

## **Diplomado de Profundización Cisco**

**(Diseño e Implementación de Soluciones Integradas LAN – WAN)**

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**Universidad Nacional Abierta y a Distancia - UNAD**

**Escuela de Ciencias Básicas y Tecnologías de la Información- ECBTI**

**Diplomado en Cisco**

**Sibaté 2018**

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**Eduardo Guarín Tangarife**

**Código: 10.131.454**

Diplomado en Cisco presentado como requisito para optar al título profesional en  
Ingeniería de Sistemas

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## Dedicatoria

En primer lugar a DIOS, padre bueno y misericordioso, el cual me ha permitido llegar a este punto de mi vida, el cual me ha guardado y siempre acompañado en todo momento y sobre todo en aquellos durante los cuales más lo he necesitado, el cual me permitió concluir a pesar de los incontables inconvenientes suscitados durante la carrera, ya que tuve que sortear grandes dificultades relacionadas con mi salud, a mi esposa quien me apoyo en todo momento alentandome para culminar con éxito esta etapa, a la UNAD y todos sus profesores quienes semestre a semestre me impulsaron a investigar, aprender, a ellos quienes con sus correcciones, apuntes, observaciones me orientaron para llegar a ser un excelente profesional.

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Agradezco también a mi familia quienes en todo momento han estado alli para darme las fuerzas necesarias en el camino recorrido. Y por último agradezco PhD. Juan Carlos Vesga Ferreira por guiarnos durante este semestre como director del curso y por darme la oportunidad de concluir este diplomado.

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## RESUMEN

En el presente documento se brindan las herramientas necesarias para desarrollar e implementar las redes LAN / WAN, utilizando para ello el software Packet Tracer, utilizando los conocimientos adquiridos a través de este diplomado, particularmente en lo referente al routing IPv4 e IPV6, Ping, Switches, Vlans, además de los protocolos OSPF, y el diseño de las redes de acuerdo a las situaciones particulares solicitadas.

## ABSTRACT

This document provides the necessary tools to develop and implement LAN / WAN networks, using the Packet Tracer software, using the knowledge acquired through this course, particularly with respect to IPv4 and IPV6 routing, Ping, Switches , Vlans, in addition to the OSPF protocols, and the design of the networks according to the particular situations requested.

## INTRODUCCION

El presente trabajo resume lo aprendido en el semestre durante el diplomado CISCO, se trata de afianzar los conocimientos en la configuración de switches y routers, aplicar los conocimientos adquiridos en las diferentes etapas del curso realizado.

Para este trabajo se utilizó el packet tracer como software para elaborar el componente practico.

## OBJETIVOS

### Objetivo General:

Implementar una red LAN/WAN, que permita realizar el enrutamiento mediante el uso lógico y adecuado de las estrategias propias con los comandos del IOS, permitiendo el tráfico en todas las interfaces.

### Objetivos Específicos:

- Verificar la conectividad entre los dispositivos.
- Utilizar las ACL para garantizar el acceso remoto a los enrutadores.
- Armar la red y configurar los parámetros básicos de los dispositivos.
- Configurar y verificar el routing OSPF.
- Configurar y verificar la NAT estática.
- Configurar y verificar la NAT dinámica.
- Diseñar, configurar y administrar la red según lo solicitado.
- Implementar la configuración de los distintos protocolos y comandos.

## Descripción del escenario propuesto para la prueba de habilidades

**Escenario:** 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

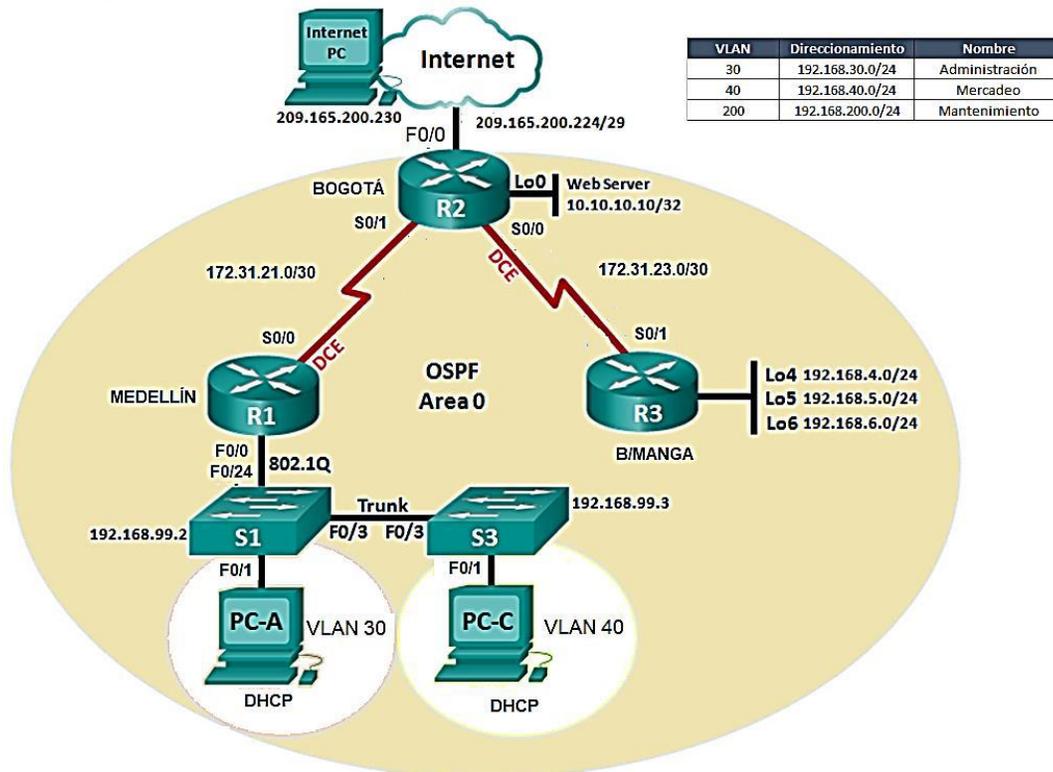


Figura 1 Topología de la red asignada

1. Configurar el direccionamiento IP acorde con la topología de red para cada uno de los dispositivos que forman parte del escenario
2. Configurar el protocolo de enrutamiento OSPFv2 bajo los siguientes criterios:

**OSPFv2 area 0 Configuration Item or Task Specification**

Router ID R1	1.1.1.1
Router ID R2	2.2.2.2
Router ID R3	3.3.3.3
Configurar todas las interfaces LAN como pasivas	
Establecer el ancho de banda para enlaces seriales en	128 Kb/s
Ajustar el costo en la métrica de S0/0 a	7500

**Verificar información de OSPF**

Visualizar tablas de enrutamiento y routers conectados por OSPFv2

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

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

3. Configurar VLANs, Puertos troncales, puertos de acceso, encapsulamiento, Inter-VLAN Routing y Seguridad en los Switches acorde a la topología de red establecida.
4. En el Switch 3 deshabilitar DNS lookup

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

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

7. Implement DHCP and NAT for IPv4

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

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

Configurar DHCP pool para VLAN 30

Name: ADMINISTRACION
DNS-Server: 10.10.10.11
Domain-Name: ccna-unad.com
Establecer default gateway.

Las claves para ingresar a los Switch y Routers son:

Password: eduardo

Contraseña: class

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

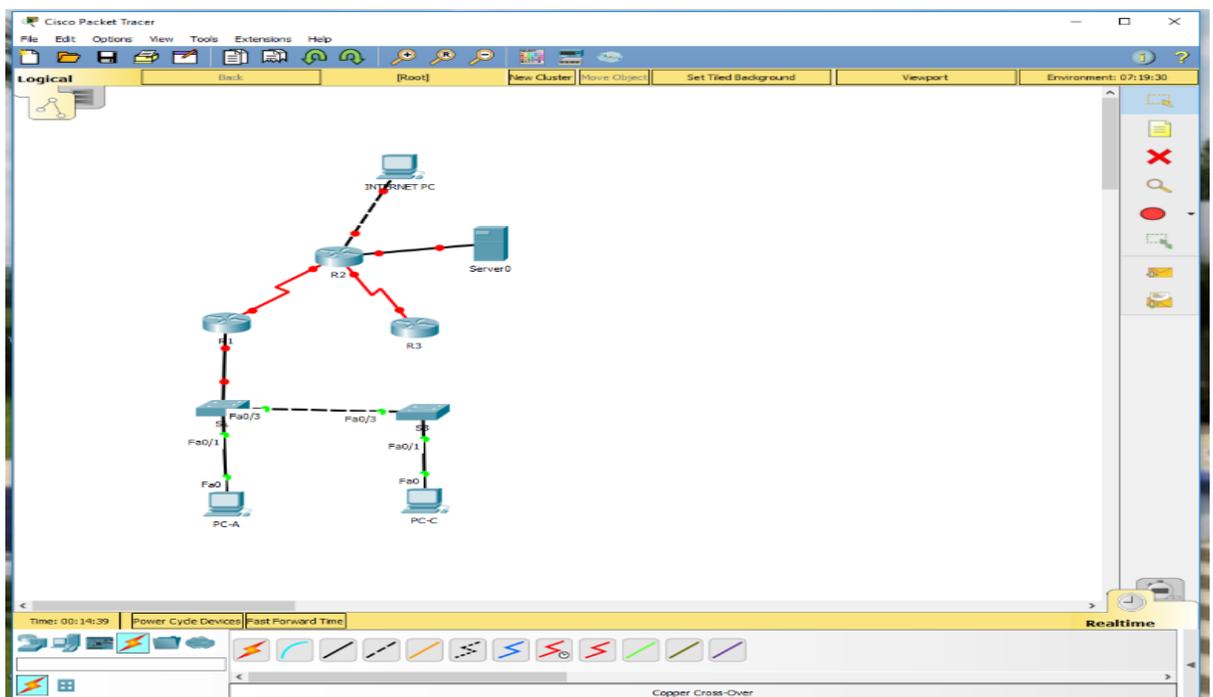


Figura 2 Configuración switches

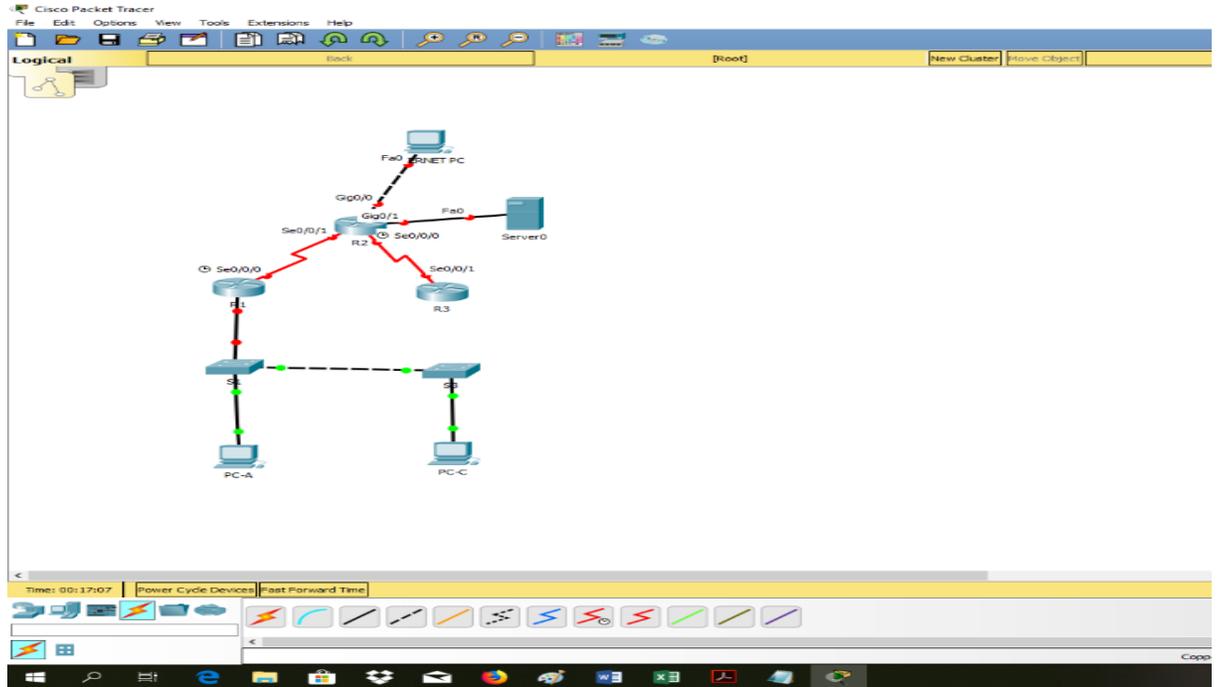


Figura 3 Configuración con routers

## Configuración Pc internet

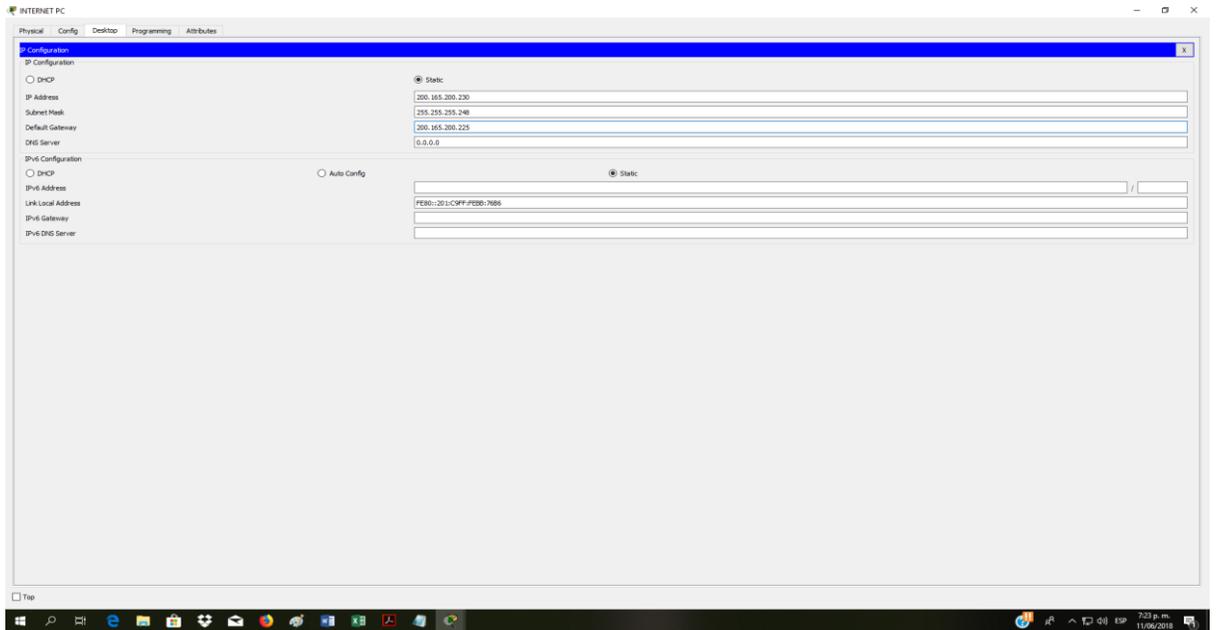


Figura 4 Configuración PC Internet

## Router R1 (Medellin)

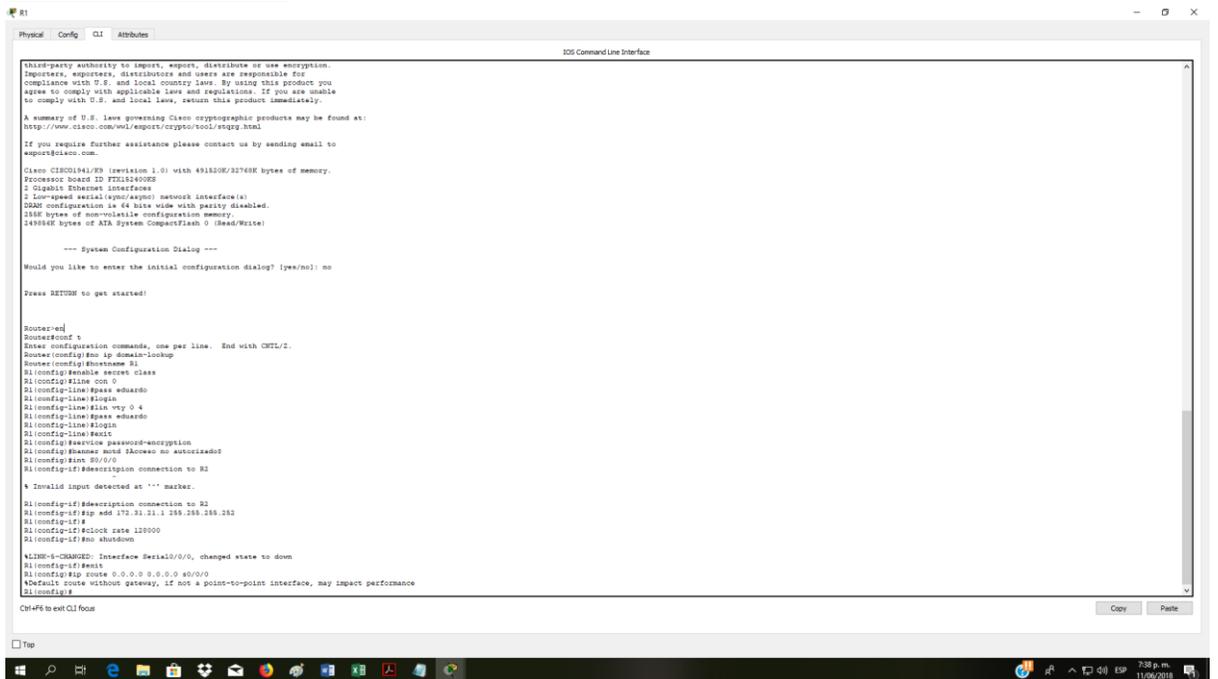


Figura 5 Router R1 Medellin

Le asigno una clave para ingresar al router (eduardo), y le asigno una clave para cuando vaya a ingresar al telnet (eduardo), le configure un banner para cuando no se digite correctamente la clave (acceso no autorizado).

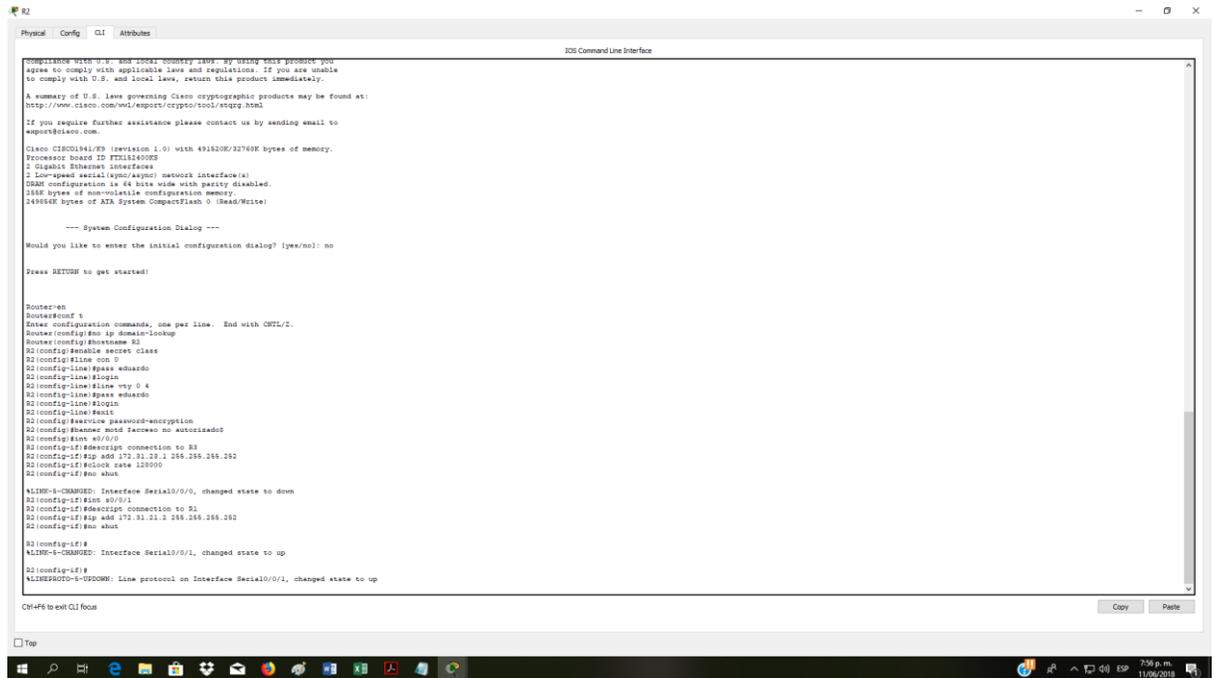
Configuro el puerto S0/0 con la dirección IP 172.31.21.1 y la submascara 255.255.255.252 por ser 172.31.21.0/30, esto lo hago con el comando ip add.

Para dar el ancho de banda de 128000 utilizo el comando clock rate 128000.

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup
Router(config)#hostname R1
R1(config)#enable secret class
R1(config)#line con 0
R1(config-line)#pass eduardo
R1(config-line)#login
R1(config-line)#lin vty 0 4
R1(config-line)#pass eduardo
R1(config-line)#login
R1(config-line)#exit
R1(config)#service password-encryption
R1(config)#banner motd $Acceso no autorizado$
R1(config)#int S0/0/0
R1(config-if)#description connection to R2
R1(config-if)#ip add 172.31.21.1 255.255.255.252
R1(config-if)#
R1(config-if)#clock rate 128000
R1(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R1(config-if)#exit
R1(config)#ip route 0.0.0.0 0.0.0.0 s0/0/0
```

## Router R2 (Bogota)



```

IOS Command Line Interface

Compliance with U.S. and local country laws by using this product you
agree to comply with applicable laws and regulations. If you are unable
to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wd/espopt/cryptotool/rtgq.html
If you require further assistance please contact us by sending email to
espopt@cisco.com.

Cisco C1801-941/29 (revision 1.0) with 491820K/32768K bytes of memory.
Processor board ID F218140000
1 Gigabit Ethernet interface(s)
1 10-speed serial (VPI/VPN) RJ45 serial interface(s)
DDMM configuration is (4 bits wide with parity disabled).
188K bytes of non-volatile configuration memory.
24988K bytes of ATA System CompactFlash 0 (Read/Write)

--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: no

Press RETURN to get started!

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip domain-lookup
Router(config)#hostname R2
R2(config)#enable secret class
R2(config)#line con 0
R2(config-line)#pass eduardo
R2(config-line)#line vty 0 4
R2(config-line)#pass eduardo
R2(config-line)#login
R2(config-line)#exit
R2(config)#service password-encryption
R2(config)#banner motd 'Welcome to UNAD/ADADAD'
R2(config)#exit #/0/0
R2(config-if)#description connection to R3
R2(config-if)#ip add 172.31.23.1 255.255.255.252
R2(config-if)#clock rate 120000
R2(config-if)#no shut

%LINE-5-CHANGED: Interface Serial0/0/0, changed state to down
R2(config-if)#line s0/0/1
R2(config-if)#description connection to R1
R2(config-if)#ip add 172.31.21.2 255.255.255.252
R2(config-if)#no shut

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

Ctrl-P to exit CLI focus
  
```

Figura 6 Router R2 Bogotá

Le asigno una clave para ingresar al router (eduardo), y le asigno una clave para cuando vaya a ingresar al telnet (eduardo), le configure un banner para cuando no se digite correctamente la clave (acceso no autorizado).

### Configuro el puerto serial S0/0 para comunicarme con el router R3

Configuro el puerto S0/0 con la dirección 172.31.23.1 255.255.255.252 por ser 172.31.23.0/30, esto lo hago con el comando ip add.

### Configuro el puerto serial S0/1 para comunicarme con el router R1

Configuro el puerto S0/1 con la dirección 172.31.21.2 255.255.255.252 por ser 172.31.21.0/30, esto lo hago con el comando ip add.

--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: no  
Press RETURN to get started!

Router>en

Router#conf t

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

Router(config)#no ip domain-lookup

Router(config)#hostname R2

```

R2(config)#enable secret class
R2(config)#line con 0
R2(config-line)#pass eduardo
R2(config-line)#login
R2(config-line)#line vty 0 4
R2(config-line)#pass eduardo
R2(config-line)#login
R2(config-line)#exit
R2(config)#service password-encryption
R2(config)#banner motd $acceso no autorizado$
R2(config)#int s0/0/0
R2(config-if)#descript connection to R3
R2(config-if)#ip add 172.31.23.1 255.255.255.252
R2(config-if)#clock rate 128000
R2(config-if)#no shut
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R2(config-if)#int s0/0/1
R2(config-if)#descript connection to R1
R2(config-if)#ip add 172.31.21.2 255.255.255.252
R2(config-if)#no shut
R2(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
R2(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state
to up

```

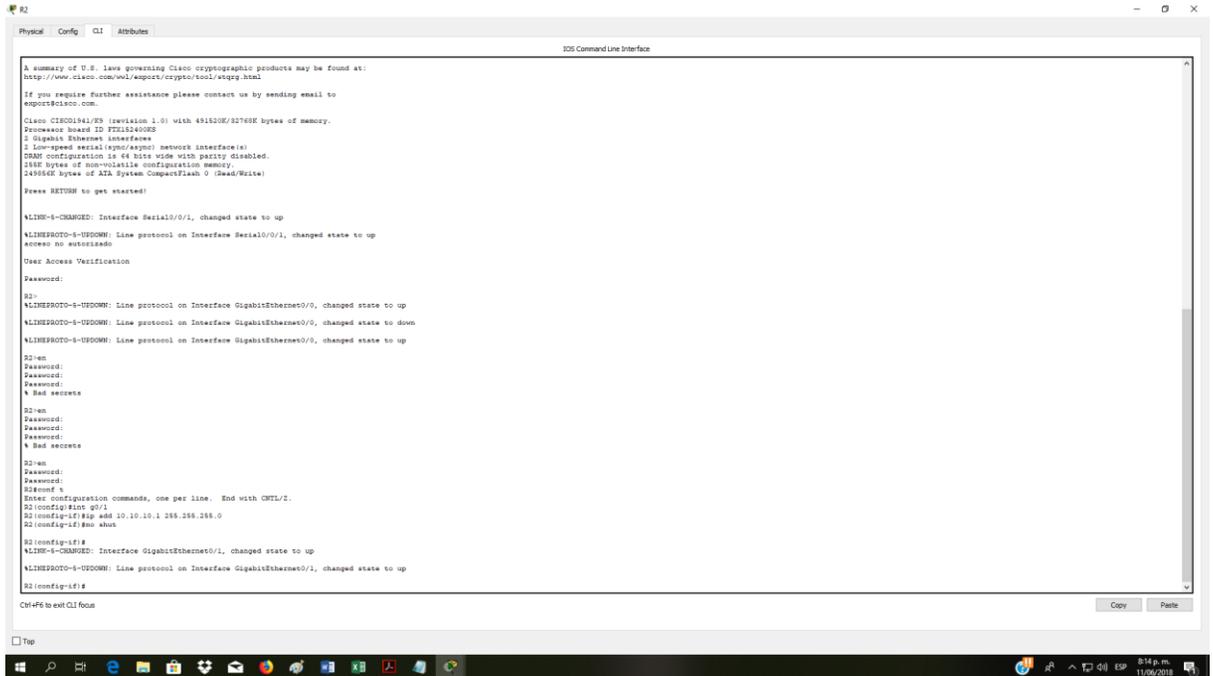
### Configurar con estación Internet y con el servidor Web

Configuro el puerto G0/0 para la estación internet y el puerto G0/1 para el servidor web, esto lo hago con el comando ip add.

```

R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#int g0/1
R2(config-if)#ip add 10.10.10.1 255.255.255.0
R2(config-if)#no shut
R2(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1,
changed state to up

```



```

R2
Physical Config CLI Attributes
IOS Command Line Interface

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/w2/airport/crypto/tool/atqrg.html
If you require further assistance please contact us by sending email to
support@cisco.com.

Cisco C1801-941/E9 (revision 1.0) with 491520K/32768K bytes of memory.
Processor board ID FT1514098B
0 Gigabit Ethernet interfaces
1 Low-speed serial (async/async) network interface(s)
32MB configuration memory with parity disabled.
256K bytes of non-volatile configuration memory.
249984K bytes of ATA System CompactFlash 0 (Read/Write)

Press RETURN to get started!

AL3HEP001-6-CHANGED: Interface Serial0/0/1, changed state to up
AL3HEP001-6-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up
access no autorizado
User Access Verification
Password:
R2
AL3HEP001-6-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
AL3HEP001-6-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to down
AL3HEP001-6-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

R2#en
Password:
Password:
* Bad secrets
R2#en
Password:
Password:
Password:
* Bad secrets
R2#en
Password:
Password:
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#int s0/1
R2(config-if)#ip add 10.10.10.1 255.255.255.0
R2(config-if)#no shut

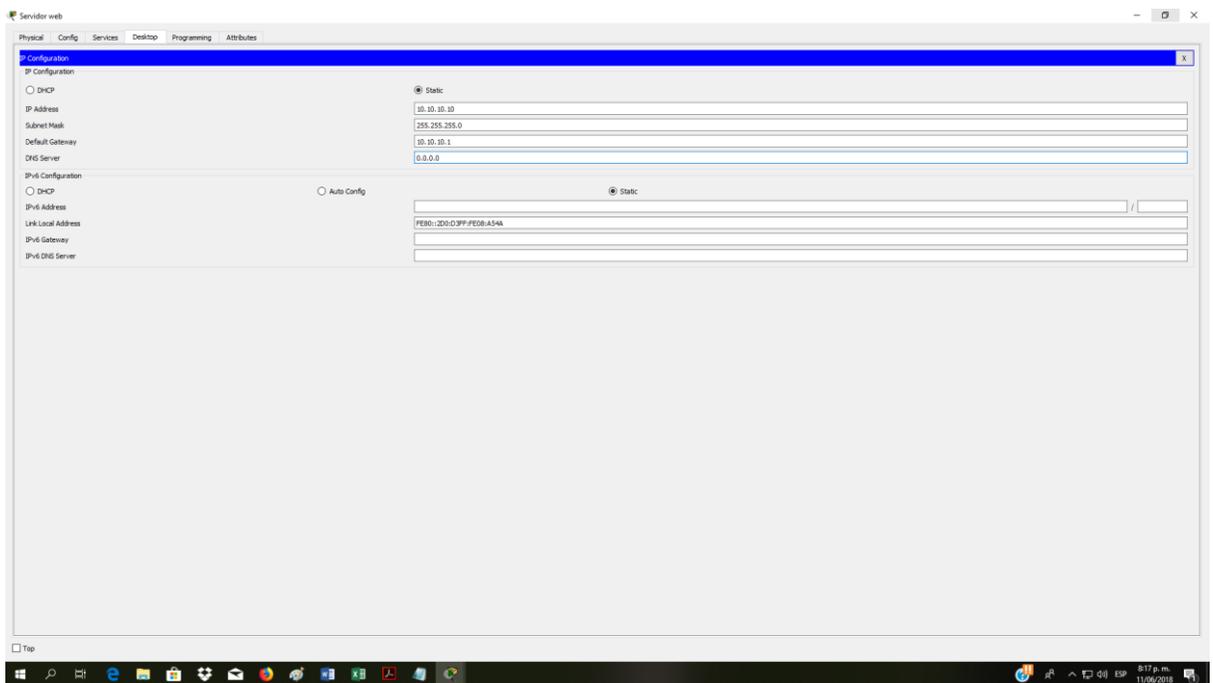
R2(config-if)#
AL3HEP001-6-CHANGED: Interface GigabitEthernet0/1, changed state to up
AL3HEP001-6-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up

R2#configure
Ctrl-C to exit CLI focus
Copy Paste

```

Figura 7 Configuración R2

## Servidor web



Servidor web

Physical Config Services Desktop Programming Attributes

Configuration

IP Configuration

DHCP  Static

IP Address: 10.10.10.10

Subnet Mask: 255.255.255.0

Default Gateway: 10.10.10.1

DNS Server: 0.0.0.0

IPv6 Configuration

DHCP  Auto Config  Static

IPv6 Address: /

Link Local Address: FE80::200:0:3FF:FE08:A5A4

IPv6 Gateway:

IPv6 DNS Server:

Figura 8 Configuración Servidor Web

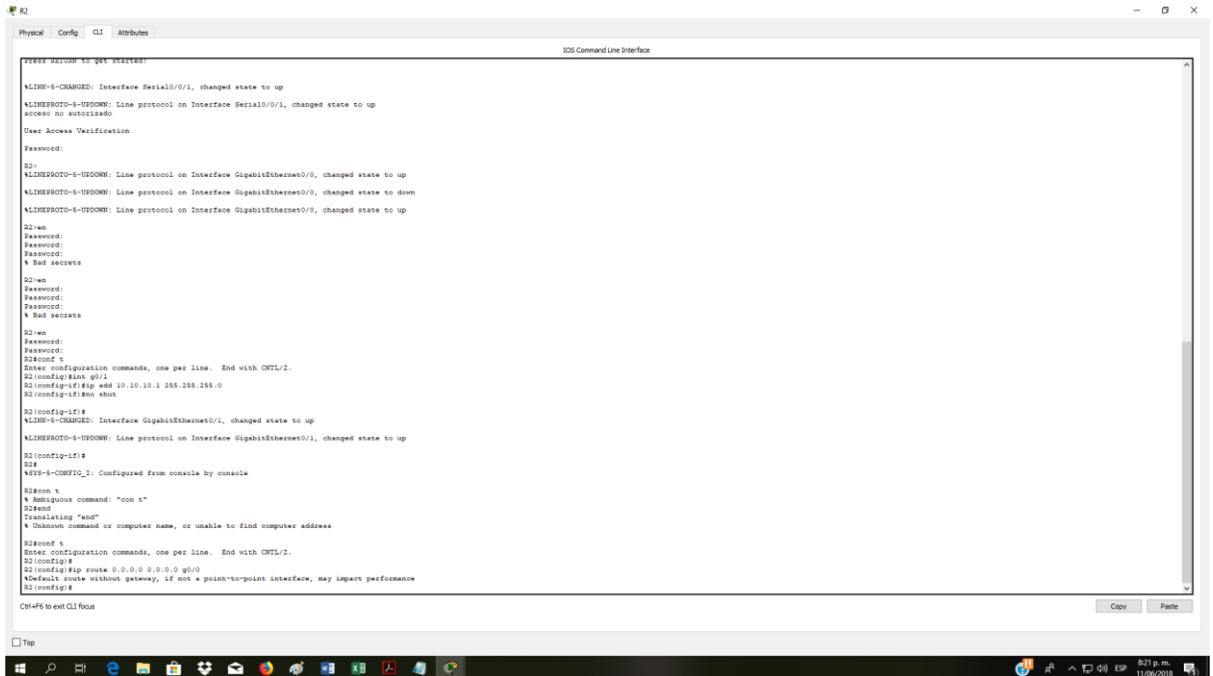
## Internet PC

Configuro por defecto una ruta de salida para g0/0 con el comando ip route

```
R2(config)#
```

```
R2(config)#ip route 0.0.0.0 0.0.0.0 g0/0
```

```
R2(config)#
```



```

R2
-----
Enter password to get started:
ALINE-6-CHANGED: Interface Serial0/0/1, changed state to up
ALINEPROTO-6-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up
acceso no autorizado
User Access Verification
Password:
R2>
ALINEPROTO-6-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
ALINEPROTO-6-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to down
ALINEPROTO-6-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
R2>en
Password:
Password:
Password:
* Bad secrets
R2>en
Password:
Password:
Password:
* Bad secrets
R2>en
Password:
Password:
Password:
* Bad secrets
R2>en
Password:
Password:
Password:
* Bad secrets
R2>en
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#no ip
R2(config)#ip route 0.0.0.0 0.0.0.0 g0/0
R2(config)#ip route add 10.10.1 255.255.255.0
R2(config)#no shun
R2(config)#if
ALINE-6-CHANGED: Interface GigabitEthernet0/1, changed state to up
ALINEPROTO-6-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
R2(config-if)#
R2#
VTYD-6-CONFIC_1: Configured from console by console
R2>
R2>end
* Ambiguous command: "con t"
R2#end
Translating "end"
* Unknown command or computer name, or unable to find computer address
R2>
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#
R2(config)#ip route 0.0.0.0 0.0.0.0 g0/0
*Default route without gateway, if not a point-to-point interface, may impact performance
R2(config)#
Ctrl+C to exit CLI focus
  
```

Figura 9 Configuración PC Internet

## Router R3

Para ello configuro el serial 0/0 con la dirección ip suministrada en el ejercicio utilizando para ello el comando ip add, luego configuro los 3 loopback (4,5 y 6) utilizo los comandos int lo4 (lo5 – lo6) y el comando ip add para agregar las direcciones ip.

```
Router#conf t
```

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

```
Router(config)#no ip domain-lookup
```

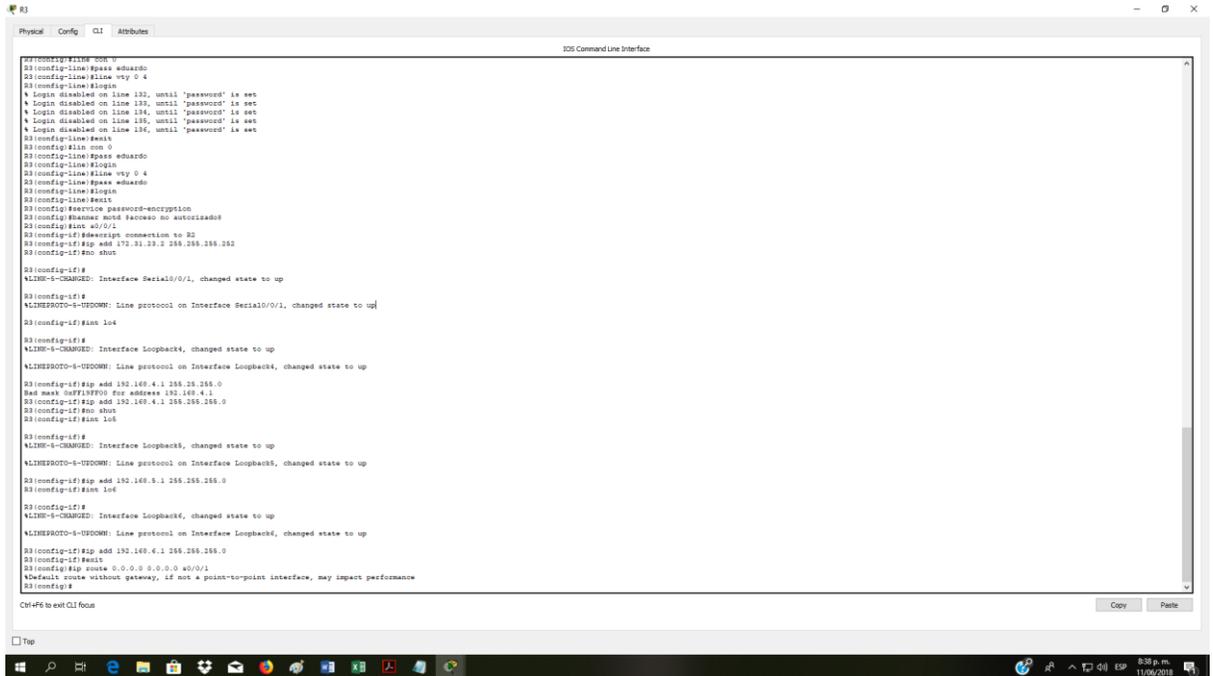
```
Router(config)#host R3
```

```
R3(config)#enable secret class
```

```
R3(config)#lin con 0
```

```
R3(config-line)#pass eduardo
```

```
R3(config-line)#login
R3(config-line)#line vty 0 4
R3(config-line)#pass eduardo
R3(config-line)#login
R3(config-line)#exit
R3(config)#service password-encryption
R3(config)#banner motd $acceso no autorizado$
R3(config)#int s0/0/1
R3(config-if)#descript connection to R2
R3(config-if)#ip add 172.31.23.2 255.255.255.252
R3(config-if)#no shut
R3(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
R3(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state
to up
R3(config-if)#int lo4
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback4, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback4, changed state
to up
R3(config-if)#ip add 192.168.4.1 255.25.255.0
Bad mask 0xFF19FF00 for address 192.168.4.1
R3(config-if)#ip add 192.168.4.1 255.255.255.0
R3(config-if)#no shut
R3(config-if)#int lo5
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback5, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback5, changed state
to up
R3(config-if)#ip add 192.168.5.1 255.255.255.0
R3(config-if)#int lo6
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback6, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback6, changed state
to up
R3(config-if)#ip add 192.168.6.1 255.255.255.0
R3(config-if)#exit
R3(config)#ip route 0.0.0.0 0.0.0.0 s0/0/1
%Default route without gateway, if not a point-to-point interface, may impact
performance
R3(config)#
```



```

R3(config)#line con 0
R3(config-line)#pass eduardo
R3(config-line)#line vty 0 4
R3(config-line)#login
^ Login disabled on line 132, until 'password' is set
^ Login disabled on line 134, until 'password' is set
^ Login disabled on line 136, until 'password' is set
^ Login disabled on line 138, until 'password' is set
R3(config-line)#exit
R3(config)#lin con 0
R3(config-line)#pass eduardo
R3(config-line)#line vty 0 4
R3(config-line)#pass eduardo
R3(config-line)#login
R3(config-line)#exit
R3(config)#service password-encryption
R3(config)#banner motd #cisco no autorizado
R3(config)#exit #0/0/
R3(config-if)#description connection to R2
R3(config-if)#ip add 192.168.4.1 255.255.255.0
R3(config-if)#no shut
R3(config-if)#

R3(config-if)#
%LINE-5-CHANGED: Interface Serial0/0/1, changed state to up
R3(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up
R3(config-if)#exit
R3(config-if)#int 104
R3(config-if)#

R3(config-if)#
%LINE-5-CHANGED: Interface Loopback4, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback4, changed state to up
R3(config-if)#ip add 192.169.4.1 255.255.255.0
R3(config-if)#description #00 address 192.169.4.1
R3(config-if)#ip add 192.169.4.1 255.255.255.0
R3(config-if)#no shut
R3(config-if)#int 108
R3(config-if)#

R3(config-if)#
%LINE-5-CHANGED: Interface Loopback5, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback5, changed state to up
R3(config-if)#ip add 192.169.5.1 255.255.255.0
R3(config-if)#exit
R3(config-if)#int 104
R3(config-if)#

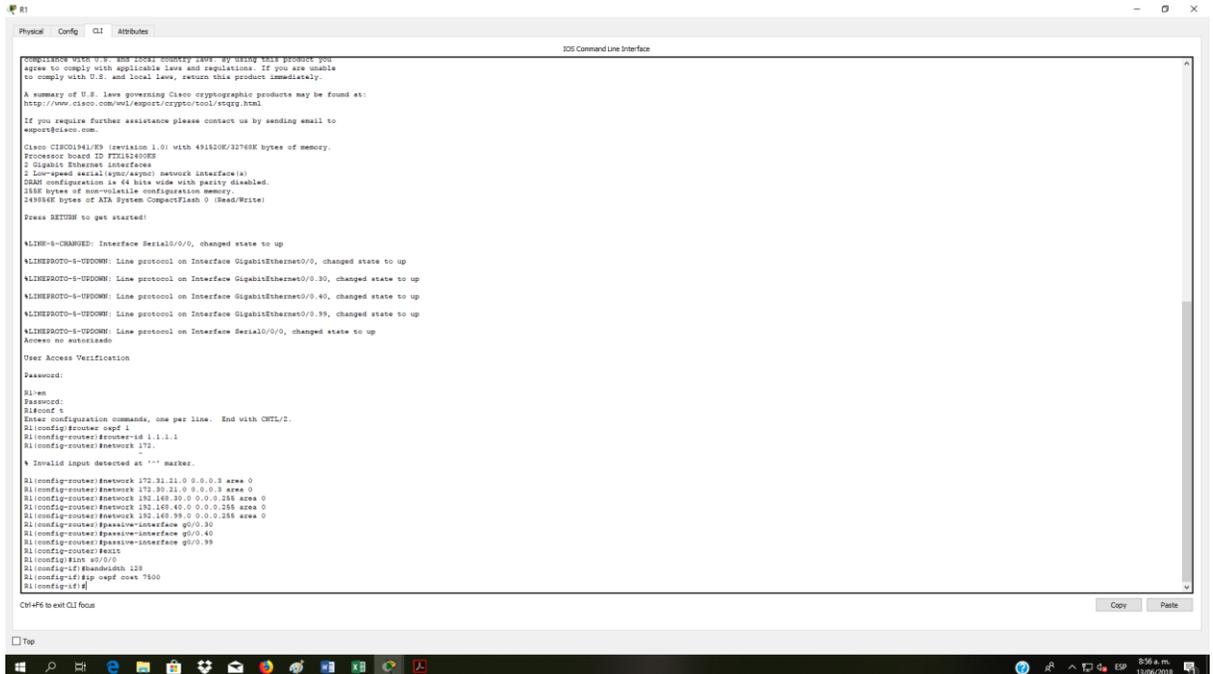
R3(config-if)#
%LINE-5-CHANGED: Interface Loopback6, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback6, changed state to up
R3(config-if)#ip add 192.169.6.1 255.255.255.0
R3(config-if)#exit
R3(config-if)#route 0.0.0.0 0.0.0.0 #0/0/1
^default route without gateway, if not a point-to-point interface, may impact performance
R3(config-if)#

Ctrl+P to exit CLI focus
  
```

Figura 10 Configuración R3

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

OSPFv2 área 0 Configuration Item or Task	Specification
Router ID R1	1.1.1.1
Router ID R2	2.2.2.2
Router ID R3	3.3.3.3
Configurar todas las interfaces LAN como pasivas	
Establecer el ancho de banda para enlaces seriales en	128 Kb/s
Ajustar el costo en la métrica de S0/0 a	7500



```

R1
Physical Config CLI Attributes
IOS Command Line Interface

Configuration file(s) were successfully saved. By saving this product you
agree to comply with applicable laws and regulations. If you are unable
to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco copyright products may be found at:
http://www.cisco.com/wwl/regaffairs/compilations.shtml

If you require further assistance please contact us by sending email to
support@cisco.com.

Cisco CISC01941R9 (revision 1.0) with 49120K/32768K bytes of memory.
Processor board ID F211240000
1 Gigabit Ethernet interfaces
2 Down-speed serial (vty/tty) network interfaces
DRAM configuration is 44 bits wide with parity disabled.
256K bytes of non-volatile configuration memory.
149184K bytes of ATA System CompactFlash 0 (read/write)

Press RETURN to get started!

%LINE-5-CHANGED: Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/30, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/40, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/99, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
Access no autorizado
User Access Verification

Username:
Password:
R1>en
Password:
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router ospf 1
R1(config-router)#router-id 1.1.1.1
R1(config-router)#network 172.

% Invalid input detected at '^' marker.
R1(config-router)#network 172.31.21.0 0.0.0.3 area 0
R1(config-router)#network 172.32.32.0 0.0.0.3 area 0
R1(config-router)#network 192.168.30.0 0.0.0.255 area 0
R1(config-router)#network 192.168.40.0 0.0.0.255 area 0
R1(config-router)#network 192.168.99.0 0.0.0.255 area 0
R1(config-router)#passive-interface g0/0/30
R1(config-router)#passive-interface g0/0/40
R1(config-router)#passive-interface g0/0/99
R1(config-router)#exit
R1(config)#line s0/0/0
R1(config-if)#bandwidth 128
R1(config-if)#ip ospf cost 7500
R1(config-if)#
R1#show ip ifconfig
  
```

Figura 11 Configuración OSPFv2 En R1

## OSPFv2 R1

Le asigno el id 1.1.1.1 esto lo hago con el comando router-id 1.1.1.1

Y creo cada una de las network, empezando por la dirección ip de conexión entre los routers R1 y R2 en el área 0. Para ello utilizo el comando network 172.31.21.0 0.0.0.3 area 0.

Luego para cada una de las Vlan ejecuto el mismo comando pero cambiando la dirección de la Vlan. De la siguiente manera:

Network 192.168.30.0 0.0.0.255 area 0

Network 192.168.40.0 0.0.0.255 area 0

Network 192.168.99.0 0.0.0.255 area 0

Para cambiar el ancho de banda para el serial 0/0 utilizo el comando bandwidth 128. Se asume por defecto que estos 128 son Kb/sg.

Para colocar las interfaces LAN como pasivas lo hago ejecutando el comando

passive-interface g0/1.30 y así para las otras Vlan.

passive-interface g0/1.40

passive-interface g0/1.99

Para asignar el costo de la métrica a 7500 ejecuto el comando:  
Ip ospf cost 7500

```
R1(config)#router ospf 1
R1(config-router)#router-id 1.1.1.1
R1(config-router)#network 172.31.21.0 0.0.0.3 area 0
R1(config-router)#network 172.30.21.0 0.0.0.3 area 0
R1(config-router)#network 192.168.30.0 0.0.0.255 area 0
R1(config-router)#network 192.168.40.0 0.0.0.255 area 0
R1(config-router)#network 192.168.99.0 0.0.0.255 area 0
R1(config-router)#passive-interface g0/0.30
R1(config-router)#passive-interface g0/0.40
R1(config-router)#passive-interface g0/0.99
R1(config-router)#exit
R1(config)#int s0/0/0
R1(config-if)#bandwidth 128
R1(config-if)#ip ospf cost 7500
R1(config-if)#
```

### Configuración de OSPF en R2

Para ello entro en el R2

Luego le asigno el id 2.2.2.2 esto lo hago con el comando router-id 2.2.2.2

Y creo cada una de las network, empezando por la dirección ip de conexión entre los routers R1 y R2 en el área 0. Para ello utilizo el comando network 172.31.21.0 0.0.0.3 area 0.

Creo cada una de las network, empezando por la dirección ip de conexión entre los routers R2 y R3 en el área 0. Para ello utilizo el comando network 172.31.23.0 0.0.0.3 area 0.

Luego para cada una de las Vlan ejecuto el mismo comando pero cambiando la dirección de la Vlan. De la siguiente manera:

```
Network 192.168.30.0 0.0.0.255 area 0
```

```
Network 192.168.40.0 0.0.0.255 area 0
```

```
Network 192.168.99.0 0.0.0.255 area 0
```

Para cambiar el ancho de banda para el serial 0/0 utilizo el comando bandwidth 128. Se asume por defecto que estos 128 son Kb/sg.

Para colocar las interfaces LAN como pasivas lo hago ejecutando el comando passive-interface g0/1.



### Configuración de OSPF en R3

192	168	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
192	168	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
192	168	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
192	168	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0

192.168.4.0
192.168.5.0
192.168.6.0
<b>192.168.4.0/22</b>

En las tablas anteriores se observa la sumarización de las tres redes.

### Visualizar tablas de enrutamiento y routers conectados por OSPFv2

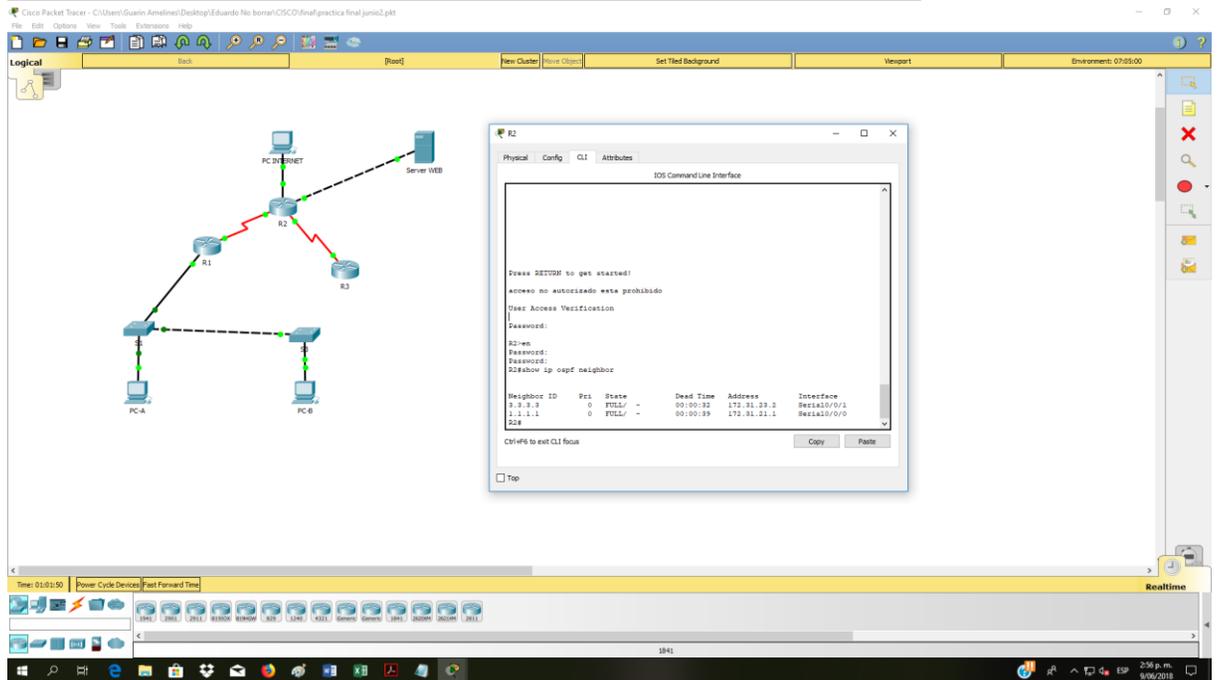


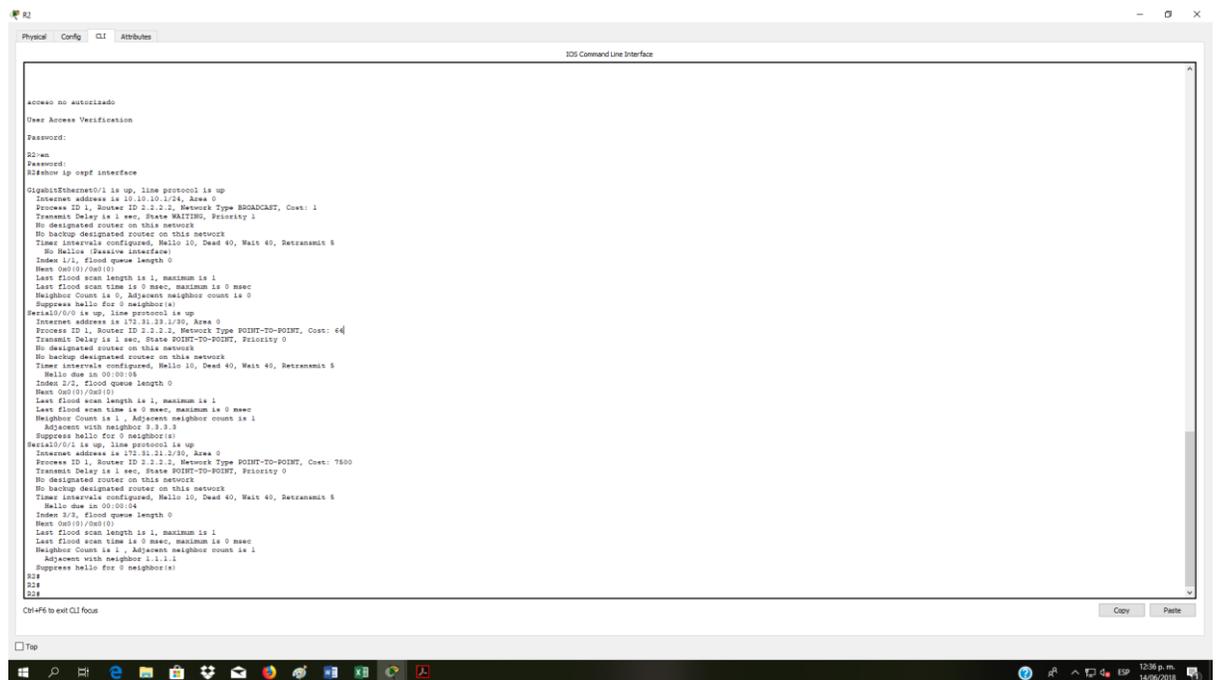
Figura 13 Visualizar tablas de enrutamiento

Con el comando show ip ospf neighbor puedo ver los router conectados en ospfv2

```
R2#show ip ospf neighbo
Neighbor ID Pri State Dead Time Address Interface
3.3.3.3 0 FULL/ - 00:00:32 172.31.23.2 Serial0/0/0
1.1.1.1 0 FULL/ - 00:00:36 172.31.21.1 Serial0/0/1
```

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

Para ello utilizamos el comando show ip ospf interface



```
R2
Physical Config CLI Attributes
IOS Command Line Interface

access no autorizado
User Access Verification
Password:
R2>en
R2#show ip ospf interface
GigabitEthernet0/1 is up, line protocol is up
Internet address is 10.10.10.1/24, Area 0
Process ID 1, Router ID 2.2.2.2, 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 1/1, flood queue length 0
Next 00:10:00:00
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 172.31.23.1/20, Area 0
Process ID 1, Router ID 2.2.2.2, Network Type POINT-TO-POINT, Cost: 64
Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:08
Index 2/2, flood queue length 0
Next 00:10:00:00
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 172.31.21.1/20, Area 0
Process ID 1, Router ID 2.2.2.2, Network Type POINT-TO-POINT, Cost: 7680
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 00:00:04
Index 3/3, flood queue length 0
Next 00:10:00:00
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)
R2#
R2#
Ctrl+C to exit CLI focus
```

Figura 14 Visualizar lista resumida interfaces por OSPF

## User Access Verification

Password:

R2>en

Password:

R2#show ip ospf interface

GigabitEthernet0/1 is up, line protocol is up

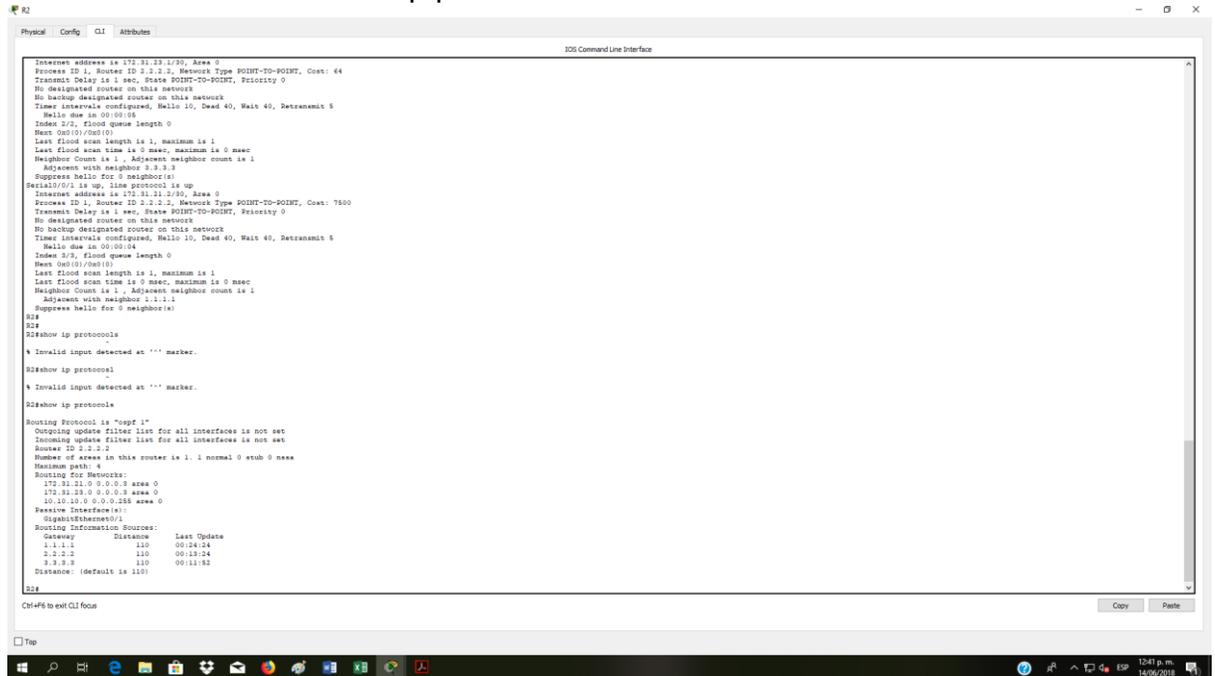
Internet address is 10.10.10.1/24, Area 0

Process ID 1, Router ID 2.2.2.2, 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 1/1, flood queue length 0  
 Next 0x0(0)/0x0(0)  
 Last flood scan length is 1, maximum is 1  
 Last flood scan time is 0 msec, maximum is 0 msec  
 Neighbor Count is 0, Adjacent neighbor count is 0  
 Suppress hello for 0 neighbor(s)  
 Serial0/0/0 is up, line protocol is up  
   Internet address is 172.31.23.1/30, Area 0  
   Process ID 1, Router ID 2.2.2.2, Network Type POINT-TO-POINT, Cost: 64  
   Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0  
   No designated router on this network  
   No backup designated router on this network  
   Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5  
     Hello due in 00:00:05  
   Index 2/2, flood queue length 0  
   Next 0x0(0)/0x0(0)  
   Last flood scan length is 1, maximum is 1  
   Last flood scan time is 0 msec, maximum is 0 msec  
   Neighbor Count is 1 , Adjacent neighbor count is 1  
     Adjacent with neighbor 3.3.3.3  
   Suppress hello for 0 neighbor(s)  
 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: 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 00:00:04  
   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 1.1.1.1

Suppress hello for 0 neighbor(s)  
R2#

Visualizar el OSPF Process ID, Router ID, Address summarizations, Routing Networks, and passive interfaces configuradas en cada router.  
Se utiliza el comando show ip protocols



```

R2#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 172.31.21.2
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.31.21.0 0.0.0.3 area 0
    172.31.23.0 0.0.0.3 area 0
    10.10.10.0 0.0.0.255 area 0
  Passive Interface(s):
    GigabitEthernet0/1
  Routing Information Sources:
    Gateway        Distance    Last Update
  1.1.1.1          110        00:24:24
  2.2.2.2          110        00:12:24
  3.3.3.3          110        00:11:52
  Distance: (default is 110)
  
```

Figura 15 Visualizar OSPF Process ID, Router ID, Address Summatizations, Routing Networks

R2#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 2.2.2.2**

Number of areas in this router is 1. 1 normal 0 stub 0 nssa

Maximum path: 4

**Routing for Networks:**

172.31.21.0 0.0.0.3 area 0

172.31.23.0 0.0.0.3 area 0

10.10.10.0 0.0.0.255 area 0

**Passive Interface(s):**

GigabitEthernet0/1

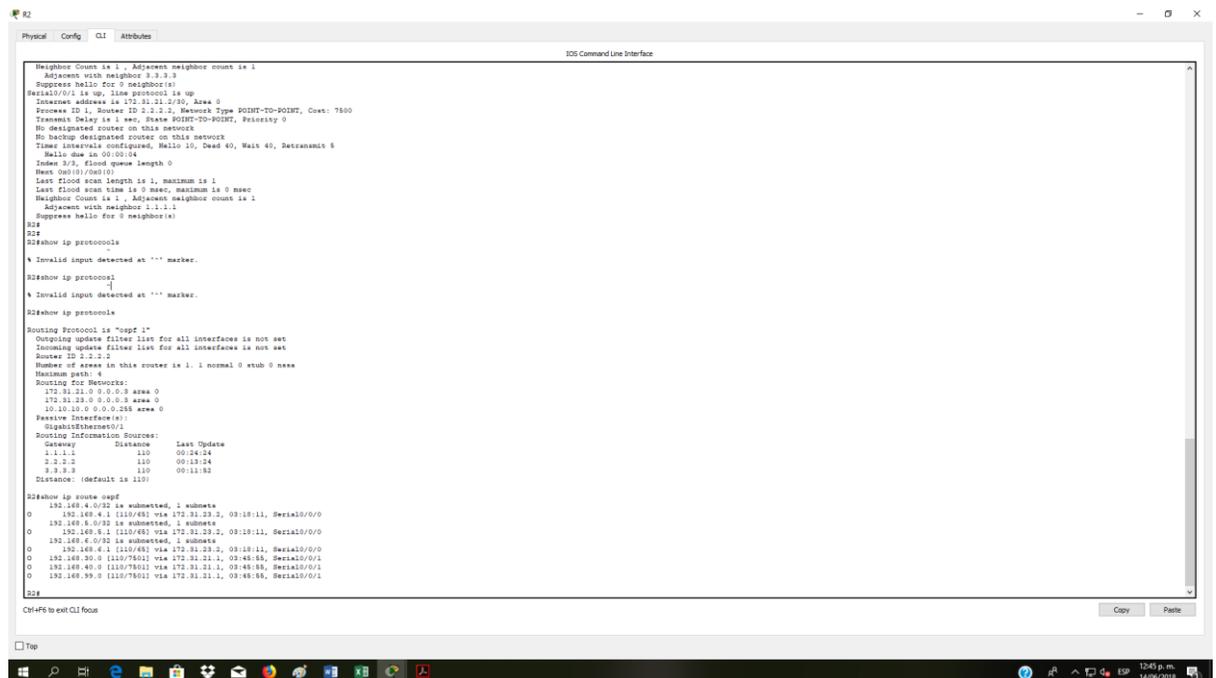
Routing Information Sources:

Gateway Distance Last Update

```
1.1.1.1 110 00:24:24
2.2.2.2 110 00:13:24
3.3.3.3 110 00:11:52
Distance: (default is 110)
```

## Visualizar las Routing Networks

Con el comando show ip route ospf podemos ver las rutas de las networks



```

Neighbor Count is 1, Adjacent neighbor count is 1
Adjacencies with neighbor 2.2.2.2
Suppress hello for 0 neighbor(s)
Serial0/0/0 is up, line protocol is up
Internet address is 172.31.21.2/30, Area 0
Process ID is 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 00:00:04
Index 3/3, Flood queue length 0
Next Out(0)/In(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
Adjacencies with neighbor 2.1.1.1
Suppress hello for 0 neighbor(s)
R2#
R2#show ip protocols
% Invalid input detected at '^' marker.
R2#show ip protocols
% Invalid input detected at '^' marker.
R2#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 2.2.2.2
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
Maximum path: 4
Routing for Networks:
 172.31.21.0 0.0.0.3 area 0
 172.31.23.0 0.0.0.3 area 0
 10.10.10.0 0.0.0.255 area 0
Passive Interface(s):
 GigabitEthernet0/1
Routing Information Sources:
 Gateway         Last Update
 1.1.1.1          110    00:14:24
 2.2.2.2          110    00:13:24
 3.3.3.3          110    00:11:52
Distance: (default is 110)

R2#show ip route ospf
 192.168.4.0/32 is subnetted, 1 subnets
 O   192.168.4.1 [110/65] via 172.31.23.2, 03:18:11, Serial0/0/0
 O   192.168.5.0/32 is subnetted, 1 subnets
 O   192.168.5.1 [110/65] via 172.31.23.2, 03:18:11, Serial0/0/0
 192.168.6.0/32 is subnetted, 1 subnets
 O   192.168.6.1 [110/65] via 172.31.23.2, 03:18:11, Serial0/0/0
 O   192.168.30.0 [110/7501] via 172.31.21.1, 03:45:55, Serial0/0/1
 O   192.168.40.0 [110/7501] via 172.31.21.1, 03:45:55, Serial0/0/1
 O   192.168.99.0 [110/7501] via 172.31.21.1, 03:45:55, Serial0/0/1
R2#

```

Figura 16 Visualizar las Routing Networks

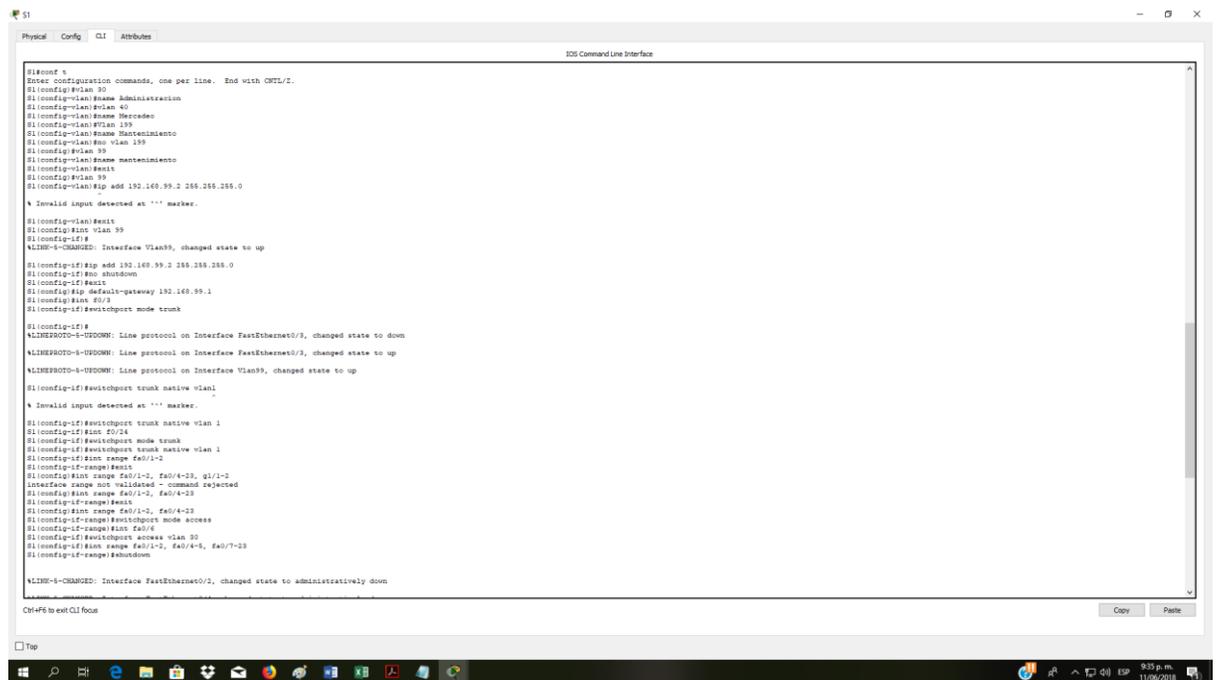
```
R2#show ip route ospf
192.168.4.0/32 is subnetted, 1 subnets
192.168.4.1 [110/65] via 172.31.23.2, 03:18:11, Serial0/0/0
192.168.5.0/32 is subnetted, 1 subnets
192.168.5.1 [110/65] via 172.31.23.2, 03:18:11, Serial0/0/0
192.168.6.0/32 is subnetted, 1 subnets
192.168.6.1 [110/65] via 172.31.23.2, 03:18:11, Serial0/0/0
192.168.30.0 [110/7501] via 172.31.21.1, 03:45:55, Serial0/0/1
192.168.40.0 [110/7501] via 172.31.21.1, 03:45:55, Serial0/0/1
192.168.99.0 [110/7501] via 172.31.21.1, 03:45:55, Serial0/0/1
```

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

#### Agrego las Vlans S1

Con el comando conf t, luego ingreso vlan y el numero de ella, vlan 30 luego le asigno el nombre con name administración. Y así lo hago para cada una de ellas.

Luego desactivo todos los puertos que no se usan para ello utilizo el comando int range y escribo los rangos de los puertos sin usar separados por coma.



```

S1
Physical Config CLI Attributes
IOS Command Line Interface

S1>conf t
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#vlan 30
S1(config-vlan)#name Administracion
S1(config-vlan)#vlan 40
S1(config-vlan)#name Mercadeo
S1(config-vlan)#vlan 139
S1(config-vlan)#name Mantenimiento
S1(config-vlan)#vlan 99
S1(config-vlan)#name mantenimiento
S1(config-vlan)#exit
S1(config)#vlan 99
S1(config-vlan)#ip add 192.168.99.2 255.255.255.0
S1(config-vlan)#exit

% Invalid input detected at '^' marker.

S1(config-vlan)#exit
S1(config)#int vlan 99
S1(config-if)#
%LINE-5-CHANGED: Interface Vlan99, changed state to up

S1(config-if)#ip add 192.168.99.2 255.255.255.0
S1(config-if)#no shutdown
S1(config-if)#exit
S1(config)#ip default-gateway 192.168.99.1
S1(config)#int fa0/3
S1(config-if)#switchport mode trunk

S1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan99, changed state to up

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

% Invalid input detected at '^' marker.

S1(config-if)#switchport trunk native vlan 1
S1(config-if)#int fa0/24
S1(config-if)#switchport mode trunk
S1(config-if)#switchport trunk native vlan 1
S1(config-if)#int range fa0/1-2
S1(config-if)#range#exit
S1(config)#int range fa0/1-2, fa0/4-23, g1/1-2
Interface range not validated - command rejected
S1(config)#int range fa0/1-2, fa0/4-23
S1(config-if-range)#exit
S1(config)#int range fa0/1-2, fa0/4-23
S1(config-if-range)#switchport mode access
S1(config-if-range)#int fa0/4
S1(config-if)#switchport access vlan 30
S1(config-if)#int range fa0/1-2, fa0/4-8, fa0/7-23
S1(config-if-range)#shutdown

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

Ctrl-C to exit CLI focus
Copy Paste

```

Figura 17 Agregar las Vlans a S1

S1>en

Password:

S1#conf t

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

S1(config)#vlan 30

S1(config-vlan)#name Administracion

S1(config-vlan)#vlan 40

S1(config-vlan)#name Mercadeo

S1(config)#vlan 99

```
S1(config-vlan)#name mantenimiento
S1(config-vlan)#exit
S1(config)#vlan 99
S1(config-if)#ip add 192.168.99.2 255.255.255.0
S1(config-if)#no shutdown
S1(config-if)#exit
S1(config)#ip default-gateway 192.168.99.1
S1(config)#int f0/3
S1(config-if)#switchport mode trunk
S1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed
state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed
state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan99, changed state to
up
S1(config-if)#switchport trunk native vlan 1
S1(config-if)#int f0/24
S1(config-if)#switchport mode trunk
S1(config-if)#switchport trunk native vlan 1
S1(config-if)#int range fa0/1-2
S1(config-if-range)#exit
S1(config)#int range fa0/1-2, fa0/4-23
S1(config-if-range)#exit

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

S1(config-if-range)#switchport mode access

S1(config-if-range)#int fa0/6

S1(config-if)#switchport access vlan 30

S1(config-if)#int range fa0/1-2, fa0/4-5, fa0/7-23

S1(config-if-range)#shutdown

%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to administratively
down
%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to administratively
down
%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to administratively
down
%LINK-5-CHANGED: Interface FastEthernet0/7, 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

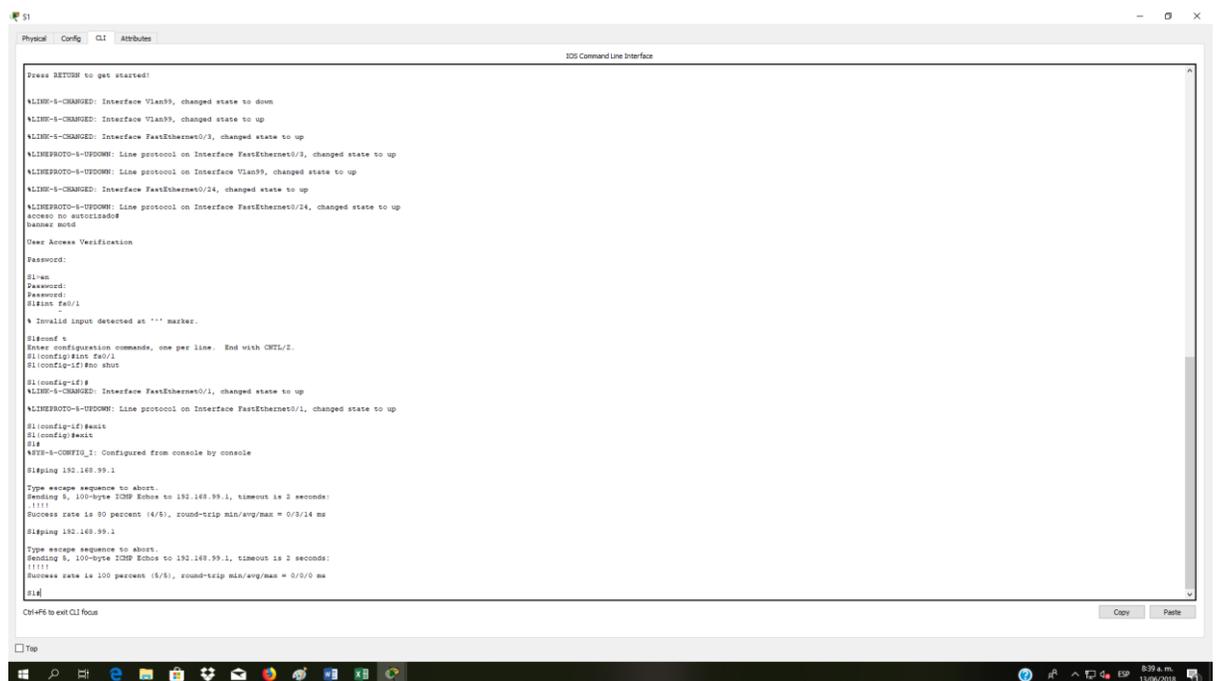
S1(config-if-range)#

%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to administratively down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down

S1(config-if-range)#

Hago prueba de conexión con R1 desde la dirección de la vlan 99



```

S1
-----
Press RETURN to get started!

%LINK-5-CHANGED: Interface Vlan99, changed state to down
%LINK-5-CHANGED: Interface Vlan99, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
%LINK-5-CHANGED: Interface Vlan99, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/24, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/24, changed state to up
Access to unauthorized
banner motd
User Access Verification
Password:
S1#en
Password:
S1#int fa0/1
% Invalid input detected at '^' marker.

S1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#int fa0/1
S1(config-if)#no shut

S1(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
S1(config-if)#exit
S1#
VLAN5-COMFIG_1: Configured from console by console
S1#ping 192.168.99.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.99.1, timeout is 2 seconds:
!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 0/3/14 ms
S1#ping 192.168.99.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.99.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
S1#
Ctrl-F5 to exit CLI focus
  
```

Figura 18 Prueba de conexión R1 a Vlan 99

## Vlans S3

Con el comando conf t, luego ingreso vlan y el numero de ella, vlan 30 luego le asigno el nombre con name administración. Y así lo hago para cada una de ellas.

Luego desactivo todos los puertos que no se usan para ello utilizo el comando int range y escribo los rangos de los puertos sin usar separados por coma.

S3>en

Password:

Password:

S3#conf t

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

S3(config)#vlan 30

S3(config-vlan)#name Administracion

S3(config-vlan)#vlan 40

S3(config-vlan)#name Mercadeo

S3(config-vlan)#vlan 99

S3(config-vlan)#name Mantenimiento

S3(config-vlan)#exit

S3(config)#int vlan 99

S3(config-if)#

%LINK-5-CHANGED: Interface Vlan99, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan99, changed state to up

S3(config-if)#ip add 192.168.99.3 255.255.255.0

S3(config-if)#no shut

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

S3(config)#int fa0/3

S3(config-if)#switchport mode trunk

S3(config-if)#int range f0/1-2, fa0/4-24

S3(config-if-range)#switchport mode access

S3(config-if-range)#int f0/1

S3(config-if)#switchport mode access

S3(config-if)#switchport access vlan 40

S3(config-if)#int range f0/2, fa0/4-24

S3(config-if-range)#shutdown

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

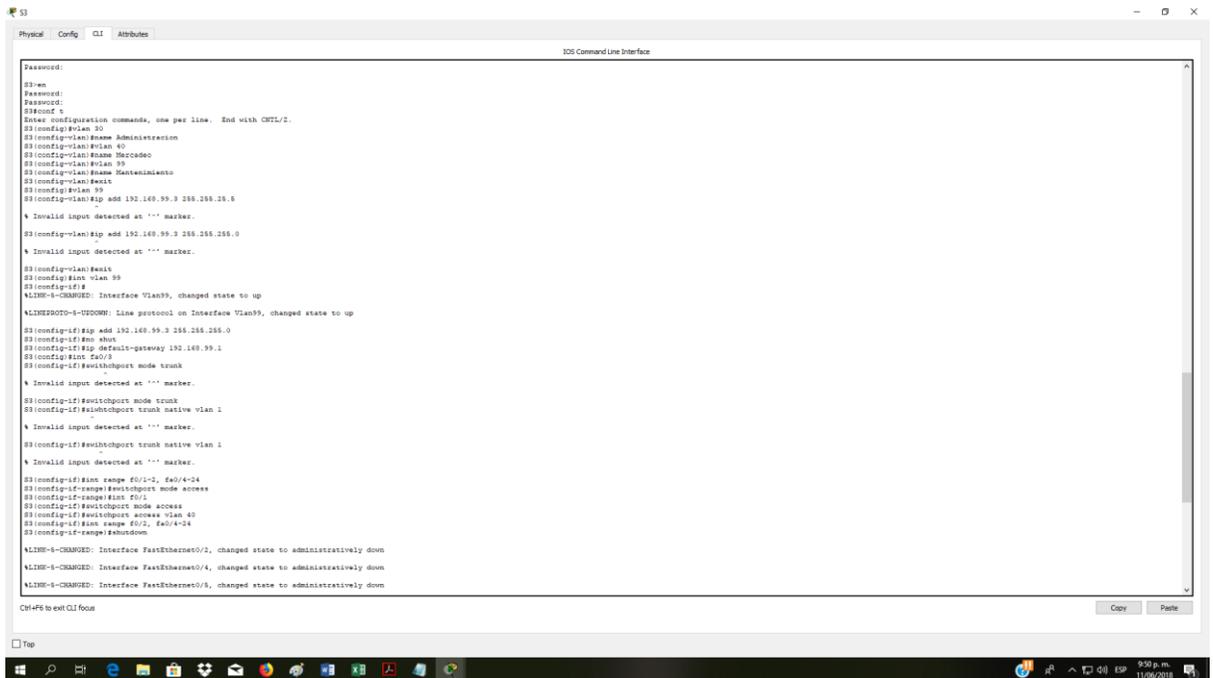
%LINK-5-CHANGED: Interface FastEthernet0/20, changed state to administratively down

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

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

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

%LINK-5-CHANGED: Interface FastEthernet0/24, changed state to administratively down  
S3(config-if-range)#

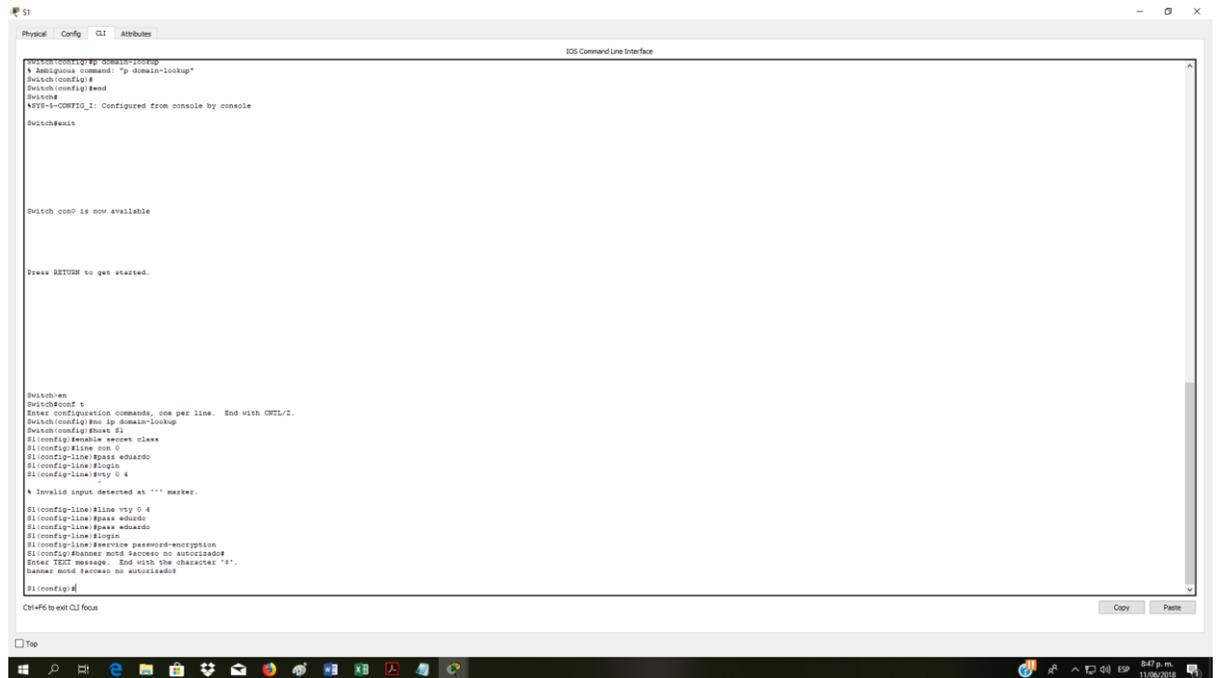


```

S3#
S3#en
S3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#vlan 30
S3(config-vlan)#name Administracion
S3(config-vlan)#vlan 40
S3(config-vlan)#name Mecabedo
S3(config-vlan)#vlan 99
S3(config-vlan)#name Mantenimiento
S3(config-vlan)#exit
S3(config)#vlan 99
S3(config-vlan)#ip add 192.168.99.3 255.255.255.0
% Invalid input detected at '^' marker.
S3(config-vlan)#ip add 192.168.99.3 255.255.255.0
% Invalid input detected at '^' marker.
S3(config-vlan)#exit
S3(config-vlan)#vlan 99
S3(config-vlan)#
%LINK-5-CHANGED: Interface Vlan99, changed state to up
%LINK-5-CHANGED: Line protocol on Interface Vlan99, changed state to up
S3(config-if)#ip add 192.168.99.3 255.255.255.0
S3(config-if)#no shut
S3(config-if)#ip default-gateway 192.168.99.1
S3(config-if)#fa0/1
S3(config-if)#switchport mode trunk
% Invalid input detected at '^' marker.
S3(config-if)#switchport mode trunk
S3(config-if)#switchport trunk native vlan 1
% Invalid input detected at '^' marker.
S3(config-if)#switchport trunk native vlan 1
% Invalid input detected at '^' marker.
S3(config-if)#range fa0/1-2, fa0/4-24
S3(config-if-range)#switchport mode access
S3(config-if-range)#switchport access vlan 40
S3(config-if)#range fa0/2, fa0/4-24
S3(config-if-range)#shutdown
%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/4, changed state to administratively down
%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to administratively down
Ctrl-C to exit CLI focus
  
```

Figura 19 Configuración Vlan S3

## Configurar S1



```

Switch(config)#hostname S1
Switch(config)#no ip domain-lookup
Switch(config)#end
Switch#
VTY-0-CONFIG-I: Configured from console by console

Switch#

Switch con0 is now available

Press RETURN to get started.

Switch#
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#host S1
Switch(config)#enable secret class
Switch(config)#line con 0
Switch(config-line)#pass eduardo
Switch(config-line)#login
Switch(config-line)#line vty 0 4
Switch(config-line)#pass class

Invalid input detected at '^' marker.
Switch(config-line)#line vty 0 4
Switch(config-line)#pass eduardo
Switch(config-line)#line vty 0 4
Switch(config-line)#pass eduardo
Switch(config-line)#login
Switch(config-line)#line vty 0 4
Switch(config-line)#pass class
Switch(config-line)#line vty 0 4
Switch(config-line)#pass class
Switch(config-line)#end
Switch#

```

Figura 20 Configurar S1

Deshabilito el dns lookup con el comando no ip domain-lookup, luego creo la clave de acceso al switch y para el telnet (Eduardo y class) las habilito y encripto, por ultimo creo un baner con un mensaje de alerta.

```

Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#no ip domain-lookup
Switch(config)#host S1
S1(config)#enable secret class
S1(config)#line con 0
S1(config-line)#pass eduardo
S1(config-line)#login
S1(config-line)#line vty 0 4
S1(config-line)#pass class

```

```
S1(config-line)#login
S1(config-line)#service password-encryption
S1(config)#banner motd $acceso no autorizado$
```

```
S1(config)#
S1#
%SYS-5-CONFIG_I: Configured from console by console
```

#### 4. En el Switch 3 deshabilitar DNS lookup

Utilizo el comando no ip domain-lookup y enter. Para verificar si el comando quedo correctamente copiado utilizo el comando

```
show run | include domain-lookup
```

Al dar enter me debe dar el siguiente mensaje

No ip-domain lookup

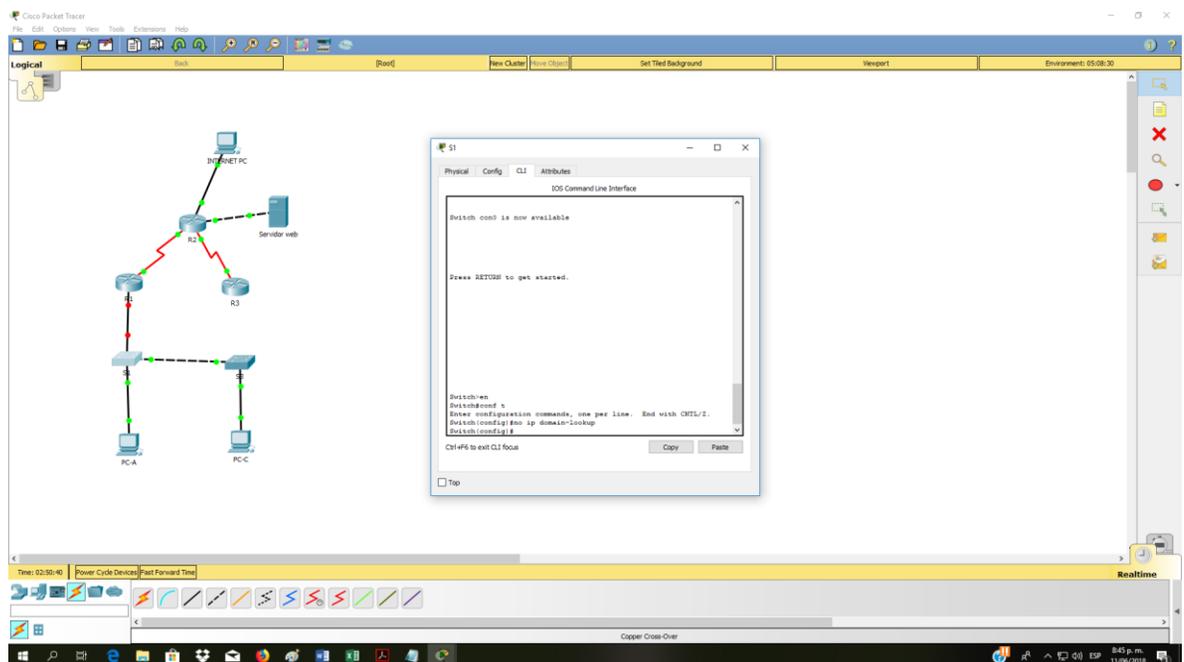
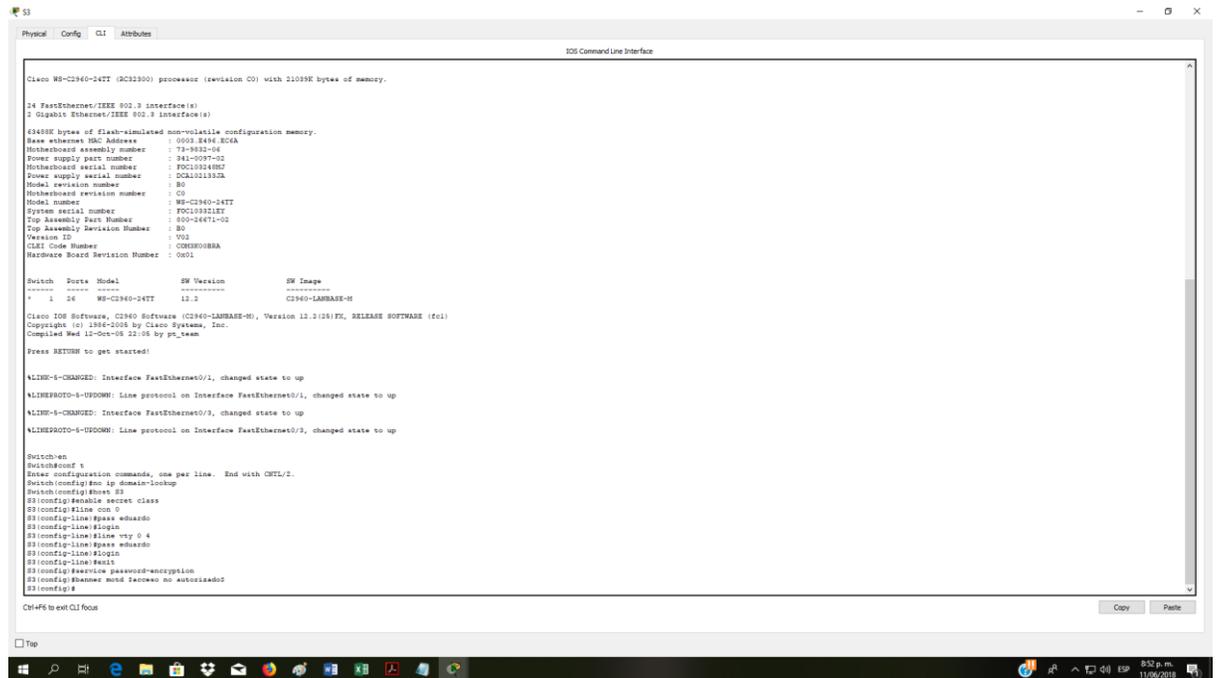


Figura 21 Deshabilitar DNS Lookup en S3

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

### Configurar S3

Deshabilito el dns lookup con el comando no ip domain-lookup, luego creo la clave de acceso al switch y para el telnet (Eduardo) las habilito y encripto, por ultimo creo un baner con un mensaje de alerta.



```

Cisco WS-C3940-04TT (3C3200) processor (revision C0) with 21039K bytes of memory.

24 FastEthernet/IEEE 802.3 interface(s)
2 Gigabit Ethernet/IEEE 802.3 interface(s)

61440K bytes of flash-simulated non-volatile configuration memory.
Base ethernet MAC Address      : 0003.8496.8C6A
Hostboard assembly number     : 78-8833-02
Power supply part number      : 341-0007-02
Hostboard serial number       : FOC1034867
Power supply serial number    : DCA1021332A
Host revision number          : 02
Hostboard revision number     : C0
Model number                  : WS-C3940-04TT
System serial number          : FOC103211T
Top Assembly Part Number      : 800-24471-02
Top Assembly Revision Number  : 80
Version ID                    : V02
CMT Code Number              : COM000088A
Hardware Board Revision Number : 0x01

Switch  Ports  Model          SW Version  SW Image
-----  ---  ---
* 1 24  WS-C3940-04TT  12.2        C3940-LANBASE-M

Cisco IOS Software, C3940 Software (C3940-LANBASE-M), Version 12.2(15)PT, RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2008 by Cisco Systems, Inc.
Compiled Wed 12-Oct-08 22:08 by pt_team

Press RETURN to get started!

ALHHEP0-0-UPDOWN: Interface FastEthernet0/1, changed state to up
ALHHEP0-0-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
ALHHEP0-0-UPDOWN: Interface FastEthernet0/3, changed state to up
ALHHEP0-0-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up

Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#no ip domain-lookup
Switch(config)#host S3
S3(config)#enable secret class
S3(config)#line con 0
S3(config-line)#pass eduardo
S3(config-line)#login
S3(config-line)#line vty 0 4
S3(config-line)#pass class
S3(config-line)#login
S3(config-line)#exit
S3(config)#service password-encryption
S3(config)#banner motd $acceso no autorizado$
S3(config)#
  
```

Figura 22 Asignar direccion IP a S3

Switch>en

Switch#conf t

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

Switch(config)#no ip domain-lookup

Switch(config)#host S3

S3(config)#enable secret class

S3(config)#line con 0

S3(config-line)#pass eduardo

S3(config-line)#login

S3(config-line)#line vty 0 4

S3(config-line)#pass class

S3(config-line)#login

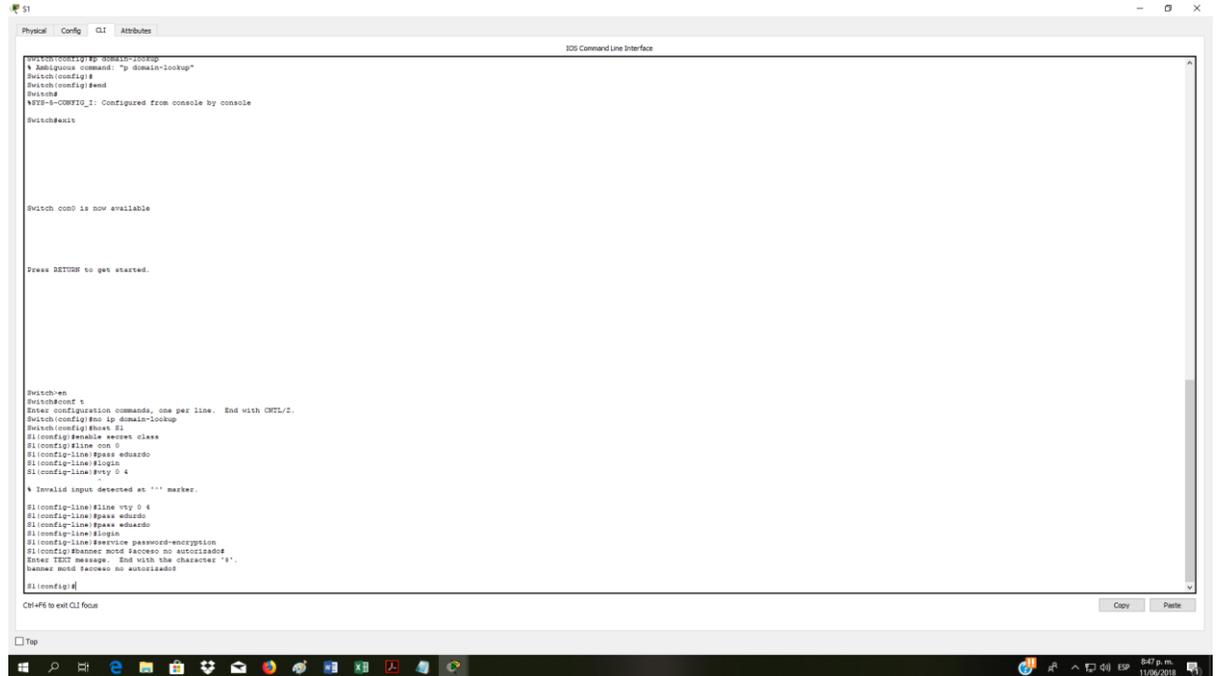
S3(config-line)#exit

S3(config)#service password-encryption

S3(config)#banner motd \$acceso no autorizado\$

S3(config)#

## Configurar S1



```

S3(config)#no ip domain-lookup
S3(config)#end
Switch#
KRYPT-S-CFG10_1: Configured from console by console
Switch#

Switch con0 is now available.

Press RETURN to get started.

Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#no ip domain-lookup
Switch(config)#host S1
S1(config)#enable secret class
S1(config)#line con 0
S1(config-line)#pass eduardo
S1(config-line)#login
S1(config-line)#vtty 0 4
S1(config-line)#pass class
S1(config-line)#login
S1(config-line)#service password-encryption
S1(config-line)#banner motd $acceso no autorizado$
S1(config-line)#end
Switch#
  
```

Figura 23 Asignar direccion IP a S1

Deshabilito el dns lookup con el comando no ip domain-lookup, luego creo la clave de acceso al switch y para el telnet (Eduardo y class) las habilito y encripto, por ultimo creo un baner con un mensaje de alerta.

Switch>en

Switch#conf t

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

Switch(config)#no ip domain-lookup

Switch(config)#host S1

S1(config)#enable secret class

S1(config)#line con 0

S1(config-line)#pass eduardo

S1(config-line)#login

S1(config-line)#line vty 0 4

S1(config-line)#pass class

S1(config-line)#login

S1(config-line)#service password-encryption

S1(config-line)#banner motd \$acceso no autorizado\$

```
S1(config)#
S1#
%SYS-5-CONFIG_I: Configured from console by console
```

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

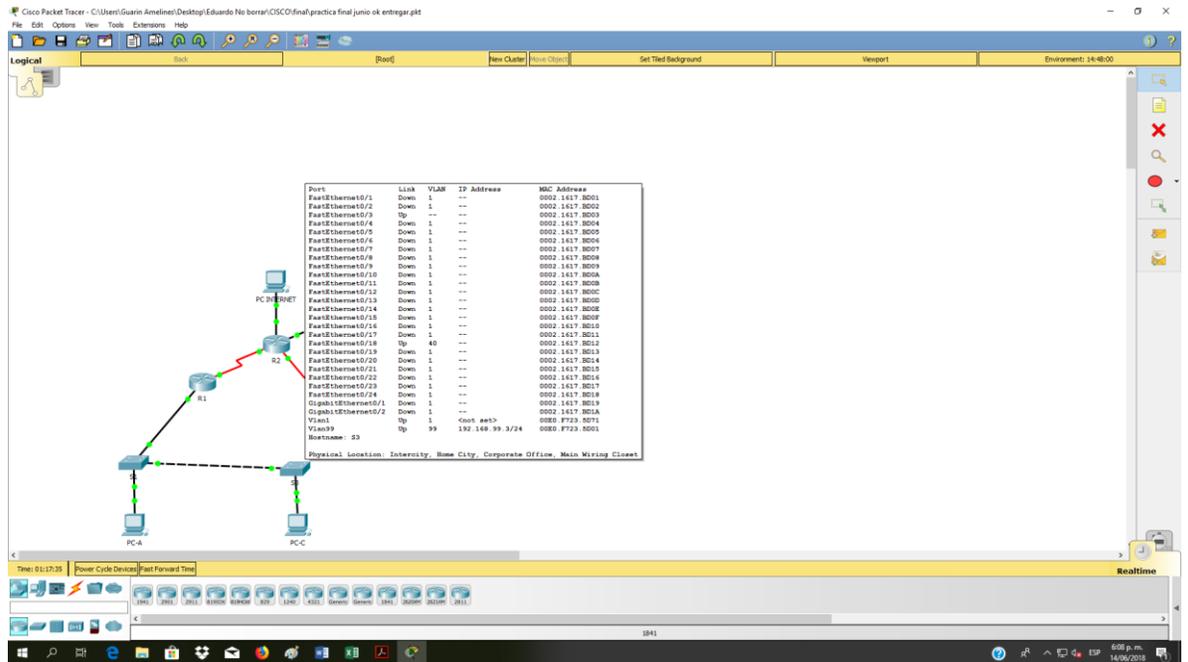


Figura 24 Desactivar interfaces no utilizadas

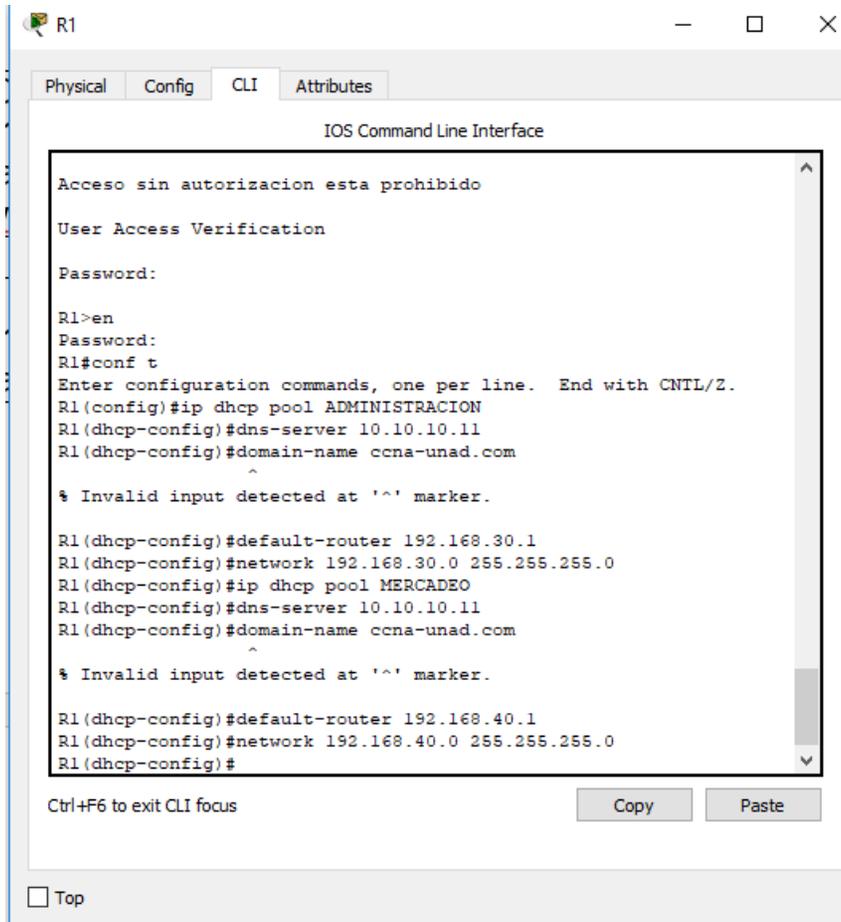
Desactivo todos los puertos que no se usan para ello utilizo el comando `int range` y escribo los rangos de los puertos sin usar separados por coma.

```
int range fa0/1-2, fa0/4-5, fa0/7-23
shutdown
```

## 7. Implement DHCP and NAT for IPv4

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

Configurar DHCP pool para VLAN 40	Name: MERCADEO DNS-Server: 10.10.10.11 Domain-Name: ccna-unad.com
--------------------------------------	---



```

R1
Physical Config CLI Attributes
IOS Command Line Interface
Acceso sin autorizacion esta prohibido
User Access Verification
Password:
R1>en
Password:
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp pool ADMINISTRACION
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#domain-name ccna-unad.com
^
% Invalid input detected at '^' marker.
R1(dhcp-config)#default-router 192.168.30.1
R1(dhcp-config)#network 192.168.30.0 255.255.255.0
R1(dhcp-config)#ip dhcp pool MERCADEO
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#domain-name ccna-unad.com
^
% Invalid input detected at '^' marker.
R1(dhcp-config)#default-router 192.168.40.1
R1(dhcp-config)#network 192.168.40.0 255.255.255.0
R1(dhcp-config)#
Ctrl+F6 to exit CLI focus
Copy Paste
Top

```

Figura 25 Implementar DHCP and NAT for IPv4

```

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

```

```
R1(dhcp-config)#default-router 192.168.40.1
```

```
R1(dhcp-config)#network 192.168.40.0 255.255.255.0
```

```
R1(dhcp-config)#
```

Para ello utilizo el comando ip dhcp pool XXXXXX para darle el nombre a este dhcp de la siguiente manera

```
Ip dhcp pool ADMINISTRACION
```

```
Ip dhcp pool MERCADEO
```

**Para asignar la direccion al servidor dns utilizo el comando dns-server XX.XX.XX.XX para cada uno de los pools de la siguiente manera**

```
Dns-server 10.10.10.11 para ADMINISTRACION
```

```
Dns-server 10.10.10.11 para MERCADEO
```

**Para asignar el nombre del dominio utilizo el comando domain-name XXXXX-XXX.com en cada uno de los pools a crear de la siguiente manera**

```
Domain-name ccna-unad.com
```

**Observación: Este comando no es valido en packet tracer 7.1.1**

**Para darle el router por defecto que debe de seguir utilizo el comando default-router con la dirección de la Vlan correspondiente. De la siguiente manera:**

```
Default-router 192.168.30.1 Para ADMINISTRACION
```

```
Default-router 192.168.40.1 Para MERCADEO
```

**Por ultimo defino en que network estaran para cada uno con el comando network direccion ip submascara de red. De la siguiente manera:**

```
Network 192.168.30.1 255.255.255.0
```

```
Network 192.168.40.1 255.255.255.0
```

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

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

Para ello utilizo el comando ip dhcp pool XXXXXX para darle el nombre a este dhcp de la siguiente manera

```
Ip dhcp pool ADMINISTRACION
Ip dhcp pool MERCADEO
```

**Para asignar la direccion al servidor dns utilizo el comando dns-server XX.XX.XX.XX para cada uno de los pools de la siguiente manera**

```
Dns-server 10.10.10.11 para ADMINISTRACION
Dns-server 10.10.10.11 para MERCADEO
```

**Para asignar el nombre del dominio utilizo el comando domain-name XXXXX-XXX.com en cada uno de los pools a crear de la siguiente manera**

```
Domain-name ccna-unad.com
```

**Observación: Este comando no es valido en packet tracer 7.1.1**

**Para darle el router por defecto que debe de seguir utilizo el comando default-router con la dirección de la Vlan correspondiente. De la siguiente manera:**

```
Default-router 192.168.30.1 Para ADMINISTRACION
Default-router 192.168.40.1 Para MERCADEO
```

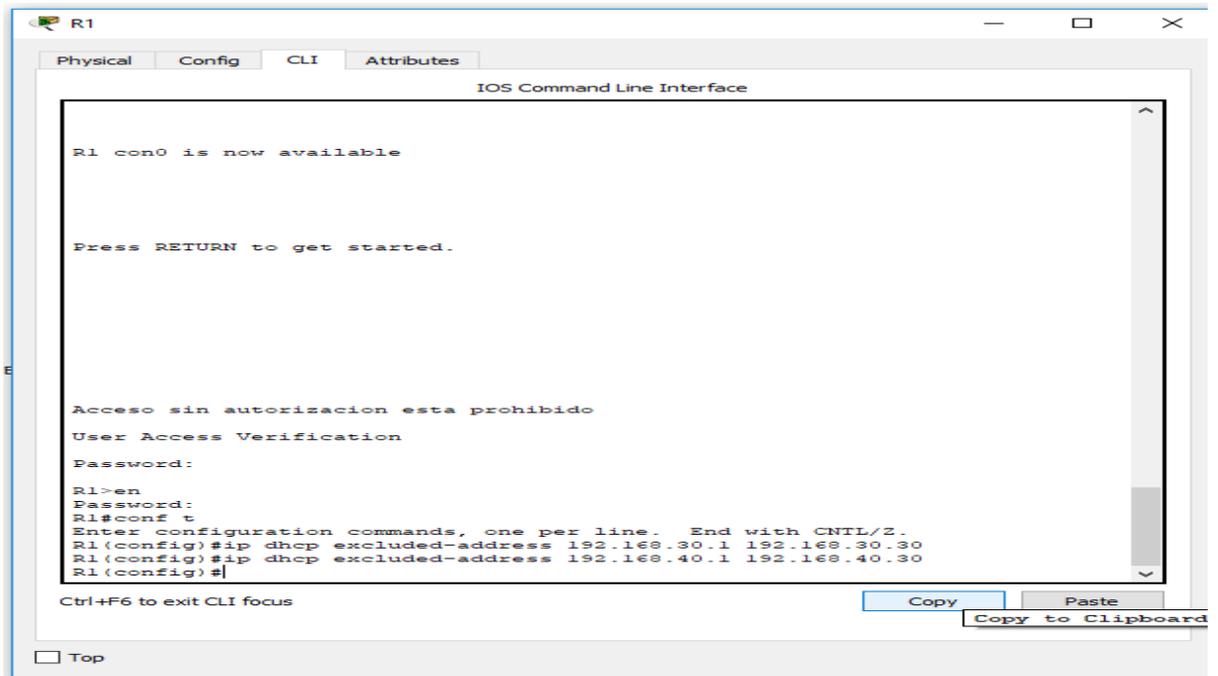
Por ultimo defino en que network estaran para cada uno con el comando network direccion ip submascara de red. De la siguiente manera:

```
Network 192.168.30.1 255.255.255.0
Network 192.168.40.1 255.255.255.0
```

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

Para ello utilizo el comando ip dhcp excluded-address entre la dirección inicial y la dirección final

```
Ip dhcp excluded-addres 192.168.30.1 192.168.30.30
Ip dhcp excluded-addres 192.168.40.1 192.168.40.30
```



```
R1
Physical Config CLI Attributes
IOS Command Line Interface

R1 con0 is now available

Press RETURN to get started.

Acceso sin autorizacion esta prohibido
User Access Verification
Password:
R1>en
Password:
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.30
R1(config)#|

Ctrl+F6 to exit CLI focus
Copy Paste
Copy to Clipboard
Top
```

Figura 26 Reservan 30 direcciones Ip de las Vlan 30 y 40

```
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)#
```

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

```
Int g0/0
Ip nat outside
Int g0/1
Ip nat inside
```

Asigno un nombre al pool de salida y un rango de direcciones con la submascara que tengo de salida a internet, esto lo hago con el comando:

Ip nat pool XXXXXX (dirección IP...hasta... dirección IP) netmask (submascara de red)

```
Ip nat pool INTERNET 209.165.200.225 209.165.200.228 netmask
255.255.255.248
```

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

```
R2>en
Password:
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#User usuario privilege 15 secret gte123
R2(config)#ip nat inside source static 10.10.10.10 209.165.200.229
R2(config-if)#User usuario1 privilege 15 secret gte123
R2(config)#ip nat inside source static 10.10.10.10 209.165.200.228
```

Luego asigno a cada puerto el nat de entrada y el nat de salida con el siguiente comando

Creo la primera lista con la dirección de la vlan 30 y la submascara respectiva, para ello utilizo el comando Access-list 1 permit (dirección ip) (submascara), de la siguiente manera:

```
Access list 1 permit 192.168.30.0 0.0.0.255 para ADMINISTRACION
```

Access list 1 permit 192.168.40.0 0.0.0.255 Para MERCADEO

Access list 1 permit 192.168.4.0 0.0.3.255 Para lo4. Lo5, lo6

Asigno un nombre al pool de salida y un rango de direcciones con la submascara que tengo de salida a internet, esto lo hago con el comando:

Ip nat pool XXXXXX (dirección IP...hasta... dirección IP) netmask (submascara de red)

Ip nat pool INTERNET 209.165.200.225 209.165.200.228 netmask 255.255.255.248

Luego para finalizar hago el nat dinámico con el comando

Ip nat inside source list 2 pool NAVEGAR

Ip nat inside source list 2 pool NAVEGAR1

R2(config)#access-list 1 permit 192.168.40.0 0.0.0.255

R2(config)#access-list 1 permit 192.168.30.0 0.0.0.255

R2(config)#access-list 1 permit 192.168.4.0 0.0.3.255

R2(config)#access-list 2 permit 192.168.40.0 0.0.0.255

R2(config)#access-list 2 permit 192.168.30.0 0.0.0.255

R2(config)#access-list 2 permit 192.168.4.0 0.0.3.255

R2(config)#ip nat pool NAVEGAR 209.165.200.225 209.165.200.227 netmask 255.255.255.248

R2(config)#ip nat inside source list 1 pool NAVEGAR

R2(config)#ip nat pool NAVEGAR1 209.165.200.225 209.165.200.227 netmask 255.255.255.248

R2(config)#ip nat inside source list 2 pool NAVEGAR1

R2(config)#



Para ello utilizare las Access list 102 y 103 y les permitiré acceso a internet desde el servidor web, accedando la dirección estática nat 209.165.200.229 y 209.165.200.228, que configure con anterioridad.

Utilizo el comando Access list permit de la siguiente manera:

```
Access-list 102 permit tcp any host 209.165.200.225 eq www
```

```
Acces list 102 permit icmp any any echo-reply
```

```
R2#conf t
```

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

```
R2(config)#access-list 102 permit tcp any host 209.165.200.229 eq www
```

```
R2(config)#access-list 103 permit tcp any host 209.165.200.228 eq www
```

```
R2(config)#access-list 102 permit icmp any any echo-reply
```

```
R2(config)#access-list 103 permit icmp any any echo-reply
```

```
R2(config)#
```

Luego en cada una de las conexiones activo el acceso con el comando Access-group.

```
Int g0/0
```

```
Ip Access-group 102 in (entrante)
```

```
Int s0/0/0
```

```
Ip Access-group 102 out (saliente)
```

```
R2(config)#int g0/0
```

```
R2(config-if)#ip access-group 101 in
```

```
R2(config-if)#int s0/0/0
```

```
R2(config-if)#ip access-group 101 out
```

```
R2(config-if)#int s0/0/1
```

```
R2(config-if)#ip access-group 101 out
```

```
R2(config-if)#int g0/1
```

```
R2(config-if)#ip access-group 101 out
```

```
R2(config-if)#int g0/0
```

```
R2(config-if)#ip access-group 102 in
```

```
R2(config-if)#int s0/0/0
```

```
R2(config-if)#ip access-group 102 out
```

```
R2(config-if)#int s0/0/1
```

```
R2(config-if)#ip access-group 102 out
```

```
R2(config-if)#int g0/1
```

```
R2(config-if)#ip access-group 102 out
```

```
R2(config-if)#int g0/0
```

```
R2(config-if)#ip access-group 103 in
```

```
R2(config-if)#int s0/0/0
```

```
R2(config-if)#ip access-group 103 out
```

```
R2(config-if)#int s0/0/1
```

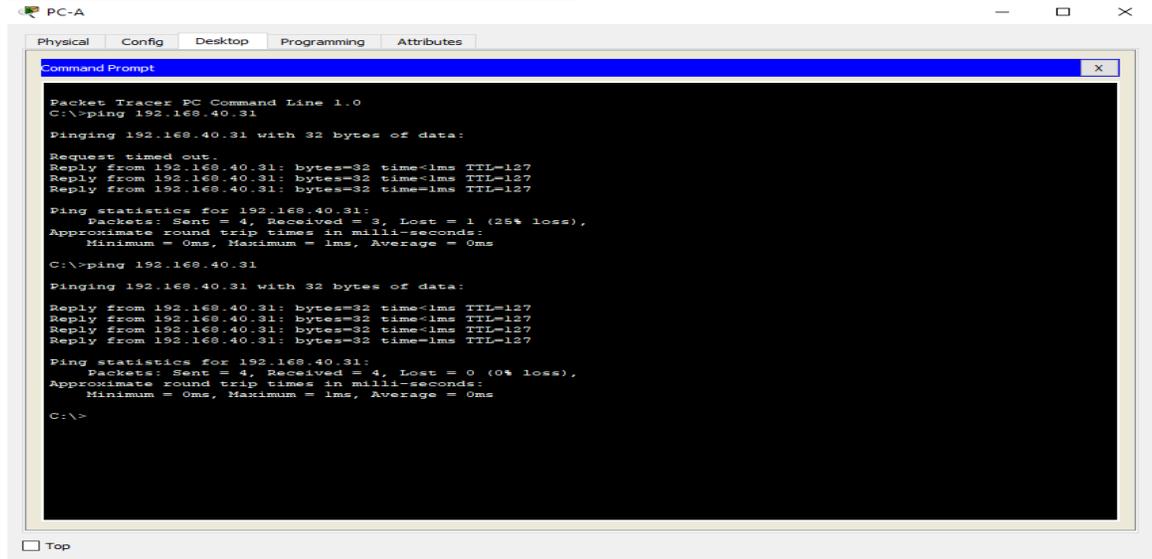
```
R2(config-if)#ip access-group 103 out
```

```
R2(config-if)#int g0/1
```

```
R2(config-if)#ip access-group 103 out
```

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

#### Del computador pc-A a Computador pc-C



```

Packet Tracer PC Command Line 1.0
C:\>ping 192.168.40.31

Pinging 192.168.40.31 with 32 bytes of data:
Request timed out.
Reply from 192.168.40.31: bytes=32 time=1ms TTL=127
Reply from 192.168.40.31: bytes=32 time=1ms TTL=127
Reply from 192.168.40.31: bytes=32 time=1ms TTL=127

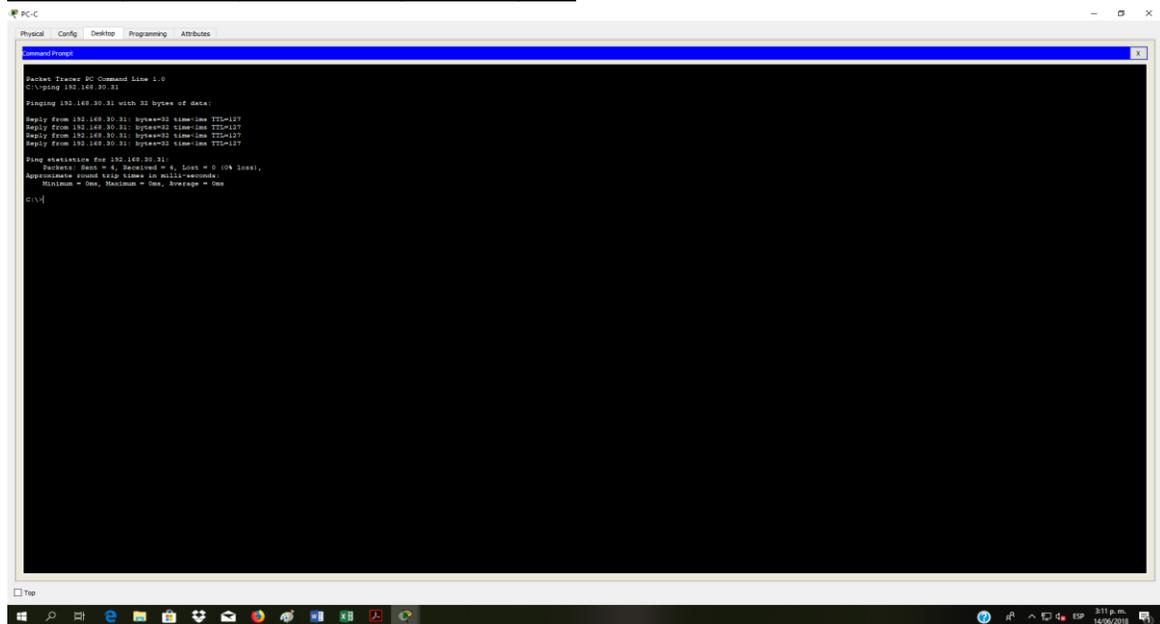
Ping statistics for 192.168.40.31:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>ping 192.168.40.31

Pinging 192.168.40.31 with 32 bytes of data:
Reply from 192.168.40.31: bytes=32 time=1ms TTL=127
Reply from 192.168.40.31: bytes=32 time=1ms TTL=127
Reply from 192.168.40.31: bytes=32 time=1ms TTL=127
Reply from 192.168.40.31: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.40.31:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>
  
```

Figura 29 verificación tráfico de PC-A a PC-C

#### Del computador pc-C a Computador pc-A



```

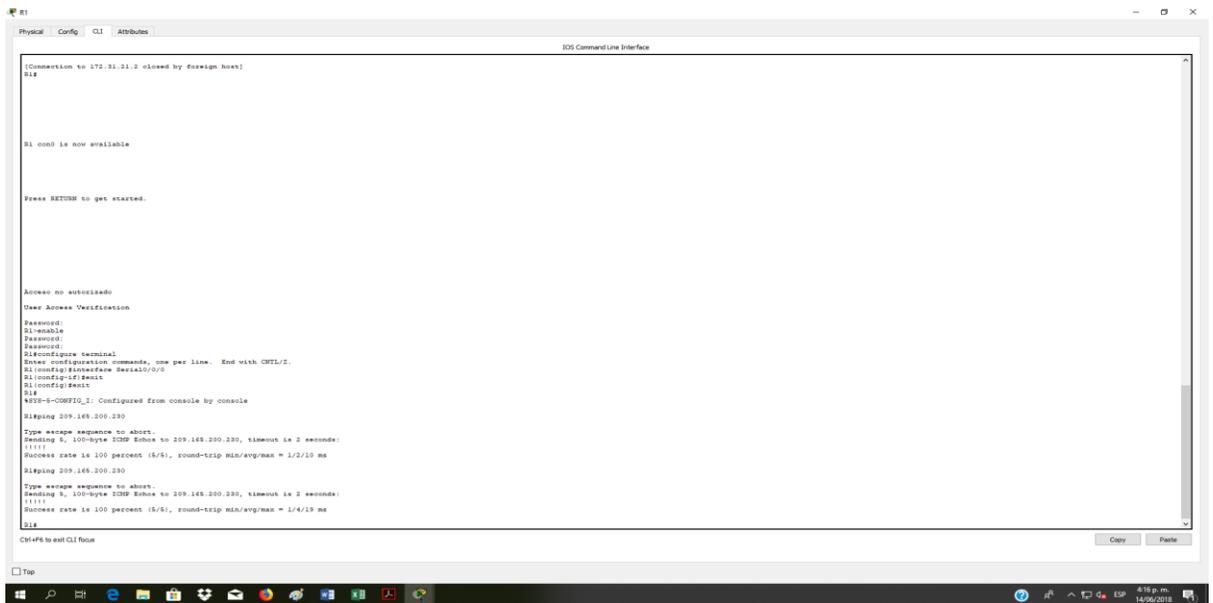
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.30.31

Pinging 192.168.30.31 with 32 bytes of data:
Reply from 192.168.30.31: bytes=32 time=1ms TTL=127
Reply from 192.168.30.31: bytes=32 time=1ms TTL=127
Reply from 192.168.30.31: bytes=32 time=1ms TTL=127
Reply from 192.168.30.31: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.30.31:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>
  
```

Figura 30 Verificación tráfico de PC-C a PC-A

## Desde R1 hasta el pc de internet



```

R1
[Connection to 172.21.21.2 closed by foreign host]
R1#
R1#

R1 con0 is now available

Press RETURN to get started.

Access no autorizado
User Access Verification
Password:
Password:
Password:
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface Serial1/0/0
R1(config-if)#ip
R1#
R1#ping -S -CONFID_1: Configured from console by console
Pinging 209.165.200.230
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.165.200.230, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/10 ms
Pinging 209.165.200.230
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.165.200.230, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/4/10 ms
R1#
Ctrl-C to exit CLI focus
  
```

Figura 31 Verificación Tráfico R1 al PC-Internet

## Verifico la salida a internet desde el pc-Internet

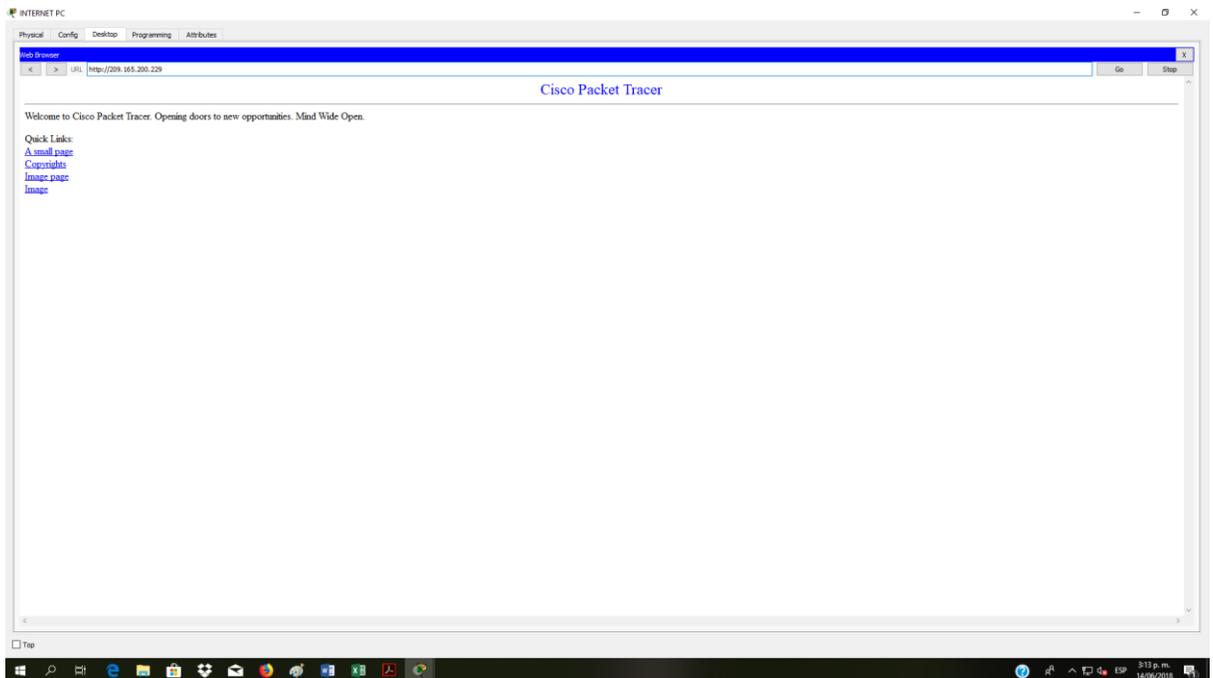


Figura 32 Verificación salida a tinernet desde PC-Intenet

## Verifico desde pc-A hasta pc-INTERNET

C:\>ping 209.165.200.230

Pinging 209.165.200.230 with 32 bytes of data:

Reply from 209.165.200.230: bytes=32 time=1ms TTL=126

Reply from 209.165.200.230: bytes=32 time=1ms TTL=126

Reply from 209.165.200.230: bytes=32 time=1ms TTL=126

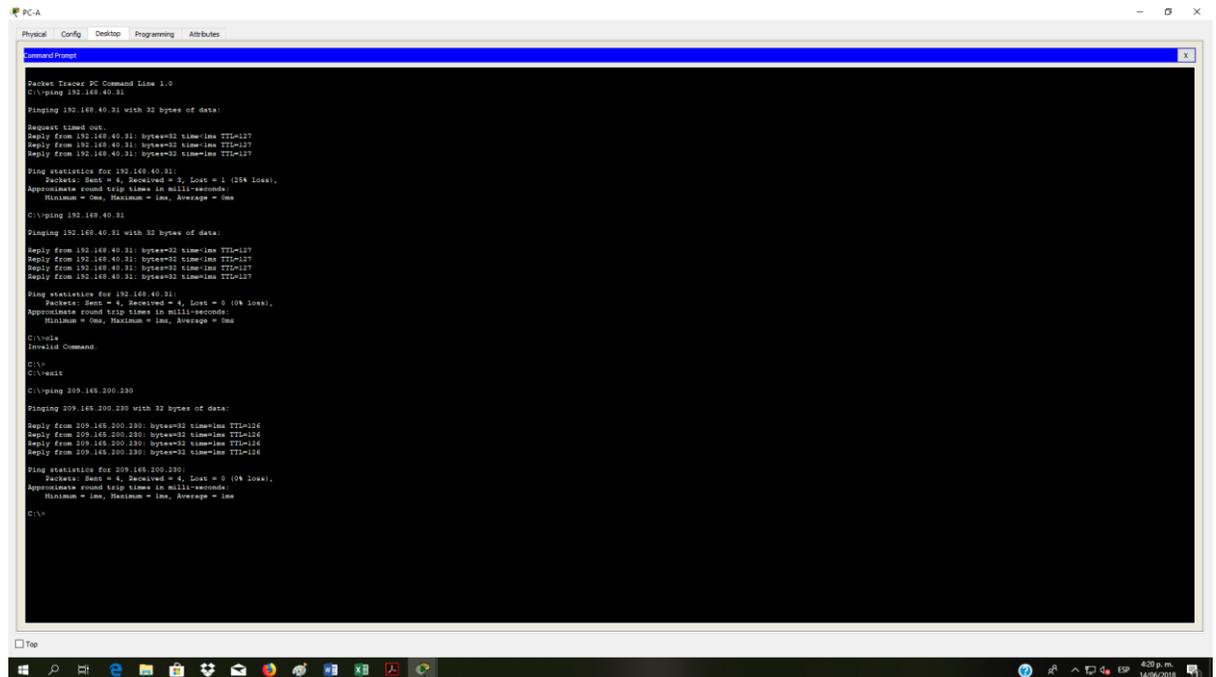
Reply from 209.165.200.230: bytes=32 time=1ms TTL=126

Ping statistics for 209.165.200.230:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms



```

PC-A
Physical  Config  Desktop  Programming  Attributes
Command Prompt

Packet Tracer PC Command Line 1.0
C:\>ping 192.168.40.31

Pinging 192.168.40.31 with 32 bytes of data:

Request timed out.
Reply from 192.168.40.31: bytes=32 time=1ms TTL=127
Reply from 192.168.40.31: bytes=32 time=1ms TTL=127
Reply from 192.168.40.31: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.40.31:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>ping 192.168.40.31

Pinging 192.168.40.31 with 32 bytes of data:

Reply from 192.168.40.31: bytes=32 time=1ms TTL=127
Reply from 192.168.40.31: bytes=32 time=1ms TTL=127
Reply from 192.168.40.31: bytes=32 time=1ms TTL=127
Reply from 192.168.40.31: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.40.31:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>cls
Invalid Command.

C:\>
C:\>exit

C:\>ping 209.165.200.230

Pinging 209.165.200.230 with 32 bytes of data:

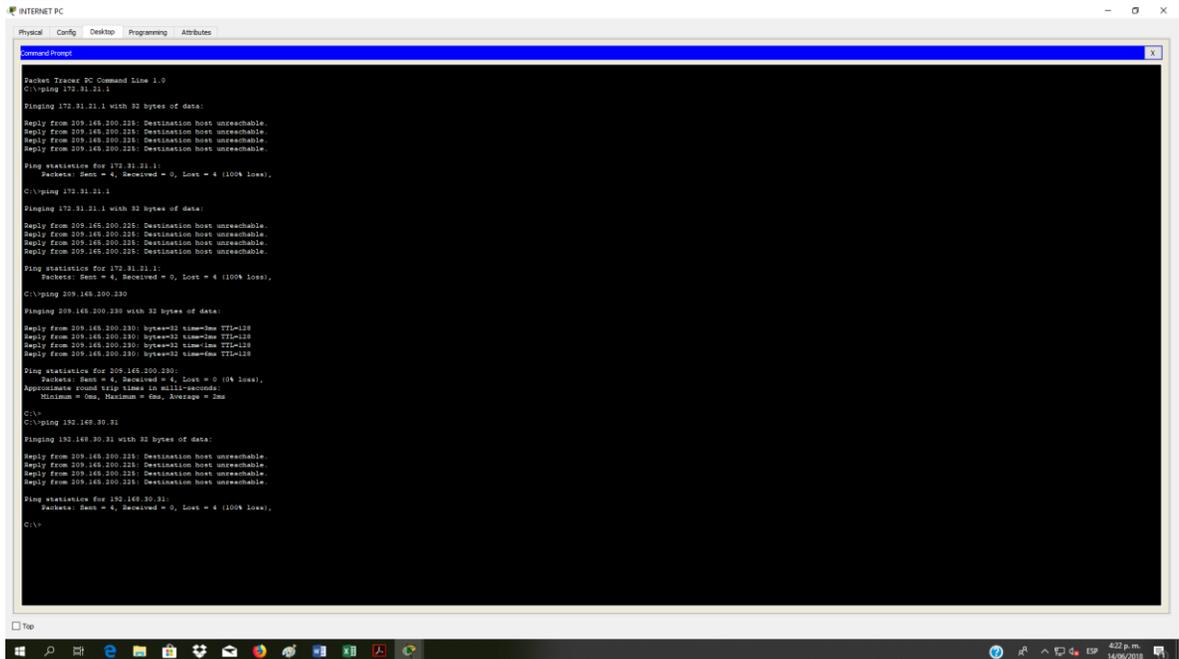
Reply from 209.165.200.230: bytes=32 time=1ms TTL=126
Reply from 209.165.200.230: bytes=32 time=1ms TTL=126
Reply from 209.165.200.230: bytes=32 time=1ms TTL=126
Reply from 209.165.200.230: bytes=32 time=1ms TTL=126

Ping statistics for 209.165.200.230:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>
  
```

Figura 33 Verificación Tráfico desde PC-A hasta PC-Internet

## Verifico que no haya conexión de afuera hacia adentro (pc-INTERNET hasta pc-A)



```

INTERNET PC
Physical Config Desktop Programming Attributes
Command Prompt
Cisco Packet Tracer - PC Command Line 1.0
C:\>ping 172.31.21.1
Pinging 172.31.21.1 with 32 bytes of data:
Reply from 209.145.200.230: Destination host unreachable.
Reply from 209.145.200.230: Destination host unreachable.
Reply from 209.145.200.230: Destination host unreachable.
Reply from 209.145.200.230: Destination host unreachable.
Ping statistics for 172.31.21.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 172.31.21.1
Pinging 172.31.21.1 with 32 bytes of data:
Reply from 209.145.200.230: Destination host unreachable.
Reply from 209.145.200.230: Destination host unreachable.
Reply from 209.145.200.230: Destination host unreachable.
Reply from 209.145.200.230: Destination host unreachable.
Ping statistics for 172.31.21.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 209.145.200.230
Pinging 209.145.200.230 with 32 bytes of data:
Reply from 209.145.200.230: bytes=32 time=3ms TTL=128
Reply from 209.145.200.230: bytes=32 time=3ms TTL=128
Reply from 209.145.200.230: bytes=32 time=3ms TTL=128
Reply from 209.145.200.230: bytes=32 time=3ms TTL=128
Ping statistics for 209.145.200.230:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milliseconds:
    Minimum = 3ms, Maximum = 3ms, Average = 3ms
C:\>
C:\>ping 192.168.30.31
Pinging 192.168.30.31 with 32 bytes of data:
Reply from 209.145.200.230: Destination host unreachable.
Reply from 209.145.200.230: Destination host unreachable.
Reply from 209.145.200.230: Destination host unreachable.
Reply from 209.145.200.230: Destination host unreachable.
Ping statistics for 192.168.30.31:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>
  
```

Figura 34 Verificación de NO tráfico de PC-Internet a PC-A

Efectivamente el host pc-A es inalcanzable.

## Pantallazo final de la configuración del proyecto

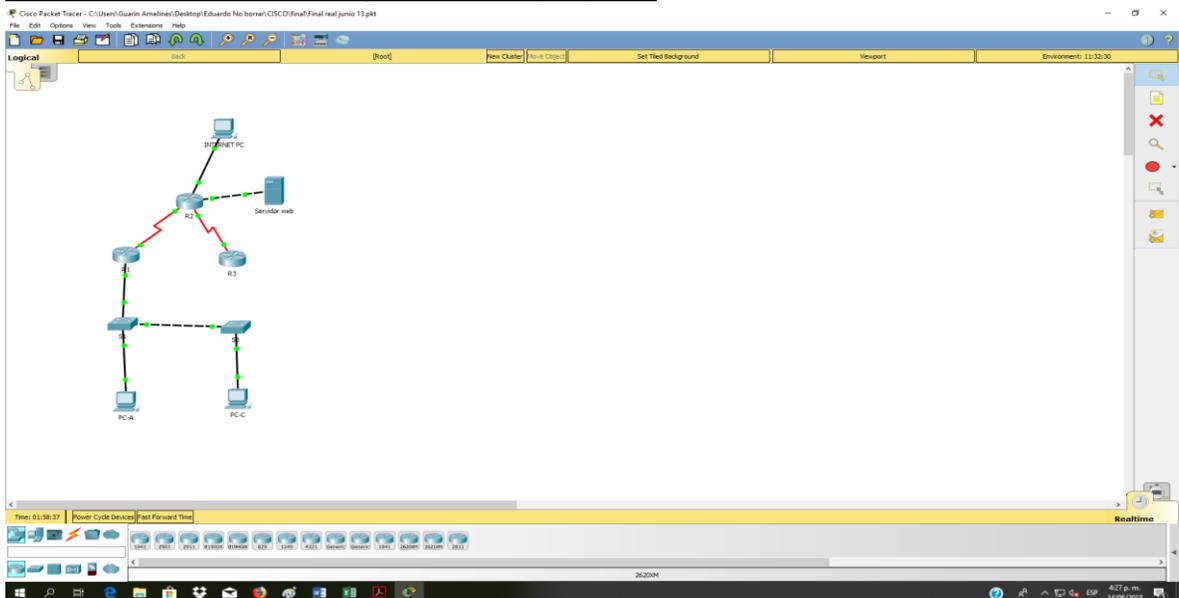
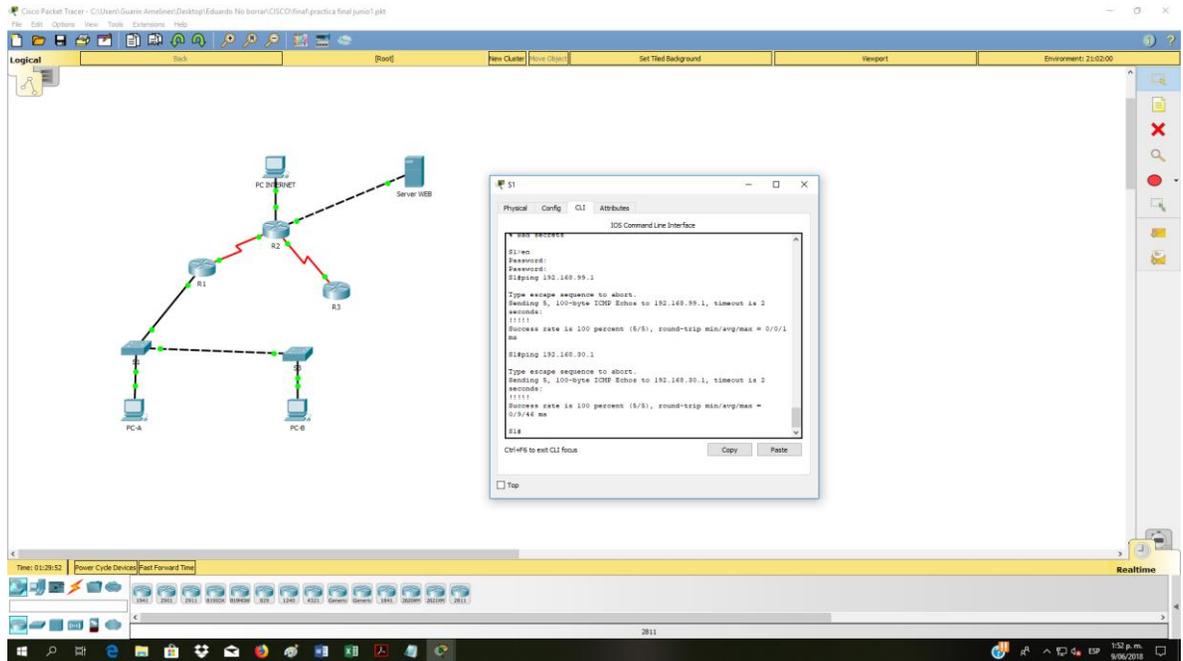


Figura 35 Final de la configuración del proyecto

## PINGS DE S1 A VLAN 99



Cisco Packet Tracer - C:\Users\Guamir Amelien\Desktop\Eduardo No borran\CISCO\final\practica final\junior1.glt

Logical View: Stack (R1, R2, R3), PC Internet, Server WEB, PC A, PC B.

CLI Window (S1):

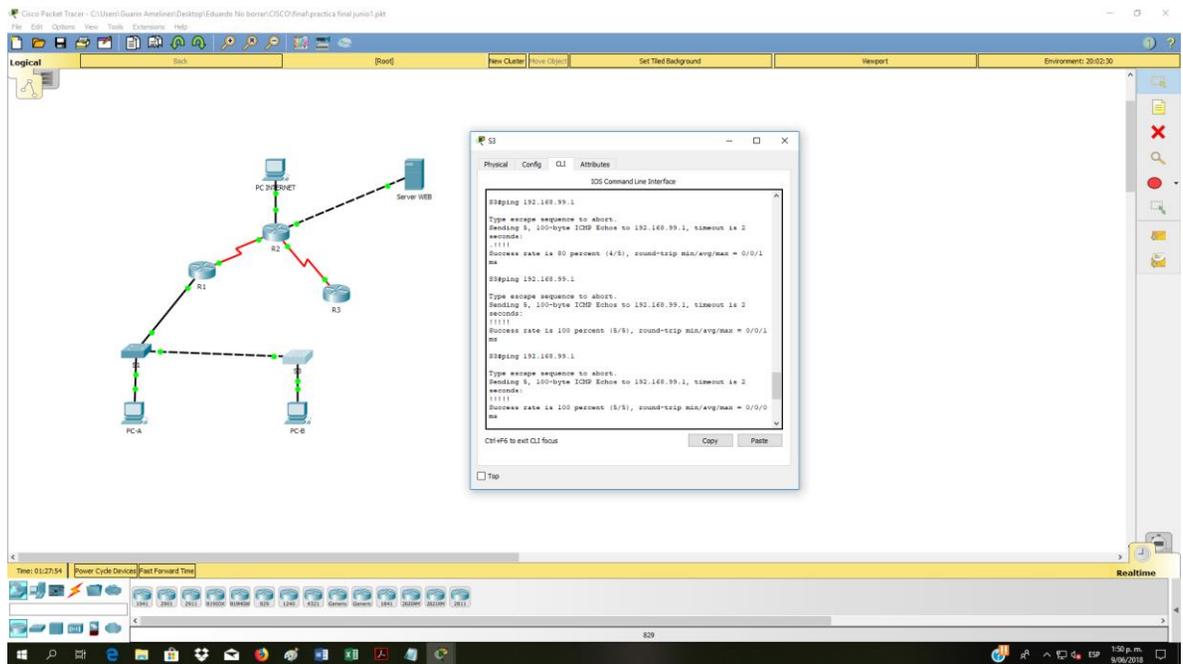
```

IOS Command Line Interface
S1>en
S1#show
S1#ping 192.168.99.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 192.168.99.1, timeout is 2
seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1
ms
S1#ping 192.168.99.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 192.168.99.1, timeout is 2
seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max =
0/0/46 ms
S1#
Ctrl-@ to exit CLI focus
  
```

Time: 01:29:52 | Power Cycle Devices | Fast Forward Time | Realtime

Figura 36 Verificación Tráfico de S1 a Vlan99

## PING DE S3 A VLAN 99



Cisco Packet Tracer - C:\Users\Guamir Amelien\Desktop\Eduardo No borran\CISCO\final\practica final\junior1.glt

Logical View: Stack (R1, R2, R3), PC Internet, Server WEB, PC A, PC B.

CLI Window (S3):

```

IOS Command Line Interface
S3>en
S3#show
S3#ping 192.168.99.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 192.168.99.1, timeout is 2
seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1
ms
S3#ping 192.168.99.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 192.168.99.1, timeout is 2
seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1
ms
S3#ping 192.168.99.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 192.168.99.1, timeout is 2
seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0
ms
S3#
Ctrl-@ to exit CLI focus
  
```

Time: 01:27:54 | Power Cycle Devices | Fast Forward Time | Realtime

Figura 37 Verificación de tráfico de S3 a Vlan99

## Conclusiones

- Se colocó en práctica la configuración de los diferentes equipos de red, tales como los switches y routers, lo cual nos permite realizar las aplicaciones e implementar las configuraciones solicitadas en la guía.
- Durante la práctica se pudo observar que cuando se utilizar los protocolos avanzados teniendo en cuenta los módulos estudiados, la conectividad se hace de una forma muy segura, lo cual se refleja en la confiabilidad de las transacciones entre los clientes.
- Se adquirió a través de esta práctica la destreza necesaria para realizar las configuraciones avanzadas tanto en los switches como en routers.
- Se pudo observar la importancia de las ACL (Listas de Control de Acceso), que al aplicarlas en un router, permiten controlar el tráfico de información dentro de una red (aceptar, denegar, bloquear).
- Se aplicaron los diferentes comandos CLI, los cuales nos permiten administrar un router o un switch.
- Se observa que los routers CISCO son como ordenadores pequeños ya que tienen un procesador, se pueden adicionar nuevos interfaces, su sistema operativo permite administrar su hardware con comandos predefinidos, además tienen 4 diferentes tipos de memoria.

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