

PRUEBA DE HABILIDADES PRACTICAS CCNA

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Diplomado de profundización Cisco

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CONTENIDO

| | |
|---------------------------------|----|
| INTRODUCCION..... | 4 |
| Descripción de escenarios | 5 |
| Escenario 1..... | 5 |
| Escenario 2..... | 24 |
| CONCLUSIONES..... | 63 |
| BIBLIOGRAFIAS | 65 |

INTRODUCCION

La evaluación final denominada prueba de habilidades prácticas, perteneciente al Diplomado de profundización CISCO, la cual busca que, a través de la solución de los ejercicios propuestos, los estudiantes pongan en práctica los niveles de conocimiento y habilidades adquiridos a lo largo del diplomado.

Todo esto dando solución a dos escenarios propuestos, realizando los procesos de configuración utilizando la herramienta Packet Tracer, en los cuales como profesionales demostraremos las capacidades y conocimiento adquiridos, mediante la configuración de cada uno de los dispositivos, describiendo su paso a paso, y su desarrollo, como también se verificará la conectividad de los dispositivos, por medio del uso del comando ping, traceroute, show ip route. Etc. También se abordarán y se mostrara evidencia en la configuración de dirección IP, VLAN, implementación de NAT, servidor DHCP, RIPV2.

Escenario 1

Topología:

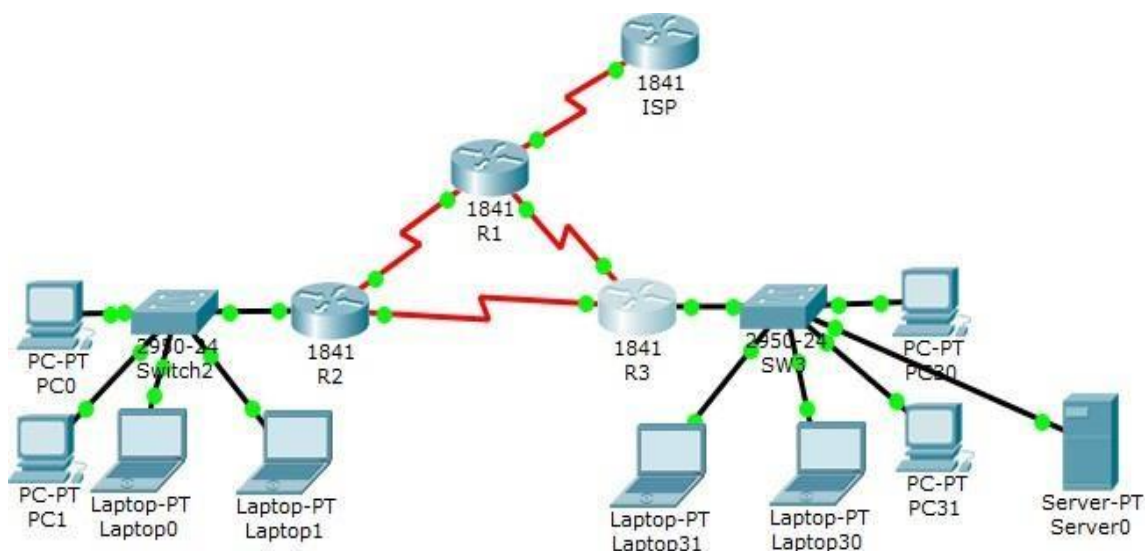


Tabla de direccionamiento

| 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 |

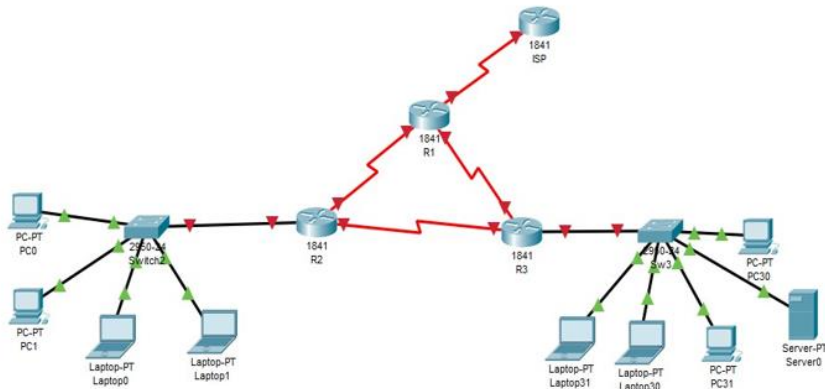
Tabla de enlaces troncales

| 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.

Topología escenario 1.



Descripción de los actividades

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

Configurar el SW2 y SW3:

SW2:

```
Switch>enable
```

```
Switch#configure terminal
```

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

```
Switch(config)#vlan 100
```

```
Switch(config-vlan)#name LAPTOPS
```

```
Switch(config-vlan)#int range f0/2-3
```

```
Switch(config-if-range)#switchport mode access
```

```
Switch(config-if-range)#switchport access vlan 100
```

```
Switch(config-if-range)#exit
```

```
Switch(config)#vlan 200
```

```
Switch(config-vlan)#name DESTOPS
```

```
Switch(config-vlan)#int range f0/4-5
```

```
Switch(config-if-range)#switchport mode access
```

```
Switch(config-if-range)#switchport access vlan 200
```

```
Switch(config-if-range)#int f0/1
```

```
Switch(config-if)#switchport mode trunk
```

Switch(config-if)#int range f0/6-24

Switch(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 FastEthernet0/8, 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
Switch(config-if-range)#

SW3:

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 1
Switch(config-vlan)#exit
Switch(config)#int range f0/1-24
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchpor access vlan 1
Switch(config-if-range)#exit
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console
Switch#wr
Building configuration...
[OK]
```

- **Los puertos de red que no se utilizan se deben deshabilitar.**
Se desabilitan los puertos que no se van a utilizar en ambos switch.

SW2:

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int range f0/6-24
Switch(config-if-range)#shutdown
```

SW3:

```
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int range f0/6-23
Switch(config-if-range)#shutdown
```

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

Se procede a realizar el direccionamiento ip en los diferentes routers de la topologia.

R1:

```
Router>enabl
```

```
Router#configure terminal
```

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

```
Router(config)#int f0/0.100
```

```
Router(config-subif)#encapsulation dot1q 100
```

```
Router(config-subif)#ip address 192.168.20.1 255.255.255.0
```

```
Router(config-subif)#exit
```

```
Router(config)#int f0/0.200
```

```
Router(config-subif)#encapsulation dot1q 200
```

```
Router(config-subif)#ip address 192.168.21.1 255.255.255.0
```

```
Router(config-subif)#exit
```

```
Router(config)#int f0/0
```

```
Router(config-if)#no shut
```

```
Router(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
```

```
Router(config-if)#int s0/0/0
```

```
Router(config-if)#ip address 10.0.0.2 255.255.255.252
```

```
Router(config-if)#no shut
```

```
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
```

```
Router(config-if)#int s0/0/1
```

```
Router(config-if)#ip address 10.0.0.9 255.255.255.252
```

```
Router(config-if)#no shut
```

```
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
```

```
Router(config-if)#
```

R2:

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 200.123.211.2 255.255.255.0
Router(config-if)#no shut
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
Router(config-if)#int s0/1/0
Router(config-if)#ip address 10.0.0.1 255.255.255.252
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
Router(config)#int s0/1/1
Router(config-if)#ip address 10.0.0.5 255.255.255.252
Router(config-if)#no shut
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
Router(config-if)#
```

R3:

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ipv6 unicast-routing
Router(config)#int f0/0
Router(config-if)#ip address 192.168.30.1 255.255.255.0
Router(config-if)#ipv6 address 2001:db8:130::9c0:80f:301/64
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/0, changed state to up
Router(config-if)#ipv6 dhcp server vlan_1
Router(config-if)#ipv6 nd other-config-flag
Router(config-if)#no shut
Router(config-if)#int s0/0/0
Router(config-if)#ip address 10.0.0.6 255.255.255.252
Router(config-if)#no shut
```

```
Router(config-if)#
```

```
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
```

```
Router(config-if)#int s0/
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0,  
changed state to up
```

```
0/1
```

```
Router(config-if)#ip address 10.0.0.10 255.255.255.252
```

```
Router(config-if)#no shut
```

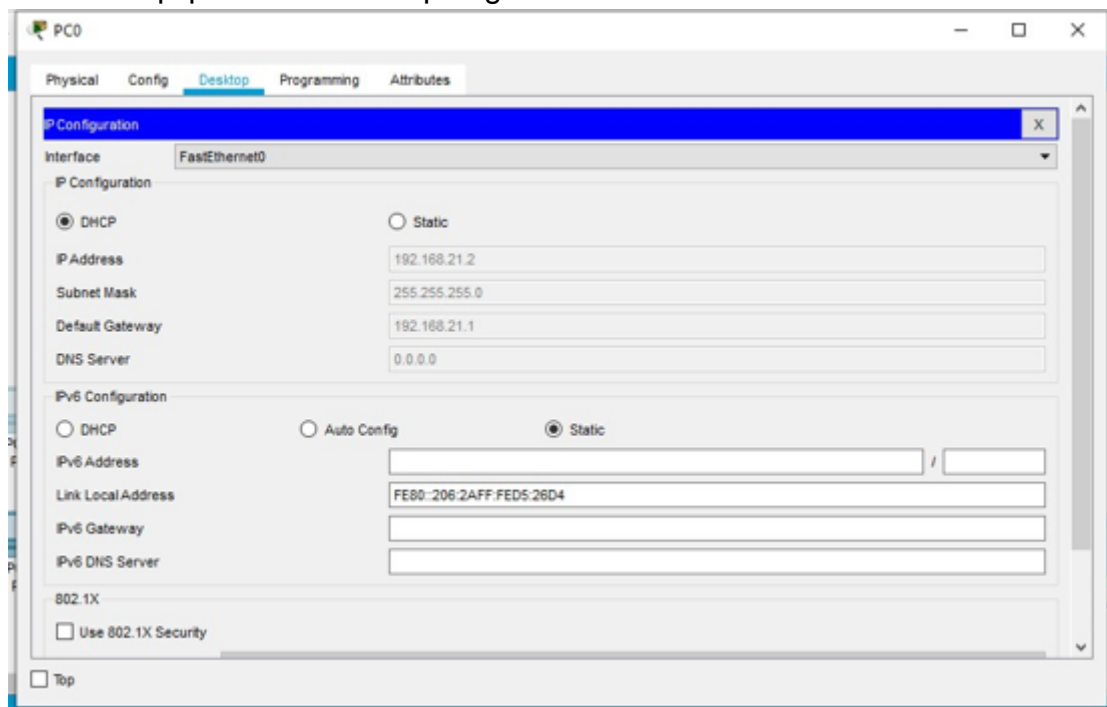
```
Router(config-if)#
```

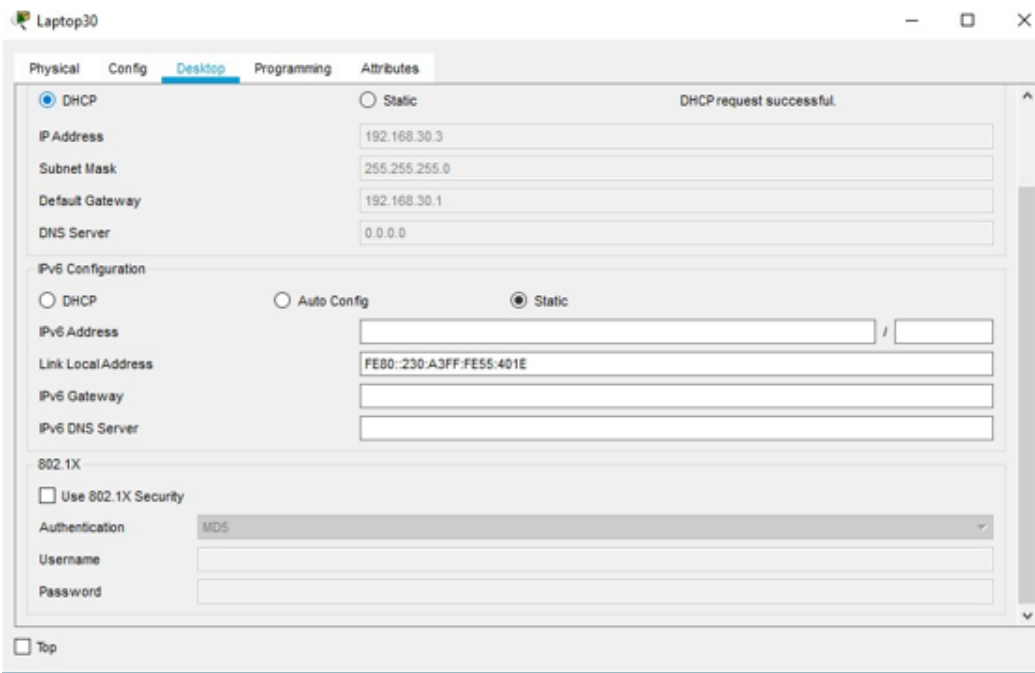
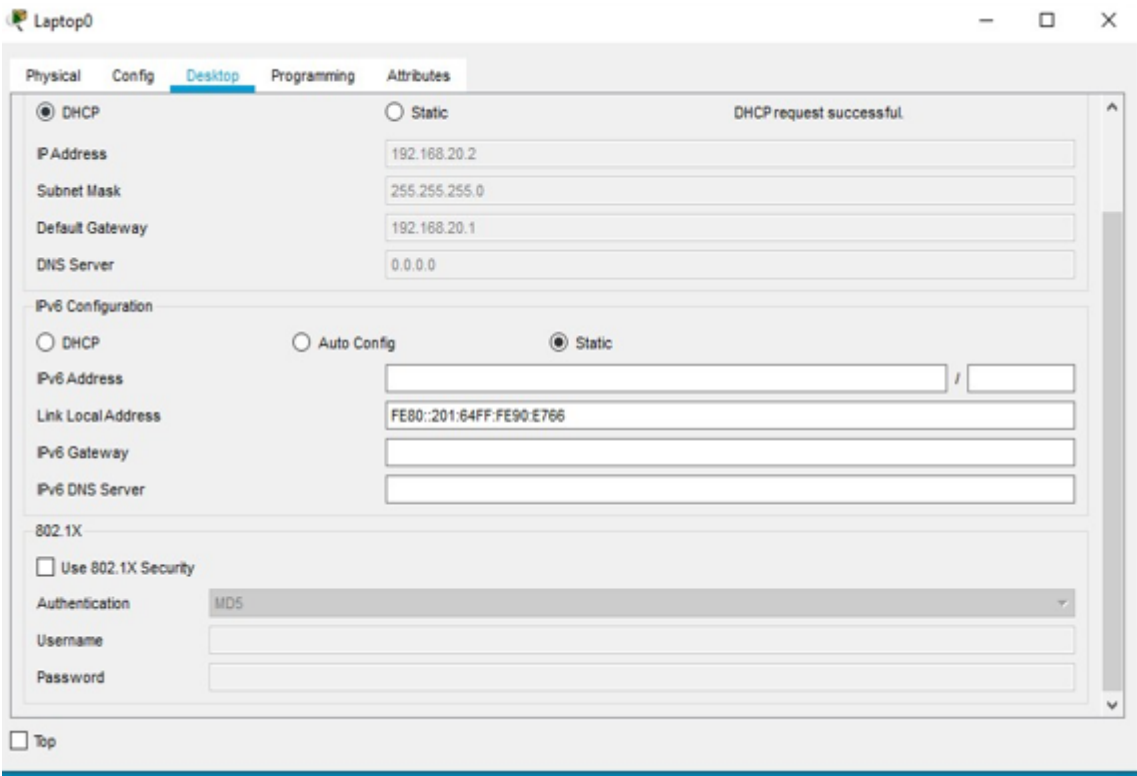
```
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
```

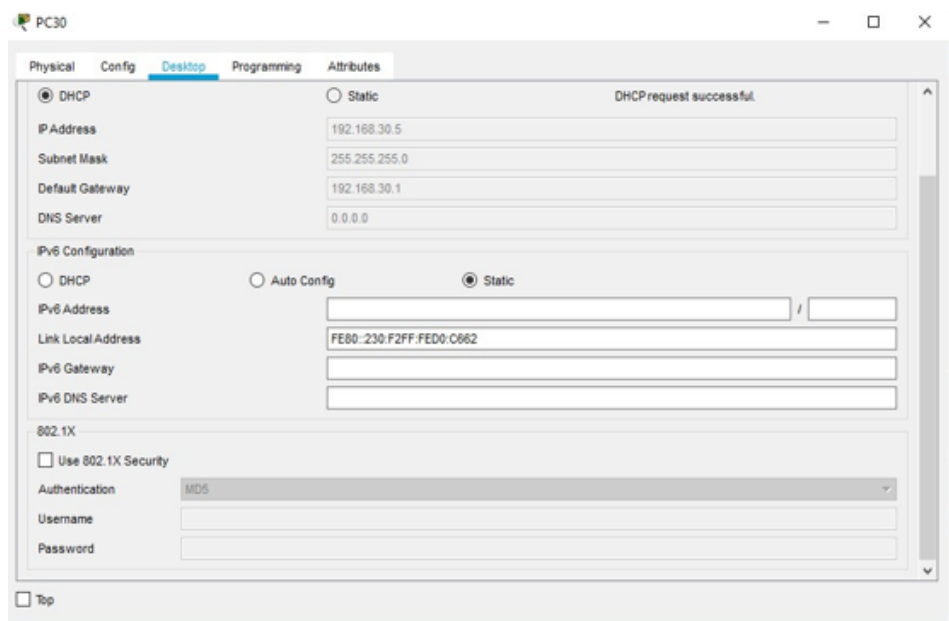
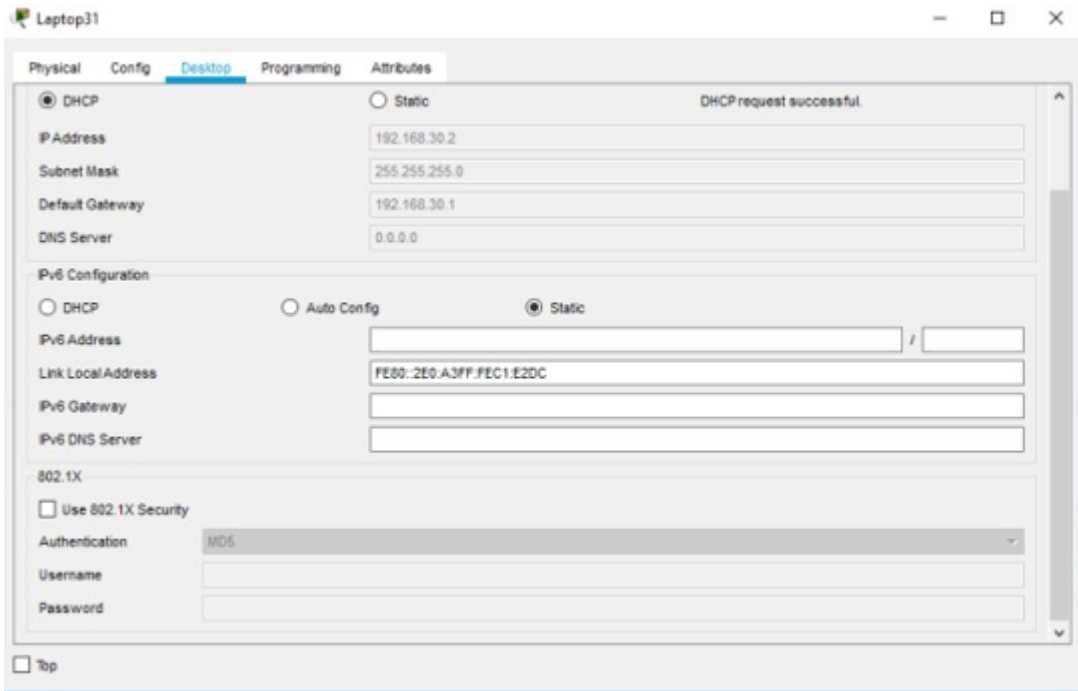
```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1,  
changed state to up
```

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

se procede a realizar la configuracion IPV4 en los respectivos equipos host de la topologia







- **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**.

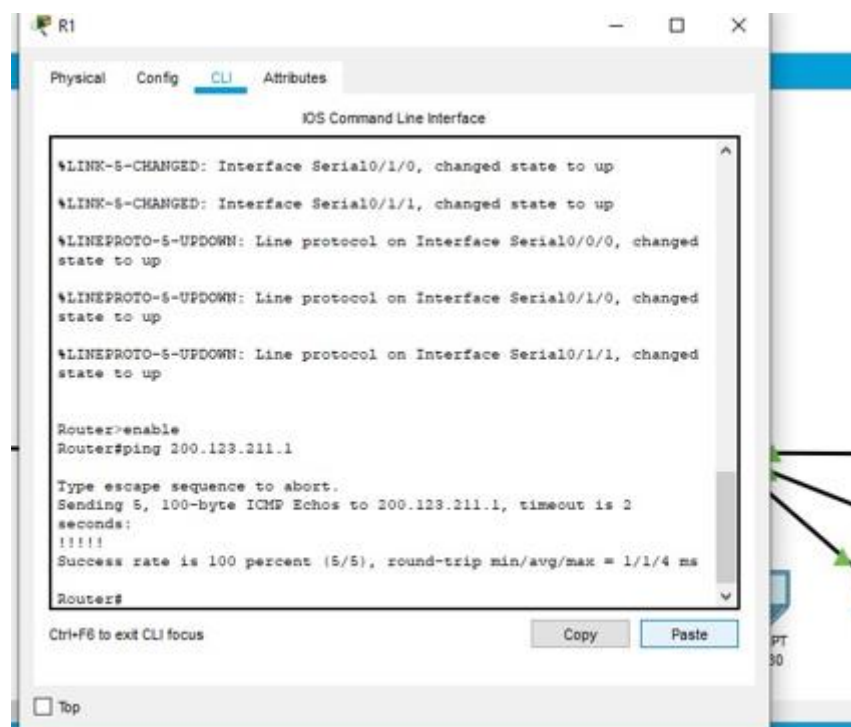
Se procede a configurar la NAT en el R1 con sobrecarga en una dirección IPv4 pública.

Router>enable

Router#conf t

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

```
Router(config)#access-list 1 permit 192.168.0.0 0.0.255.255
Router(config)#access-list 1 permit 10.0.0.0 0.0.0.255
Router(config)#ip nat pool INSIDE-DEVS 200.123.211.2
200.123.211.128 netmask 255.255.255.0
Router(config)#ip nat inside source list 1 interface s0/0/0
overload
Router(config)#int s0/1/1
Router(config-if)#ip nat inside
Router(config-if)#int s0/1/0
Router(config-if)#ip nat inside
Router(config-if)#int s0/0/0
Router(config-if)#ip nat outside
Router(config-if)#exit
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#network 1.0.0.0
Router(config-router)#network 10.0.0.0
Router(config-router)#default-information originate
Router(config-router)#ip route 0.0.0.0 0.0.0.0 s0/0/0
Router(config)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0/0/0, changed state to up
```



The screenshot shows a Cisco IOS CLI window titled "R1" with tabs for "Physical", "Config", "CLI", and "Attributes". The "CLI" tab is active, displaying the "IOS Command Line Interface". The output shows the following messages:

```
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed
state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed
state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed
state to up

Router>enable
Router#ping 200.123.211.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 200.123.211.1, timeout is 2
seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/4 ms

Router#
```

At the bottom of the window, there are "Copy" and "Paste" buttons, and a "Top" button. The status bar at the bottom left shows "Ctrl+F6 to exit CLI focus".

- R1** debe tener una ruta estática predeterminada al ISP que se configuró y que incluye esa ruta en **el dominio** RIPv2.

Se procedio desde el R1 crear una ruta estatica predeterminada al ISP.

```
Router(config-router)#ip route 0.0.0.0 0.0.0.0 s0/0/0
```
- R2** es un servidor de DHCP para los dispositivos conectados al puerto FastEthernet0/0.

Se procedio a configura el R2 como un servidor DHCP para los dispositivos conectados a la interfaz f0/0.

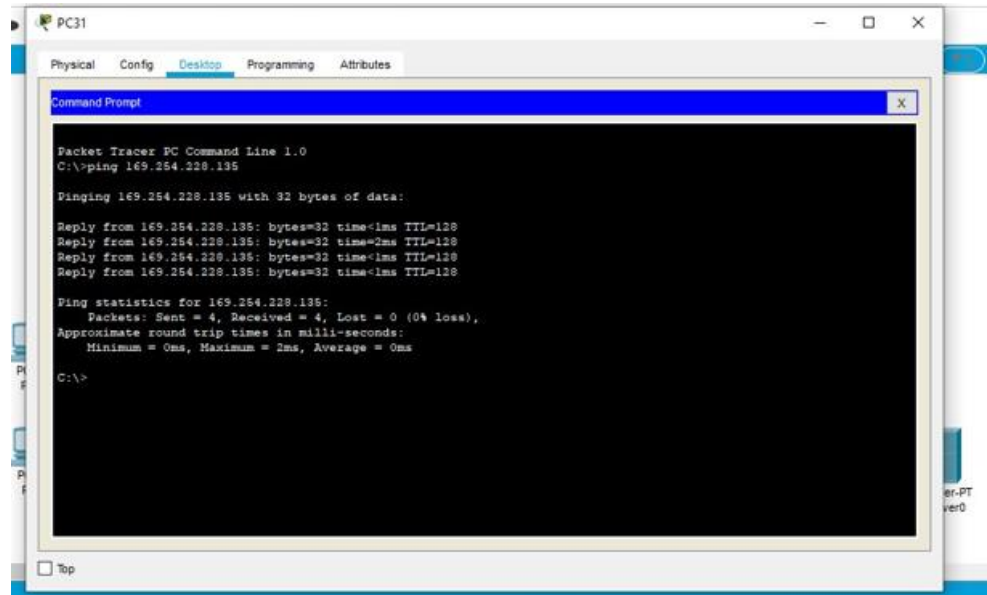
```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip dhcp excluded-address 10.0.0.2 10.0.0.9
Router(config)#ip dhcp pool INSIDE-DEVS
Router(dhcp-config)#network 192.168.20.1 255.255.255.0
Router(dhcp-config)#network 192.168.21.1 255.255.255.0
Router(dhcp-config)#default-router 192.168.1.1
Router(dhcp-config)#dns-server 0.0.0.0
Router(dhcp-config)#exit
Router(config)#
```
- R2** debe, además de enrutamiento a otras partes de la red, ruta entre las VLAN 100 y 200.

Se configuro las vlan 100 y 200 en el router 2.

```
Router(config)#int vlan 100
Router(config-if)#ip address 192.168.20.1 255.255.255.0
% 192.168.20.0 overlaps with FastEthernet0/0.100
Router(config-if)#exit
Router(config)#int vlan 200
Router(config-if)#ip address 192.168.21.1 255.255.255.0
% 192.168.21.0 overlaps with FastEthernet0/0.200
Router(config-if)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#wr
Building configuration...
[OK]
Router#
```
- El Servidor0 es sólo un servidor IPv6 y solo debe ser accesibles para

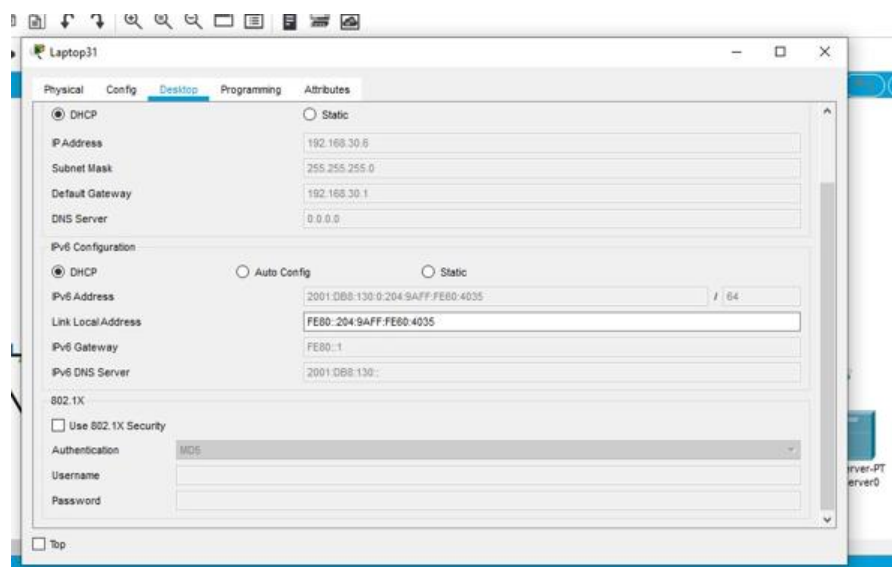
los dispositivos en R3 (ping).

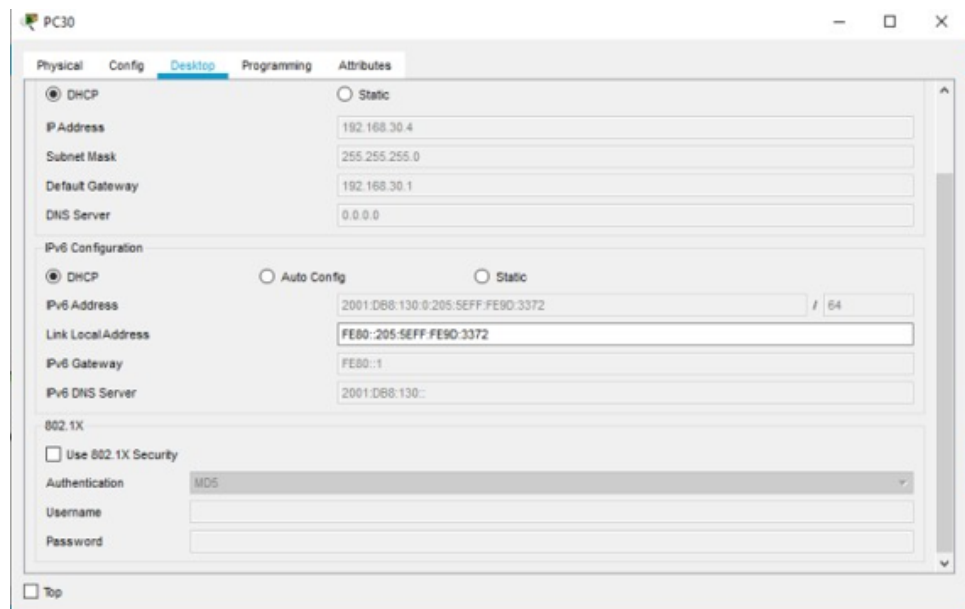
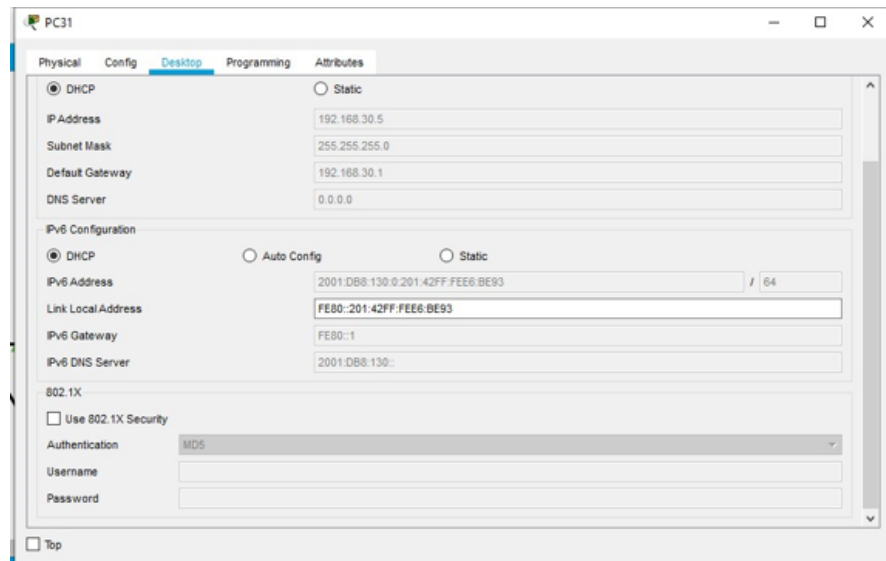
Se configuro el servidor0 con direccionamiento para que solo puedan acceder los dispositivos conectados al R3.



-
- 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.

Se configuran direccionamientos ipv4 y ipv6 en los host del R3.





- La interfaz FastEthernet 0/0 del R3 también deben tener direcciones IPv4 e IPv6 configuradas (dual-stack). Se configuro la interfaz f0/0 del R3 con direcciones ipv4 y ipv6 dual-stack.

Router>enable

Router#configure terminal

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

Router(config)#ipv6 unicast-routing

Router(config)#int f0/0

Router(config-if)#ipv6 enable

Router(config-if)#ip address 192.168.30.1 255.255.255.0

```
Router(config-if)#ipv6 address 2001:db8::9c0:80f:301/64
Router(config-if)#no shutdown
Router(config-if)#
```

- R1, R2 y R3 intercambian información de routing mediante RIP versión 2.

Se configuraron los router para intercambiar informacionde routing mediante RIP version 2.

R1:

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#ip route 0.0.0.0 0.0.0.0 s0/0/0
Router(config)#router rip
Router(config-router)#network 10.0.0.4
Router(config-router)#network 10.0.0.0
Router(config-router)#default-information originate
Router(config-router)#
```

R2:

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#network 192.168.30.0
Router(config-router)#network 192.168.20.0
Router(config-router)#network 192.168.21.0
Router(config-router)#network 10.0.0.0
Router(config-router)#network 10.0.0.8
Router(config-router)#
```

R3:

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#network 192.168.0.0
Router(config-router)#network 10.0.0.8
Router(config-router)#network 10.0.0.4
Router(config-router)#exit
Router(config)#
```

- R1, R2 y R3 deben saber sobre las rutas de cada uno y la ruta predeterminada desde R1.

La ruta predeterminada desde R1 es:

```
Router(config-router)#ip route 0.0.0.0 0.0.0.0 s0/0/0
```

Rutas de cada uno de ellos:

R1:

```
Router(config-router)#network 10.0.0.4
```

```
Router(config-router)#network 10.0.0.0
```

R2:

```
Router(config-router)#network 192.168.30.0
```

```
Router(config-router)#network 192.168.20.0
```

```
Router(config-router)#network 192.168.21.0
```

```
Router(config-router)#network 10.0.0.0
```

```
Router(config-router)#network 10.0.0.8
```

R3:

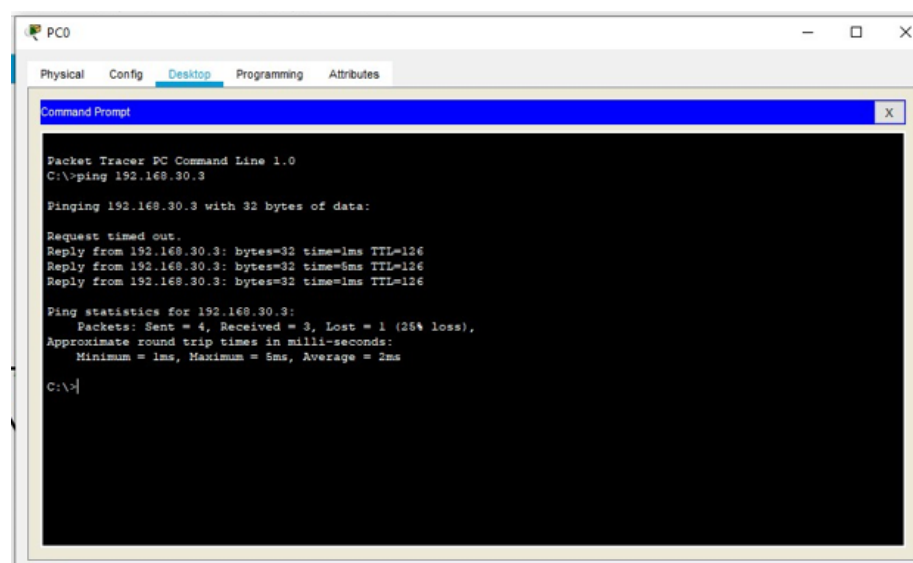
```
Router(config-router)#network 192.168.0.0
```

```
Router(config-router)#network 10.0.0.8
```

```
Router(config-router)#network 10.0.0.4
```

- 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 de PC0 A Laptop 30:



```

PC0
-----
Physical  Config  Desktop  Programming  Attributes
-----
Command Prompt
-----
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.30.3

Pinging 192.168.30.3 with 32 bytes of data:

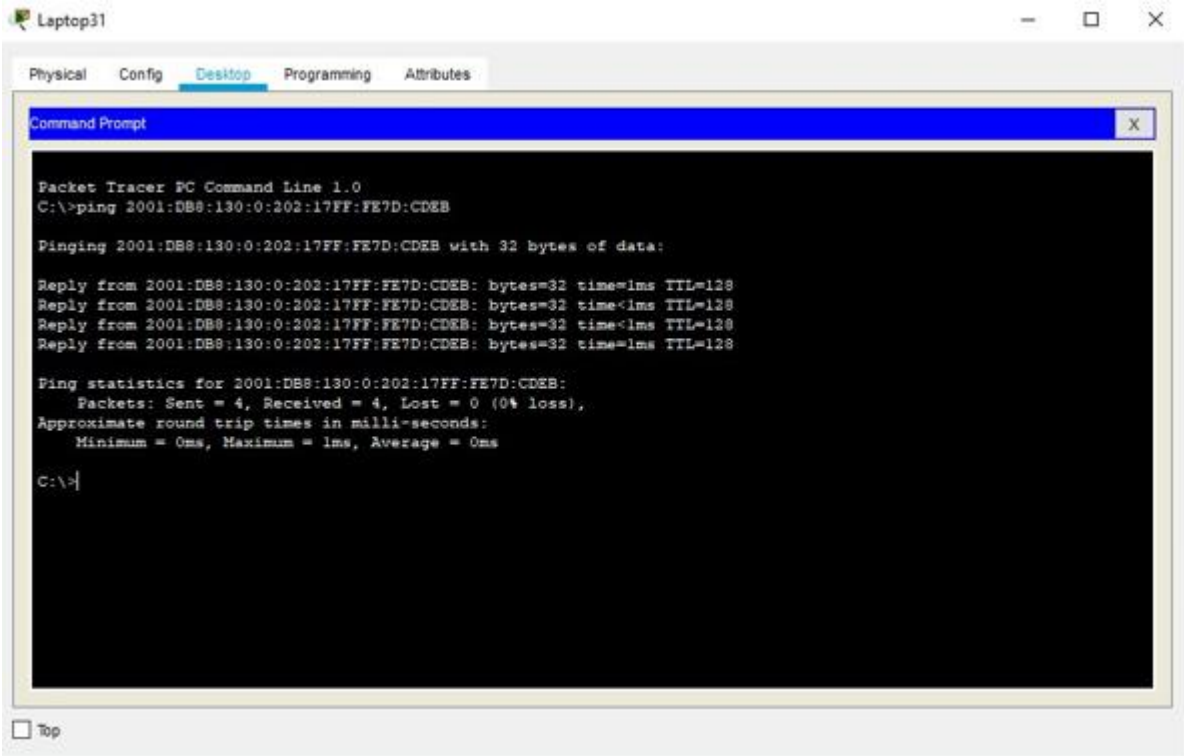
Request timed out.
Reply from 192.168.30.3: bytes=32 time=1ms TTL=126
Reply from 192.168.30.3: bytes=32 time=5ms TTL=126
Reply from 192.168.30.3: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.30.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 5ms, Average = 2ms

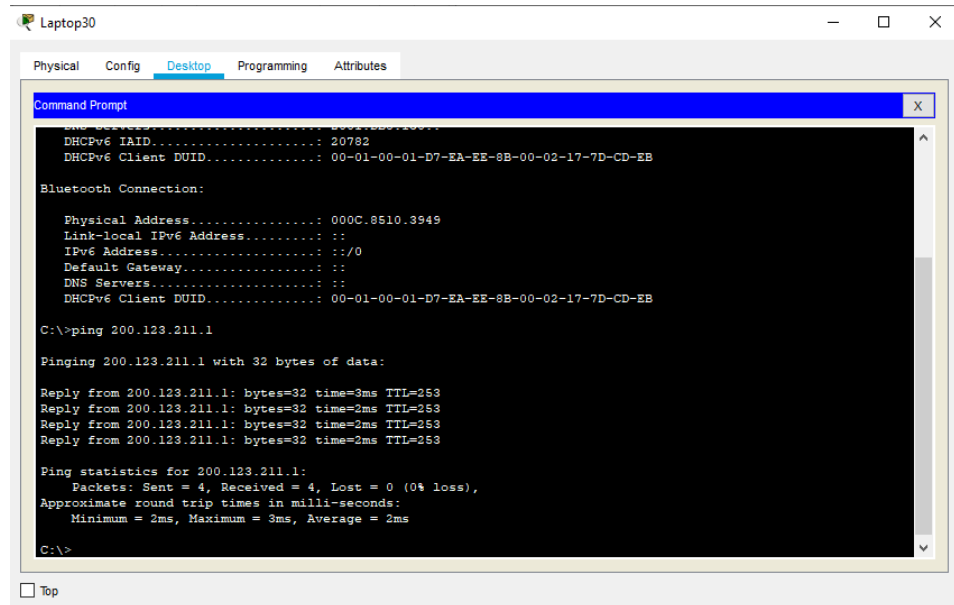
C:\>

```

Ping de Laptop30 a Laptop 31:



Ping de PC30 a ISP:



```
Physical Config Desktop Programming Attributes
Command Prompt
DHCPv6 IAID.....: 20782
DHCPv6 Client DUID.....: 00-01-00-01-D7-EA-EE-8B-00-02-17-7D-CD-EB

Bluetooth Connection:

Physical Address.....: 000C.8510.3949
Link-local IPv6 Address.....: ::
IPv6 Address.....: ::/0
Default Gateway.....: ::
DNS Servers.....: ::
DHCPv6 Client DUID.....: 00-01-00-01-D7-EA-EE-8B-00-02-17-7D-CD-EB

C:\>ping 200.123.211.1

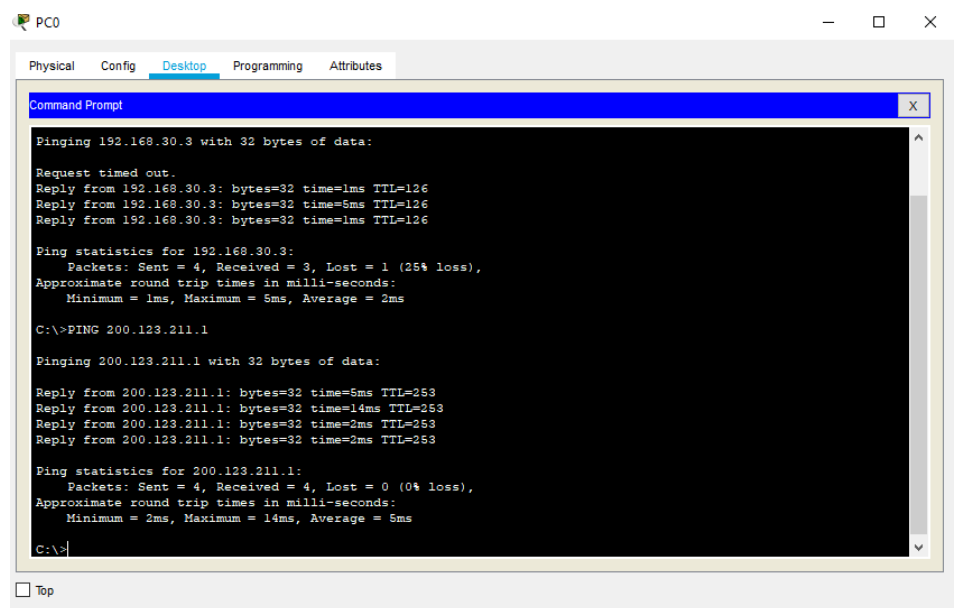
Pinging 200.123.211.1 with 32 bytes of data:

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=2ms 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 = 3ms, Average = 2ms

C:\>
```

PC0 a ISP:



```
Physical Config Desktop Programming Attributes
Command Prompt

Pinging 192.168.30.3 with 32 bytes of data:

Request timed out.
Reply from 192.168.30.3: bytes=32 time=1ms TTL=126
Reply from 192.168.30.3: bytes=32 time=5ms TTL=126
Reply from 192.168.30.3: bytes=32 time=1ms 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 = 1ms, Maximum = 5ms, Average = 2ms

C:\>PING 200.123.211.1

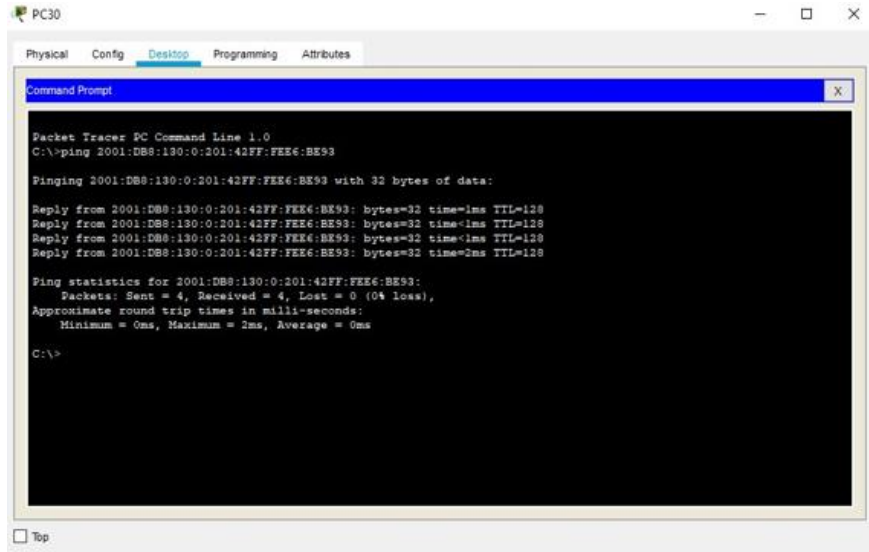
Pinging 200.123.211.1 with 32 bytes of data:

Reply from 200.123.211.1: bytes=32 time=5ms TTL=253
Reply from 200.123.211.1: bytes=32 time=14ms TTL=253
Reply from 200.123.211.1: bytes=32 time=2ms 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 = 14ms, Average = 5ms

C:\>
```

Ping de PC-30 a PC-31:

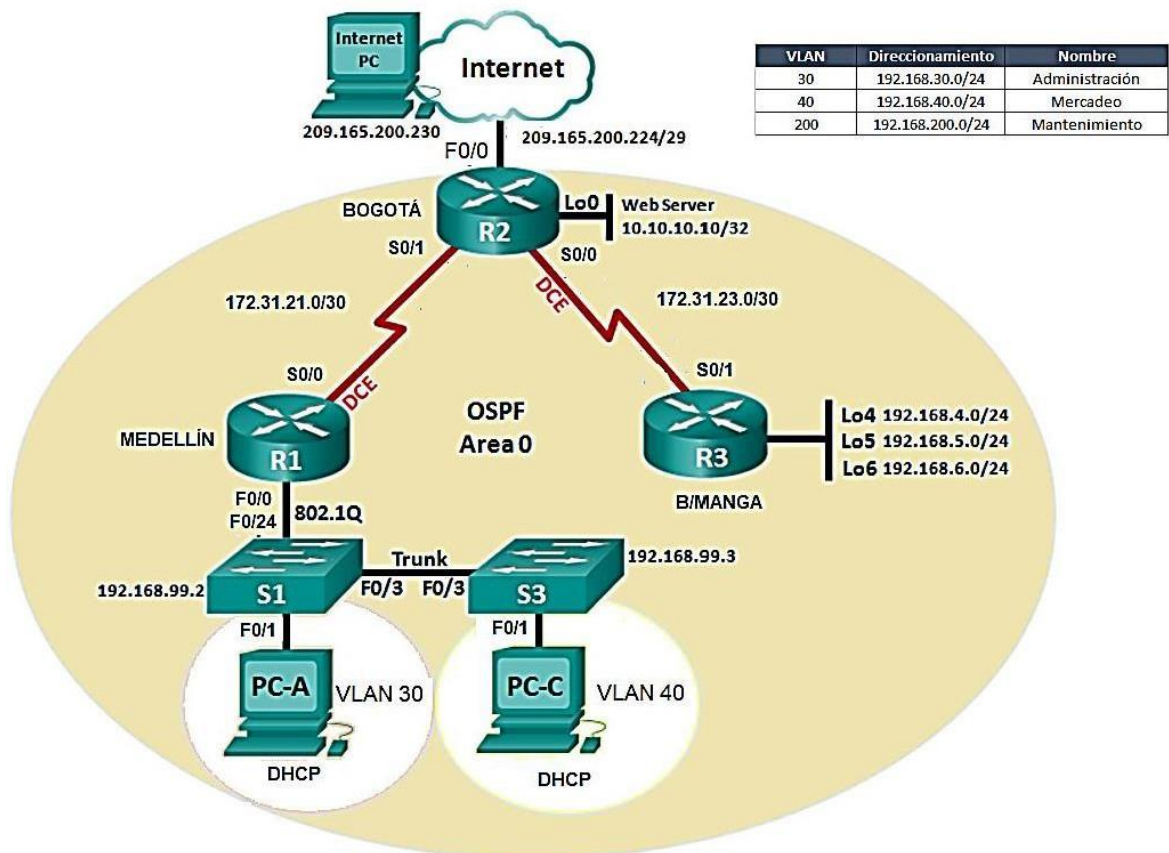


ESCENARIO 2

DESCRIPCIÓN DEL ESCENARIO PROPUESTO

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

TOPOLOGÍA DE RED



DIRECCIONAMIENTO DE RED

TABLA DE DIRECCIONAMIENTO IP ASIGNADO

El direccionamiento IP asignado a los equipos que conforman el escenario de red propuesto se resumen a continuación:

Tabla 1. Direccionamiento de IP de equipos de red

| DISPOSITIVO | INTERFACE | DIRECCION IP | MASCARA DE SUBRED |
|-------------|------------|-----------------|-------------------|
| ROUTER ISP | GI 0/0 | 209.165.200.230 | 255.255.255.248 |
| R2 | FA 0/0 | 209.165.200.225 | 255.255.255.248 |
| R2 | S0/0/0 | 172.31.23.1 | 255.255.255.252 |
| R2 | S0/0/1 | 172.31.21.2 | 255.255.255.252 |
| R2 | Lo0 | 10.10.10.10 | 255.255.255.255 |
| R1 | S 0/0/0 | 172.31.21.1 | 255.255.255.252 |
| R1 | FA 0/0.30 | 192.168.30.1 | 255.255.255.0 |
| R1 | FA 0/0.40 | 192.168.40.1 | 255.255.255.0 |
| R1 | FA 0/0.200 | 192.168.200.1 | 255.255.255.0 |
| R1 | FA 0/0.99 | 192.168.99.1 | 255.255.255.0 |
| R3 | S0/0/1 | 172.31.23.2 | 255.255.255.252 |
| R3 | Lo4 | 192.168.4.1 | 255.255.255.0 |
| R3 | Lo5 | 192.168.5.1 | 255.255.255.0 |
| R3 | Lo6 | 192.168.6.1 | 255.255.255.0 |
| SW1 | Vlan 99 | 192.168.99.2 | 255.255.255.0 |
| SW3 | Vlan 99 | 192.168.99.3 | 255.255.255.0 |
| PC-A | Vlan 30 | Dinámica | Dinámica |
| PC-C | Vlan 40 | Dinámica | Dinámica |

1. CONFIGURACIÓN Y VERIFICACIÓN PROTOCOLO OSPF V2

3.1 TABLA DE ENRUTAMIENTO Y ROUTERS CONECTADOS POR OSPF

3.1.1 Router 1

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

Gateway of last resort is not set

10.0.0.0/32 is subnetted, 1 subnets
O   10.10.10.10 [110/7501] via 172.31.21.2, 00:23:32, Serial0/0/0
172.31.0.0/30 is subnetted, 2 subnets
C   172.31.21.0 is directly connected, Serial0/0/0
O   172.31.23.0 [110/15000] via 172.31.21.2, 00:23:32, Serial0/0/0
192.168.4.0/32 is subnetted, 1 subnets
O   192.168.4.1 [110/15001] via 172.31.21.2, 00:23:22, Serial0/0/0
192.168.5.0/32 is subnetted, 1 subnets
O   192.168.5.1 [110/15001] via 172.31.21.2, 00:23:22, Serial0/0/0
192.168.6.0/32 is subnetted, 1 subnets
O   192.168.6.1 [110/15001] via 172.31.21.2, 00:23:22, Serial0/0/0
C   192.168.30.0/24 is directly connected, FastEthernet0/0.30
C   192.168.40.0/24 is directly connected, FastEthernet0/0.40
C   192.168.99.0/24 is directly connected, FastEthernet0/0.99
C   192.168.200.0/24 is directly connected, FastEthernet0/0.200
209.165.200.0/29 is subnetted, 1 subnets
O   209.165.200.224 [110/7501] via 172.31.21.2, 00:23:32, Serial0/0/0
```

3.1.2 Router 2

```
R2#sh ip ro
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 209.165.200.230 to network 0.0.0.0

 10.0.0.0/32 is subnetted, 1 subnets
C    10.10.10.10 is directly connected, Loopback0
 172.31.0.0/30 is subnetted, 2 subnets
C    172.31.21.0 is directly connected, Serial0/0/1
C    172.31.23.0 is directly connected, Serial0/0/0
 192.168.4.0/32 is subnetted, 1 subnets
O    192.168.4.1 [110/7501] via 172.31.23.2, 00:24:52, Serial0/0/0
 192.168.5.0/32 is subnetted, 1 subnets
O    192.168.5.1 [110/7501] via 172.31.23.2, 00:24:52, Serial0/0/0
 192.168.6.0/32 is subnetted, 1 subnets
O    192.168.6.1 [110/7501] via 172.31.23.2, 00:24:52, Serial0/0/0
O    192.168.30.0/24 [110/782] via 172.31.21.1, 00:24:52, Serial0/0/1
O    192.168.40.0/24 [110/782] via 172.31.21.1, 00:24:52, Serial0/0/1
O    192.168.99.0/24 [110/782] via 172.31.21.1, 00:24:52, Serial0/0/1
O    192.168.200.0/24 [110/782] via 172.31.21.1, 00:24:52, Serial0/0/1
 209.165.200.0/29 is subnetted, 1 subnets
C    209.165.200.224 is directly connected, FastEthernet0/0
S*   0.0.0.0/0 [1/0] via 209.165.200.230

R2#
```

3.1.3 Router 3

```
R3#sh ip ro
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

 10.0.0.0/32 is subnetted, 1 subnets
O    10.10.10.10 [110/782] via 172.31.23.1, 00:29:27, Serial0/0/1
 172.31.0.0/30 is subnetted, 2 subnets
O    172.31.21.0 [110/1562] via 172.31.23.1, 00:29:27, Serial0/0/1
C    172.31.23.0 is directly connected, Serial0/0/1
C    192.168.4.0/24 is directly connected, Loopback4
C    192.168.5.0/24 is directly connected, Loopback5
C    192.168.6.0/24 is directly connected, Loopback6
O    192.168.30.0/24 [110/1563] via 172.31.23.1, 00:29:27, Serial0/0/1
O    192.168.40.0/24 [110/1563] via 172.31.23.1, 00:29:27, Serial0/0/1
O    192.168.99.0/24 [110/1563] via 172.31.23.1, 00:29:27, Serial0/0/1
O    192.168.200.0/24 [110/1563] via 172.31.23.1, 00:29:27, Serial0/0/1
 209.165.200.0/29 is subnetted, 1 subnets
O    209.165.200.224 [110/782] via 172.31.23.1, 00:29:27, Serial0/0/1

R3#
```

3.2 CONFIGURACIÓN OSPF (PROCESS ID, INTERFACES, ROUTER ID, INTERFACES COSTO)

3.2.1 Router 1

```
FastEthernet0/0.30 is up, line protocol is up
  Internet address is 192.168.30.1/24, Area 0
  Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 1.1.1.1, Interface address 192.168.30.1
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:07
  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)
FastEthernet0/0.40 is up, line protocol is up
  Internet address is 192.168.40.1/24, Area 0
  Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 1.1.1.1, Interface address 192.168.40.1
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:07
  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)
FastEthernet0/0.99 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 DR, Priority 1
  Designated Router (ID) 1.1.1.1, Interface address 192.168.99.1
  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 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
FastEthernet0/0.200 is up, line protocol is up
  Internet address is 192.168.200.1/24, Area 0
  Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 1.1.1.1, Interface address 192.168.200.1
  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 4/4, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
Serial0/0/0 is up, line protocol is up
  Internet address is 172.31.21.1/30, Area 0
  Process ID 1, Router ID 1.1.1.1, Network Type POINT-TO-POINT, Cost: 7500
  Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
```

3.2.2 Router 2

```
R2#sh ip ospf interface

Loopback0 is up, line protocol is up
  Internet address is 10.10.10.10/32, Area 0
  Process ID 1, Router ID 2.2.2.2, Network Type LOOPBACK, Cost: 1
  Loopback interface is treated as a stub Host
FastEthernet0/0 is up, line protocol is up
  Internet address is 209.165.200.225/29, Area 0
  Process ID 1, Router ID 2.2.2.2, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 2.2.2.2, Interface address 209.165.200.225
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  No Hellos (Passive interface)
  Index 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)
Serial0/0/0 is up, line protocol is up
  Internet address is 172.31.23.1/30, Area 0
  Process ID 1, Router ID 2.2.2.2, Network Type POINT-TO-POINT, Cost: 7500
  Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  Hello due in 00:00:03
  Index 3/3, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 1, Adjacent neighbor count is 1
  Adjacent with neighbor 3.3.3.3
  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 2.2.2.2, Network Type POINT-TO-POINT, Cost: 781
  Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  Hello due in 00:00:09
  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 1.1.1.1
  Suppress hello for 0 neighbor(s)
```

3.2.3 Router 3

```
R3#sh ip ospf interface s0/0/1
Serial0/0/1 is up, line protocol is up
Internet address is 172.31.23.2/30, Area 0
Process ID 1, Router ID 3.3.3.3, Network Type POINT-TO-POINT, Cost: 781
Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  Hello due in 00:00:03
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 2.2.2.2
Suppress hello for 0 neighbor(s)
R3#sh ip ospf ?
<1-65535>      Process ID number
border-routers  Border and Boundary Router Information
database       Database summary
interface      Interface information
neighbor       Neighbor list
virtual-links  Virtual link information
<cr>
```

2. CONFIGURACIÓN DE VLANS, PUERTOS TRONCALES, PUERTOS DE ACCESO, ENCAPSULAMIENTO, INTER-VLAN ROUTING

4.1 Router 1

En R1 se llevó a cabo la configuración del enrutamiento inter-vlan y la respectiva encapsulación.

```
interface FastEthernet0/0
  description LAN
  no ip address
  duplex auto
  speed auto
!
interface FastEthernet0/0.30
  description VLAN Administracion
  encapsulation dot1Q 30
  ip address 192.168.30.1 255.255.255.0
  ip access-group 102 out
!
interface FastEthernet0/0.40
  description VLAN Mercadeo
  encapsulation dot1Q 40
  ip address 192.168.40.1 255.255.255.0
  ip access-group 101 out
!
interface FastEthernet0/0.99
  description VLAN Management
  encapsulation dot1Q 99
  ip address 192.168.99.1 255.255.255.0
!
interface FastEthernet0/0.200
  description VLAN Mantenimiento
  encapsulation dot1Q 200
  ip address 192.168.200.1 255.255.255.0
  ip access-group 21 out
!
interface FastEthernet0/1
  no ip address
  duplex auto
  speed auto
  shutdown
```

4.2 SW1

En el switch 1 se llevó a cabo a configuración de puertos troncales (conexión a router 1 y conexión a SW3), puerto de acceso, conexión a PC-A

Puerto de acceso:

```
!  
interface FastEthernet0/1  
description PC VLAN 30  
switchport access vlan 30  
switchport mode access  
spanning-tree portfast
```

Puertos troncales:

```
SW1#sh inter trunk  
Port      Mode      Encapsulation  Status      Native vlan  
Fa0/3     on        802.1q         trunking    1  
Fa0/24    on        802.1q         trunking    1  
  
Port      Vlans allowed on trunk  
Fa0/3     1-1005  
Fa0/24    1-1005  
  
Port      Vlans allowed and active in management domain  
Fa0/3     1,30,40,99,200  
Fa0/24    1,30,40,99,200  
  
Port      Vlans in spanning tree forwarding state and not pruned  
Fa0/3     1,30,40,99,200  
Fa0/24    1,30,40,99,200
```

4.3 SW3

En el SW3 se configuró el puerto de acceso para la conexión a PC – C y un puerto troncal que conecta a SW1.

Puerto de acceso:

```
!  
interface FastEthernet0/1  
description PC VLAN 40  
switchport access vlan 40  
switchport mode access  
spanning-tree portfast
```


Puertos troncales:

```
SW3#sh int trunk
Port      Mode      Encapsulation  Status      Native vlan
Fa0/3     on        802.1q         trunking    1

Port      Vlans allowed on trunk
Fa0/3     1-1005

Port      Vlans allowed and active in management domain
Fa0/3     1,30,40,99,200

Port      Vlans in spanning tree forwarding state and not pruned
Fa0/3     1,30,40,99,200
```

3. DESHABILITAR DNS LOOKUP EN SW3

5.1 SW3

Se llevó a cabo la configuración requerida mediante el comando que se ilustra en la imagen:

```
ip domain-lookup
no ip domain-lookup
ip domain-lookup
```

4. ASIGNACIÓN DE DIRECCIONES IP A SWITCHES

Para la administración de los switches se llevó a cabo la creación de la vlan 99 para gestionar los equipos, como buena práctica se evitó usar la vlan 1 para administrar los equipos, en la tabla se resumen el direccionamiento IP asignado a los dispositivos.

Tabla 2. Direccionamiento de IP asignado switches

| DISPOSITIVO | INTERFACE | DIRECCION IP | MASCARA DE SUBRED |
|-------------|-----------|--------------|-------------------|
| SW1 | Vlan 99 | 192.168.99.2 | 255.255.255.0 |
| SW3 | Vlan 99 | 192.168.99.3 | 255.255.255.0 |

5. CONFIGURACIÓN DE DHCP

La configuración del protocolo DHCP para las vlan 30 y 40 se llevó a cabo en el R1, inicialmente se configuró en el dispositivo los rangos de IP que debían excluirse y posteriormente se asignaron los parámetros propuestos en el escenario.

```
!
ip dhcp excluded-address 192.168.30.1 192.168.30.30
ip dhcp excluded-address 192.168.40.1 192.168.40.30
!
ip dhcp pool ADMINISTRACION
 network 192.168.30.0 255.255.255.0
 default-router 192.168.30.1
 dns-server 10.10.10.11
ip dhcp pool MERCADEO
 network 192.168.40.0 255.255.255.0
 default-router 192.168.40.1
 dns-server 10.10.10.11
```

6. CONFIGURACIÓN DE NAT

```
!
ip nat inside source list 10 interface FastEthernet0/0 overload
ip classless
ip route 0.0.0.0 0.0.0.0 209.165.200.230
!
ip flow-export version 9
!
access-list 10 permit 172.31.21.0 0.0.0.3
access-list 10 permit 172.31.23.0 0.0.0.3
access-list 10 permit host 10.10.10.10
access-list 10 permit 192.168.30.0 0.0.0.255
access-list 10 permit 192.168.40.0 0.0.0.255
access-list 10 permit 192.168.200.0 0.0.0.255
access-list 10 permit 192.168.4.0 0.0.0.255
access-list 10 permit 192.168.5.0 0.0.0.255
access-list 10 permit 192.168.6.0 0.0.0.255
!
interface FastEthernet0/0
 description Enlace_ISP
 ip address 209.165.200.225 255.255.255.248
 ip nat outside
 duplex auto
 speed auto
!
```

```

interface Serial0/0/0
description Enlace a R3
bandwidth 128
ip address 172.31.23.1 255.255.255.252
ip ospf cost 7500
ip nat inside
clock rate 4000
!
interface Serial0/0/1
description Enlace a R1
bandwidth 128
ip address 172.31.21.2 255.255.255.252
ip nat inside

```

7. CONFIGURACIÓN DE ACL ESTÁNDAR

ACL20: Esta lista de acceso aplicada en R3 deniega el tráfico de la red 192.168.6.0/24 hacia el R2

```

access-list 20 deny 192.168.6.0 0.0.0.255
access-list 20 permit host 0.0.0.0

```

```

!
interface Serial0/0/1
description Enlace a R2
bandwidth 128
ip address 172.31.23.2 255.255.255.252
ip access-group 20 out

```

ACL1: Esta lista de acceso aplicada en R1 deniega el tráfico de la red 192.1068.200.0/24 hacia las redes de R2,

```

access-list 21 deny 192.168.200.0 0.0.0.255
access-list 21 permit host 0.0.0.0

```

```

interface FastEthernet0/0.200
description VLAN Mantenimiento
encapsulation dot1Q 200
ip address 192.168.200.1 255.255.255.0
ip access-group 21 out

```

8. CONFIGURACIÓN DE ACL EXTENDIDA

Se crearon dos listas de acceso extendidas en R1: La ACL 101 deniega el tráfico de la red 192.168.40.0/24 hacia la red de internet 209.165.200.224/29 y la ACL 102 deniega el tráfico de la red 192.168.30.0/24 hacia el servidor web con la IP 10.10.10.10. Todo el tráfico restante es permitido.

```
access-list 101 deny ip 192.168.40.0 0.0.0.255 209.165.200.224 0.0.0.7
access-list 101 permit ip any any
access-list 102 deny ip 192.168.30.0 0.0.0.255 host 10.10.10.10
access-list 102 permit ip any any
```

```
interface FastEthernet0/0.30
description VLAN Administracion
encapsulation dot1Q 30
ip address 192.168.30.1 255.255.255.0
ip access-group 102 out
```

```
interface FastEthernet0/0.40
description VLAN Mercadeo
encapsulation dot1Q 40
ip address 192.168.40.1 255.255.255.0
ip access-group 101 out
```

9. PRUEBAS DE CONECTIVIDAD

Trazas desde la PC-A hacia las redes de R3

```
Packet Tracer PC Command Line 1.0
C:\>tracert 192.168.5.1

Tracing route to 192.168.5.1 over a maximum of 30 hops:

  1  1 ms      0 ms      0 ms      192.168.30.1
  2  1 ms      0 ms      1 ms      172.31.21.2
  3  47 ms     2 ms      1 ms      192.168.5.1

Trace complete.

C:\>tracert 192.168.4.1

Tracing route to 192.168.4.1 over a maximum of 30 hops:

  1  0 ms      0 ms      0 ms      192.168.30.1
  2  1 ms      0 ms      6 ms      172.31.21.2
  3  0 ms      3 ms      2 ms      192.168.4.1

Trace complete.

C:\>tracert 192.168.6.1

Tracing route to 192.168.6.1 over a maximum of 30 hops:

  1  0 ms      1 ms      0 ms      192.168.30.1
  2  1 ms      1 ms      0 ms      172.31.21.2
  3  1 ms      2 ms      0 ms      192.168.6.1

Trace complete.
```

Trazas desde PC – A hacia redes de R2

```
C:\>tracert 209.165.200.225

Tracing route to 209.165.200.225 over a maximum of 30 hops:

  1  0 ms      0 ms      0 ms      192.168.30.1
  2  1 ms      4 ms      0 ms      209.165.200.225

Trace complete.

C:\>tracert 10.10.10.10

Tracing route to 10.10.10.10 over a maximum of 30 hops:

  1  1 ms      0 ms      1 ms      192.168.30.1
  2  0 ms      1 ms      1 ms      10.10.10.10

Trace complete.

C:\>
```

Conectividad desde PC – A hacia redes de R1

```
C:\>ping 192.168.30.1

Pinging 192.168.30.1 with 32 bytes of data:

Reply from 192.168.30.1: bytes=32 time<lms TTL=255
Reply from 192.168.30.1: bytes=32 time<lms TTL=255
Reply from 192.168.30.1: bytes=32 time<lms TTL=255
Reply from 192.168.30.1: bytes=32 time<lms TTL=255

Ping statistics for 192.168.30.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.40.1

Pinging 192.168.40.1 with 32 bytes of data:

Reply from 192.168.40.1: bytes=32 time=lms TTL=255
Reply from 192.168.40.1: bytes=32 time<lms TTL=255
Reply from 192.168.40.1: bytes=32 time<lms TTL=255
Reply from 192.168.40.1: bytes=32 time=lms TTL=255

Ping statistics for 192.168.40.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = lms, Average = 0ms

C:\>ping 192.168.200.1

Pinging 192.168.200.1 with 32 bytes of data:

Reply from 192.168.200.1: bytes=32 time=lms TTL=255
Reply from 192.168.200.1: bytes=32 time<lms TTL=255
Reply from 192.168.200.1: bytes=32 time<lms TTL=255
Reply from 192.168.200.1: bytes=32 time<lms TTL=255

Ping statistics for 192.168.200.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = lms, Average = 0ms
```

Conectividad desde PC-C hacia R3

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.6.1

Pinging 192.168.6.1 with 32 bytes of data:

Reply from 192.168.6.1: bytes=32 time=3ms TTL=253
Reply from 192.168.6.1: bytes=32 time=3ms TTL=253
Reply from 192.168.6.1: bytes=32 time=2ms TTL=253
Reply from 192.168.6.1: bytes=32 time=3ms TTL=253

Ping statistics for 192.168.6.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 3ms, Average = 2ms

C:\>ping 192.168.5.1

Pinging 192.168.5.1 with 32 bytes of data:

Reply from 192.168.5.1: bytes=32 time=2ms TTL=253
Reply from 192.168.5.1: bytes=32 time=2ms TTL=253
Reply from 192.168.5.1: bytes=32 time=2ms TTL=253
Reply from 192.168.5.1: bytes=32 time=5ms TTL=253

Ping statistics for 192.168.5.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 5ms, Average = 2ms

C:\>ping 192.168.4.1

Pinging 192.168.4.1 with 32 bytes of data:

Reply from 192.168.4.1: bytes=32 time=3ms TTL=253
Reply from 192.168.4.1: bytes=32 time=2ms TTL=253
Reply from 192.168.4.1: bytes=32 time=2ms TTL=253
Reply from 192.168.4.1: bytes=32 time=2ms TTL=253

Ping statistics for 192.168.4.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 3ms, Average = 2ms
```

Conectividad desde PC-C hacia R2

```
C:\>ping 10.10.10.10

Pinging 10.10.10.10 with 32 bytes of data:

Reply from 10.10.10.10: bytes=32 time=1ms TTL=254
Reply from 10.10.10.10: bytes=32 time=1ms TTL=254
Reply from 10.10.10.10: bytes=32 time=10ms TTL=254
Reply from 10.10.10.10: bytes=32 time=2ms TTL=254

Ping statistics for 10.10.10.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 10ms, Average = 3ms

C:\>ping 209.165.200.224

Pinging 209.165.200.224 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=2ms TTL=254
Reply from 172.31.21.2: bytes=32 time=1ms TTL=254

Ping statistics for 209.165.200.224:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms
```


Conectividad desde PC-C hacia R1

```
C:\>ping 192.168.30.1

Pinging 192.168.30.1 with 32 bytes of data:

Reply from 192.168.30.1: bytes=32 time<lms TTL=255
Reply from 192.168.30.1: bytes=32 time<lms TTL=255
Reply from 192.168.30.1: bytes=32 time<lms TTL=255
Reply from 192.168.30.1: bytes=32 time<lms TTL=255

Ping statistics for 192.168.30.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.40.1

Pinging 192.168.40.1 with 32 bytes of data:

Reply from 192.168.40.1: bytes=32 time<lms TTL=255
Reply from 192.168.40.1: bytes=32 time<lms TTL=255
Reply from 192.168.40.1: bytes=32 time<lms TTL=255
Reply from 192.168.40.1: bytes=32 time<lms TTL=255

Ping statistics for 192.168.40.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.200.1

Pinging 192.168.200.1 with 32 bytes of data:

Reply from 192.168.200.1: bytes=32 time<lms TTL=255
Reply from 192.168.200.1: bytes=32 time<lms TTL=255
Reply from 192.168.200.1: bytes=32 time=lms TTL=255
Reply from 192.168.200.1: bytes=32 time<lms TTL=255

Ping statistics for 192.168.200.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = lms, Average = 0ms
```

10. ARCHIVOS DE CONFIGURACIÓN

Adicional a la configuración requerida en el escenario propuesto, a los equipos de red se les realizó la siguiente configuración: Banners, cifrado de contraseñas, SSH, nombres, direcciones IP de gestión, y accesos para líneas de consola y vty. El siguiente es el archivo de configuración de cada uno de los equipos con componen la red.

ROUTER 1

```
R1#sh run
```

```
Building configuration...
```

```
Current configuration : 2609 bytes
```

```
!
```

```
version 12.4
```

```
no service timestamps log datetime msec
```

```
no service timestamps debug datetime msec
```

```
service password-encryption
```

```
!
```

```
hostname R1
```

```
!
```

```
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1 enable
```

```
password 7 0822455D0A16
```

```
!
```

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

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

```
!
```

```
ip dhcp pool ADMINISTRACION network
```

```
192.168.30.0 255.255.255.0
```

```
default-router 192.168.30.1
```

```
dns-server 10.10.10.11
ip dhcp pool MERCADEO
network 192.168.40.0 255.255.255.0
default-router 192.168.40.1
dns-server 10.10.10.11
!
no ip cef no
ipv6 cef
!
username admin secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
!
ip ssh version 2
ip domain-name ccna-unad.com
!
spanning-tree mode pvst
!
interface FastEthernet0/0
description LAN
no ip address
duplex auto speed
auto
!
interface FastEthernet0/0.30
description VLAN Administracion
encapsulation dot1Q 30
ip address 192.168.30.1 255.255.255.0
ip access-group 102 out
!
interface FastEthernet0/0.40
description VLAN Mercadeo
```

```
encapsulation dot1Q 40
ip address 192.168.40.1 255.255.255.0
ip access-group 101 out
!
interface FastEthernet0/0.99
description VLAN Management
encapsulation dot1Q 99
ip address 192.168.99.1 255.255.255.0
!
interface FastEthernet0/0.200
description VLAN Mantenimiento
encapsulation dot1Q 200
ip address 192.168.200.1 255.255.255.0
ip access-group 21 out
!
interface FastEthernet0/1 no
ip address
duplex    auto
speed    auto
shutdown
!
interface Serial0/0/0
description Enlace a R2
bandwidth 128
ip address 172.31.21.1 255.255.255.252
ip ospf cost 7500
clock rate 64000
!
interface Serial0/0/1 no
ip address
```

```
clock rate 2000000
shutdown
!
interface Vlan1 no
ip address
shutdown
!
router ospf 1
router-id 1.1.1.1
log-adjacency-changes
passive-interface FastEthernet0/0
network 172.31.21.0 0.0.0.3 area 0
network 192.168.30.0 0.0.0.255 area 0
network 192.168.40.0 0.0.0.255 area 0
network 192.168.200.0 0.0.0.255 area 0
network 192.168.99.0 0.0.0.255 area 0
!
ip classless
!
ip flow-export version 9
!
access-list 21 deny 192.168.200.0 0.0.0.255
access-list 21 permit host 0.0.0.0
access-list 101 deny ip 192.168.40.0 0.0.0.255 209.165.200.224 0.0.0.7
access-list 101 permit ip any any
access-list 102 deny ip 192.168.30.0 0.0.0.255 host 10.10.10.10
access-list 102 permit ip any any
!
no cdp run
!
```

```
banner motd ^C Acceso solo a personal autorizado ^C
!  
line con 0  
exec-timeout 5 0  
password 7 0822455D0A16  
login  
!  
line aux 0  
!  
line vty 0 4  
login local  
transport input ssh line  
vty 5 15  
login local transport  
input ssh  
!  
end R1#
```

ROUTER 2

```
R2#sh run  
Building configuration...  
  
Current configuration : 2077 bytes  
!  
version 12.4  
no service timestamps log datetime msec  
no service timestamps debug datetime msec  
service password-encryption  
!
```

```
hostname R2
!
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1 enable
password 7 0822455D0A16
!
no ip cef no
ipv6 cef
!
username admin secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
!
ip ssh version 2
ip domain-name unad-ccna.com
!
spanning-tree mode pvst
!
interface Loopback0
description Web Server
ip address 10.10.10.10 255.255.255.255
!
interface FastEthernet0/0
description Enlace_ISP
ip address 209.165.200.225 255.255.255.248
ip nat outside
duplex auto speed
auto
!
interface FastEthernet0/1 no
ip address
duplex auto
speed auto
```

```
shutdown
!
interface Serial0/0/0
description Enlace a R3
bandwidth 128
ip address 172.31.23.1 255.255.255.252
ip ospf cost 7500 ip
nat inside clock rate
64000
!
interface Serial0/0/1
description Enlace a R1
bandwidth 128
ip address 172.31.21.2 255.255.255.252
ip nat inside
!
interface Vlan1 no
ip address
shutdown
!
router ospf 1
router-id 2.2.2.2
log-adjacency-changes
passive-interface FastEthernet0/0
network 172.31.21.0 0.0.0.3 area 0
network 10.10.10.10 0.0.0.0 area 0
network 172.31.23.0 0.0.0.255 area 0
network 209.165.200.224 0.0.0.7 area 0
!
ip nat inside source list 10 interface FastEthernet0/0 overload
```



```
ip classless
ip route 0.0.0.0 0.0.0.0 209.165.200.230
!
ip flow-export version 9
!
access-list 10 permit 172.31.21.0 0.0.0.3
access-list 10 permit 172.31.23.0 0.0.0.3
access-list 10 permit host 10.10.10.10
access-list 10 permit 192.168.30.0 0.0.0.255
access-list 10 permit 192.168.40.0 0.0.0.255
access-list 10 permit 192.168.200.0 0.0.0.255
access-list 10 permit 192.168.4.0 0.0.0.255
access-list 10 permit 192.168.5.0 0.0.0.255
access-list 10 permit 192.168.6.0 0.0.0.255
!
no cdp run
!
banner motd ^C Acceso solo a personal autorizado ^C
!
line con 0
exec-timeout 5 0
password 7 0822455D0A16
login
!
line aux 0
!
line vty 0 4
login local
transport input ssh line
vty 5 15
```

```
login local transport
input ssh
!
end
```

ROUTER 3

```
R3#sh run
Building configuration...
```

```
Current configuration : 1615 bytes
```

```
!
version 12.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname R3
!
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1 enable
password 7 0822455D0A16
!
no ip cef no
ipv6 cef
!
username admin secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
!
ip ssh version 2
ip domain-name unad-ccna.com
!
spanning-tree mode pvst
```

```
!  
interface Loopback4  
ip address 192.168.4.1 255.255.255.0  
!  
interface Loopback5  
ip address 192.168.5.1 255.255.255.0  
!  
interface Loopback6  
ip address 192.168.6.1 255.255.255.0  
!  
interface FastEthernet0/0 no  
ip address  
duplex auto  
speed auto  
shutdown  
!  
interface FastEthernet0/1 no  
ip address  
duplex auto  
speed auto  
shutdown  
!  
interface Serial0/0/0 no  
ip address  
clock rate 2000000  
shutdown  
!  
interface Serial0/0/1  
description Enlace a R2  
bandwidth 128
```

```
ip address 172.31.23.2 255.255.255.252
ip access-group 20 out
!
interface Vlan1 no
ip address
shutdown
!
router ospf 1
router-id 3.3.3.3
log-adjacency-changes
passive-interface FastEthernet0/0
network 172.31.23.0 0.0.0.3 area 0
network 192.168.4.0 0.0.0.255 area 0
network 192.168.5.0 0.0.0.255 area 0
network 192.168.6.0 0.0.0.255 area 0
!
ip classless
!
ip flow-export version 9
!
access-list 20 deny 192.168.6.0 0.0.0.255
access-list 20 permit host 0.0.0.0
!
no cdp run
!
banner motd ^C Acceso solo a personal autorizado ^C
!
line con 0
exec-timeout 5 0
password 7 0822455D0A16
```

```
login
!  
line aux 0
!  
line vty 0 4
login local
transport input ssh line
vty 5 15
login local transport
input ssh
!  
end R3#
```

SWITCH 1

```
SW1#sh run  
Building configuration...
```

```
Current configuration : 2521 bytes
```

```
!  
version 12.1  
no service timestamps log datetime msec  
no service timestamps debug datetime msec  
service password-encryption  
!  
hostname SW1  
!  
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1 enable  
password 7 0822455D0A16  
!
```

```
ip ssh version 2
ip domain-name unad-ccna.com
!
username admin secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1
!
spanning-tree mode pvst
!
interface FastEthernet0/1
description PC VLAN 30
switchport access vlan 30
switchport mode access
spanning-tree portfast
!
interface FastEthernet0/2
description Sin uso shutdown
!
interface FastEthernet0/3
description Enlace a SW3
switchport mode trunk
!
interface FastEthernet0/4
description Interfaces sin uso
shutdown
!
interface FastEthernet0/5
description Interfaces sin uso
shutdown
!
interface FastEthernet0/6
```

```
description Interfaces sin uso  
shutdown
```

```
!
```

```
interface FastEthernet0/7  
description Interfaces sin uso  
shutdown
```

```
!
```

```
interface FastEthernet0/8  
description Interfaces sin uso  
shutdown
```

```
!
```

```
interface FastEthernet0/9  
description Interfaces sin uso  
shutdown
```

```
!
```

```
interface FastEthernet0/10  
description Interfaces sin uso  
shutdown
```

```
!
```

```
interface FastEthernet0/11  
description Interfaces sin uso  
shutdown
```

```
!
```

```
interface FastEthernet0/12  
description Interfaces sin uso  
shutdown
```

```
!
```

```
interface FastEthernet0/13  
description Interfaces sin uso  
shutdown
```

```
!  
interface FastEthernet0/14  
description Interfaces sin uso  
shutdown
```

```
!  
interface FastEthernet0/15  
description Interfaces sin uso  
shutdown
```

```
!  
interface FastEthernet0/16  
description Interfaces sin uso  
shutdown
```

```
!  
interface FastEthernet0/17  
description Interfaces sin uso  
shutdown
```

```
!  
interface FastEthernet0/18  
description Interfaces sin uso  
shutdown
```

```
!  
interface FastEthernet0/19  
description Interfaces sin uso  
shutdown
```

```
!  
interface FastEthernet0/20  
description Interfaces sin uso  
shutdown
```

```
!  
interface FastEthernet0/21
```



```
description Interfaces sin uso
shutdown
!
interface FastEthernet0/22
description Interfaces sin uso
shutdown
!
interface FastEthernet0/23
description Interfaces sin uso
shutdown
!
interface FastEthernet0/24
description Enlace a R1
switchport mode trunk
!
interface Vlan1 no
ip address
shutdown
!
interface Vlan99 description
Management
mac-address 00d0.5840.3901
ip address 192.168.99.2 255.255.255.0
!
ip default-gateway 192.168.99.1
!
banner motd ^C Acceso solo a personal autorizado ^C
!
line con 0
password 7 0822455D0A16
```

```
login
exec-timeout 5 0
!
line vty 0 4
login local
transport input ssh line
vty 5 15
login local transport
input ssh
!
end
```

SW1#

SWITCH 3

SW3#sh run

Building configuration...

Current configuration : 2458 bytes

```
!
version 12.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname SW3
!
enable secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1 enable
password 7 0822455D0A16
```

```
!  
ip ssh version 2  
no ip domain-lookup  
ip domain-name unad-ccna.com  
!  
username admin secret 5 $1$mERr$9cTjUIEqNGurQiFU.ZeCi1  
!  
spanning-tree mode pvst  
!  
interface FastEthernet0/1  
description PC VLAN 40  
switchport access vlan 40  
switchport mode access  
spanning-tree portfast  
!  
interface      FastEthernet0/2  
description   Puerto sin uso  
shutdown  
!  
interface      FastEthernet0/3  
description   Enlace a SW1  
switchport mode trunk  
!  
interface FastEthernet0/4  
description Puerto Sin uso  
shutdown  
!  
interface FastEthernet0/5  
description Puerto Sin uso  
shutdown
```

```
!  
interface FastEthernet0/6  
description Puerto Sin uso  
shutdown  
!  
interface FastEthernet0/7  
description Puerto Sin uso  
shutdown  
!  
interface FastEthernet0/8  
description Puerto Sin uso  
shutdown  
!  
interface FastEthernet0/9  
description Puerto Sin uso  
shutdown  
!  
interface    FastEthernet0/10  
description  Puerto Sin uso  
shutdown  
!  
interface    FastEthernet0/11  
description  Puerto Sin uso  
shutdown  
!  
interface    FastEthernet0/12  
description  Puerto Sin uso  
shutdown  
!  
interface FastEthernet0/13
```

```
description Puerto Sin uso
shutdown
!
interface FastEthernet0/14
description Puerto Sin uso
shutdown
!
interface FastEthernet0/15
description Puerto Sin uso
shutdown
!
interface FastEthernet0/16
description Puerto Sin uso
shutdown
!
interface FastEthernet0/17
description Puerto Sin uso
shutdown
!
interface FastEthernet0/18
description Puerto Sin uso
shutdown
!
interface FastEthernet0/19
description Puerto Sin uso
shutdown
!
interface FastEthernet0/20
description Puerto Sin uso
shutdown
```

```
!  
interface    FastEthernet0/21  
description  Puerto Sin uso  
shutdown  
!  
interface    FastEthernet0/22  
description  Puerto Sin uso  
shutdown  
!  
interface    FastEthernet0/23  
description  Puerto Sin uso  
shutdown  
!  
interface    FastEthernet0/24  
description  Puerto Sin uso  
shutdown  
!  
interface Vlan1 no  
ip address  
shutdown  
!  
interface Vlan99 description  
Management  
mac-address 0090.2b35.9401  
ip address 192.168.99.3 255.255.255.0  
!  
ip default-gateway 192.168.99.1  
!  
banner motd ^C Acceso solo a personal autorizado ^C  
!
```

```
line con 0
password 7 0822455D0A16 login
exec-timeout 5 0
!
line vty 0 4 login local
transport input ssh line vty 5 15
login local transport input ssh
!
end SW3#
```

CONCLUSIONES

Durante el desarrollo de esta actividad, se logró demostrar los conocimientos adquiridos en cuanto a la configuración de los equipos de red, Cisco, como routers y Switches, mediante la configuración y direccionamiento de los diferentes dispositivos

.

Se logró poner en práctica los protocolos de enrutamiento dinámico como OSPF y otros servicios como DHCP, verificar conectividad y funcionalidad, como también resolver problemas presentando.

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