config-std-nacl)#exit
R2(config)#line vty 0 4
R2(config-line)#access-class ACCESO_VTY in
R2(config-line)#exit
R2(config)#
```

Verificamos el rechazo de acceso por telnet al R2 desde el PC-C



```
C:\>telnet 172.31.21.2
Trying 172.31.21.2 ...
% Connection refused by remote host
C:\>
```

Top

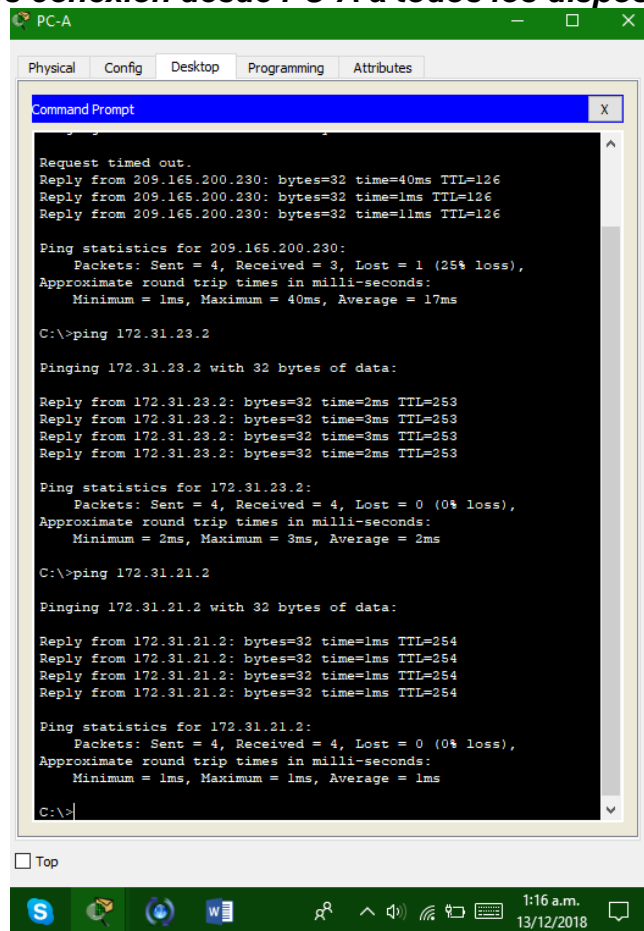
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13/12/2018

Se configuro la ACL 100 la cual permite enviar solicitudes a los puestos 80 y 443 (http y https) La ACL 101 permite recibir respuestas de http y https establecidas.

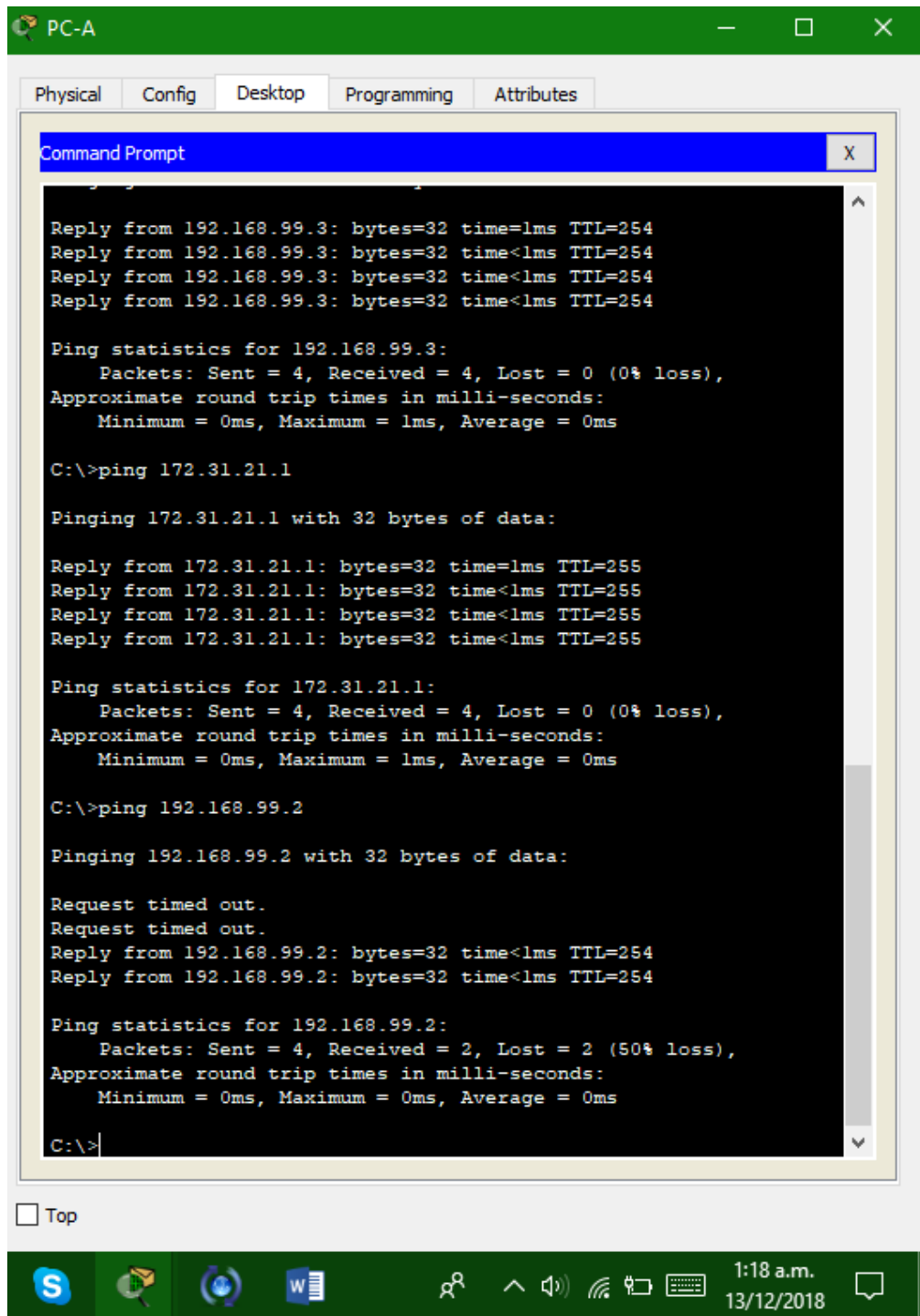
```
R2(config)#access-list 100 permit tcp 192.168.30.0 0.0.0.255 any eq 80
R2(config)#access-list 100 permit tcp 192.168.30.0 0.0.0.255 any eq 443
R2(config)#access-list 101 permit tcp any 192.168.30.0 0.0.0.255 established
R2(config)#
```

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

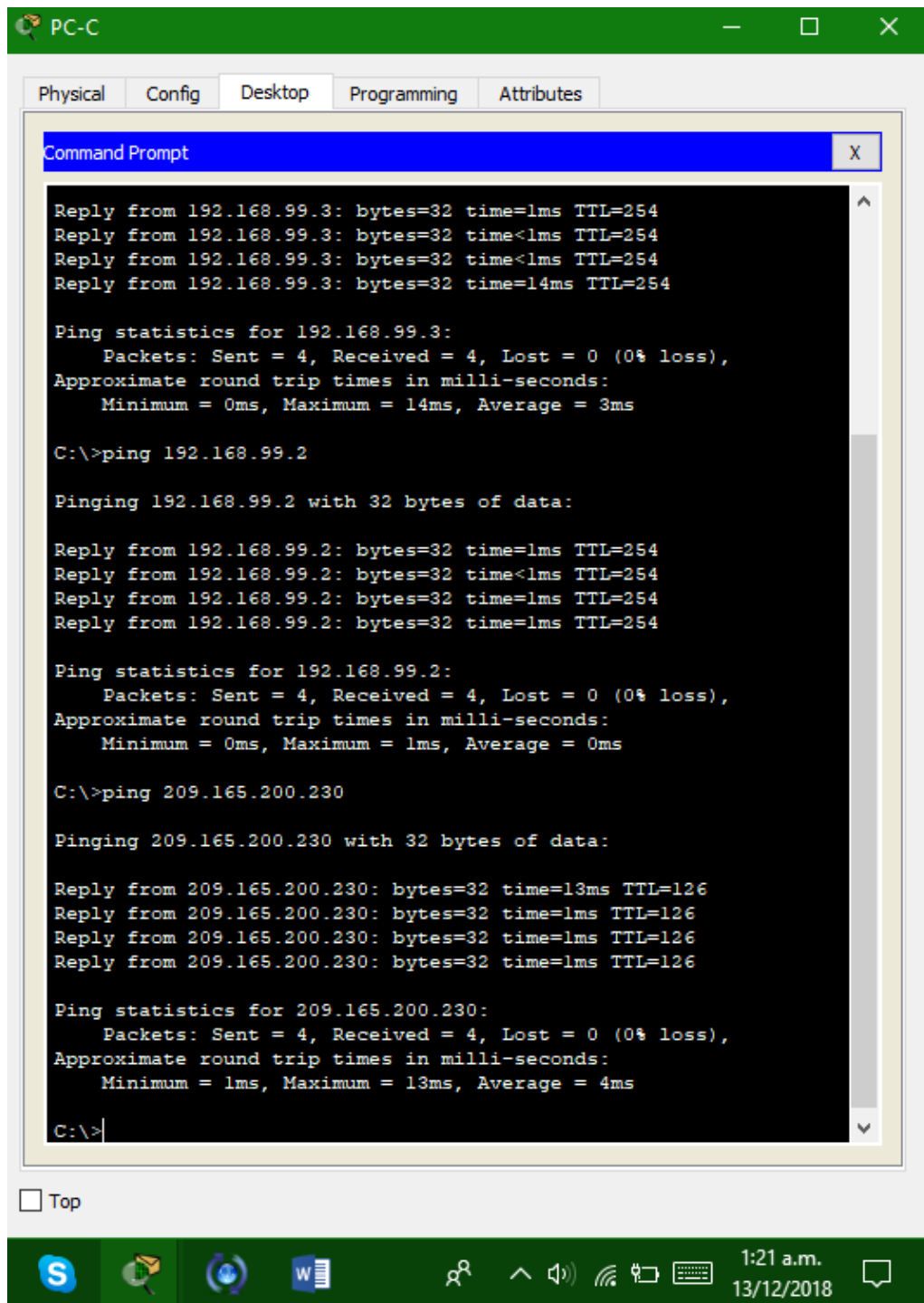
Verificamos conexión desde PC-A a todos los dispositivos de la red

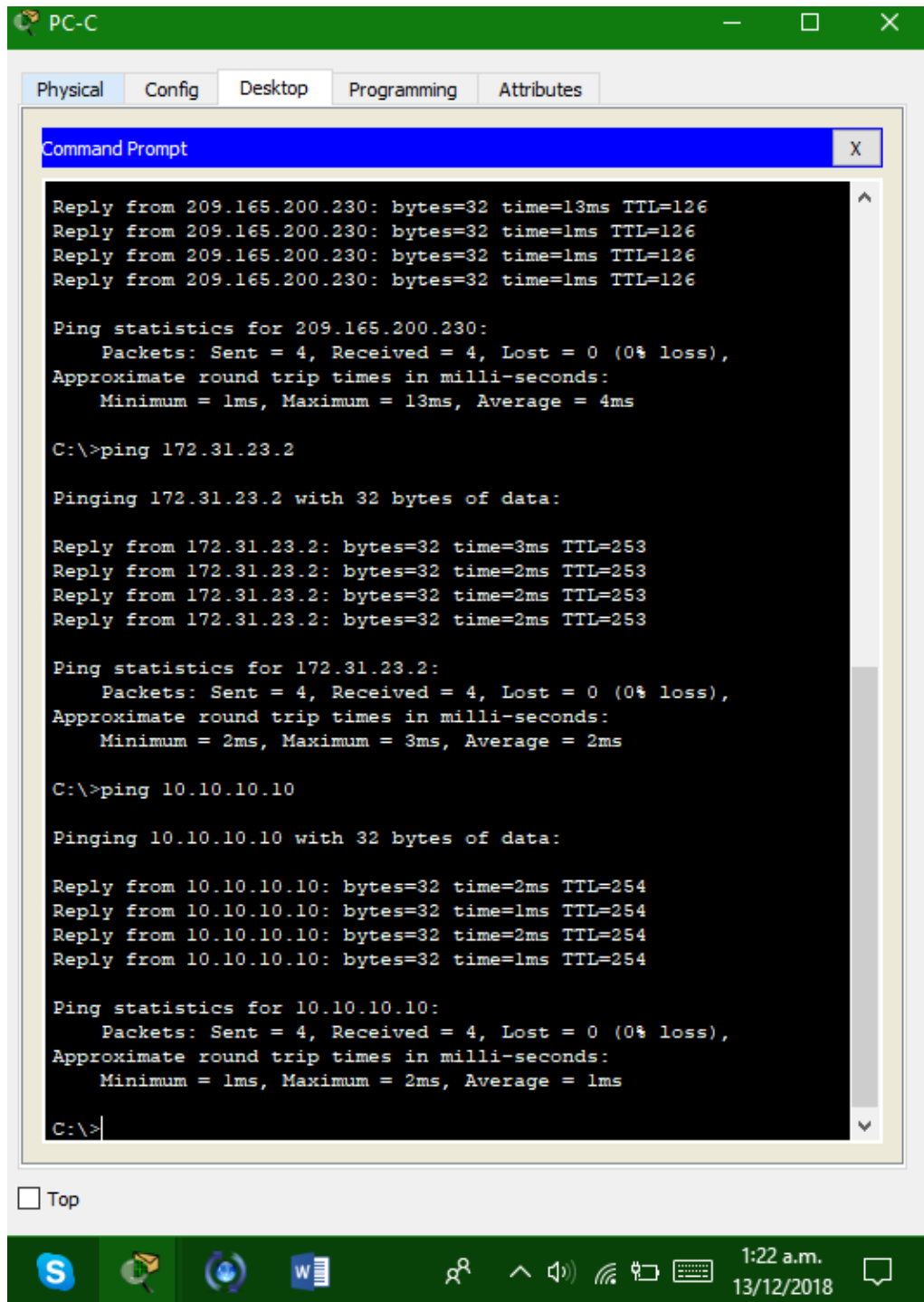


```
PC-A
Physical Config Desktop Programming Attributes
Command Prompt
Request timed out.
Reply from 209.165.200.230: bytes=32 time=40ms TTL=126
Reply from 209.165.200.230: bytes=32 time=1ms TTL=126
Reply from 209.165.200.230: bytes=32 time=11ms TTL=126
Ping statistics for 209.165.200.230:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 40ms, Average = 17ms
C:\>ping 172.31.23.2
Pinging 172.31.23.2 with 32 bytes of data:
Reply from 172.31.23.2: bytes=32 time=2ms TTL=253
Reply from 172.31.23.2: bytes=32 time=3ms TTL=253
Reply from 172.31.23.2: bytes=32 time=3ms TTL=253
Reply from 172.31.23.2: bytes=32 time=2ms TTL=253
Ping statistics for 172.31.23.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 3ms, Average = 2ms
C:\>ping 172.31.21.2
Pinging 172.31.21.2 with 32 bytes of data:
Reply from 172.31.21.2: bytes=32 time=1ms TTL=254
Reply from 172.31.21.2: bytes=32 time=1ms TTL=254
Reply from 172.31.21.2: bytes=32 time=1ms TTL=254
Reply from 172.31.21.2: bytes=32 time=1ms TTL=254
Ping statistics for 172.31.21.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms
C:\>
```



Verificamos conexión desde PC-C a todos los dispositivos de la red





Verificamos conexión desde Router R2 a todos los dispositivos de la red mediante Traceroute

Physical Config CLI Attributes

IOS Command Line Interface

```
R2>enable
R2#traceroute 172.31.21.1
Type escape sequence to abort.
Tracing the route to 172.31.21.1

 1  172.31.21.1    1 msec    0 msec    0 msec
R2#traceroute 192.168.30.31
Type escape sequence to abort.
Tracing the route to 192.168.30.31

 1  172.31.21.1    25 msec   1 msec    0 msec
 2  192.168.30.31  1 msec    1 msec    1 msec
R2#traceroute 10.10.10.10
Type escape sequence to abort.
Tracing the route to 10.10.10.10

 1  10.10.10.10   26 msec   2 msec    0 msec
R2#traceroute 192.168.99.3
Type escape sequence to abort.
Tracing the route to 192.168.99.3

 1  172.31.21.1    1 msec    3 msec    2 msec
 2  192.168.99.3   0 msec    0 msec    0 msec
R2#traceroute 209.165.200.230
Type escape sequence to abort.
Tracing the route to 209.165.200.230

 1  209.165.200.230 1 msec    0 msec    0 msec
R2#
```

Ctrl+F6 to exit CLI focus

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Top

S [Search] [Network] [Word] [System] 1:26 a.m. 13/12/2018

CONCLUSIONES

Se desarrolla cada una de las actividades propuestas en la guía, logrando poner en práctica los conceptos y conocimientos adquiridos sobre redes como sus configuraciones en cuanto al ruteo y switching.

Se aplica las configuraciones NAT en el router mediante los comandos, verificando dicha configuración sobre su aplicabilidad.

Se practico el protocolo de enrutamiento OSPF, concluyendo que es utilizado jerárquicamente para calcular la ruta más corta entre dos nodos

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