

CONFIGURACIÓN E INTERCONEXIÓN DE RED DE UNA EMPRESA EN TRES
SUCURSALES DE DIFERENTES CIUDADES

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CEAD SOGAMOSO
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DIPLOMADO DE PROFUNDIZACIÓN CISCO (DISEÑO E IMPLEMENTACIÓN DE
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Evaluación – Prueba de habilidades prácticas CCNA

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CEAD SOGAMOSO
2018

NOTA DE ACEPTACION

Presidente del jurado

Jurado

Sogamoso 25 de mayo de 2018

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A Dios primeramente por permitir culminar mis estudios profesionales y a mi familia por su apoyo incondicional

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GLOSARIO

LAN: red de área local. _____	18
WAN: red de varias redes de área local _____	10
PROTOCOLO: normas y disposiciones para las conexiones _____	18
TRONCAL: red para interconectar varias redes _____	25
VLAN: manera de crear redes lógicas dentro de una física _____	25
DCHP: protocolo de asignación automática de direccionamiento _____	31

RESUMEN

En el desarrollo de los laboratorios durante la ejecución del diplomado en diseño e implementación de soluciones integradas LAN / WAN impartido por CISCO se conocieron; tablas de enrutamiento, configuración de web server, enrutadores, switches OSPFV2 y lista de accesos ACL entre otros, lo que permitió la elaboración, adecuación, instalación y configuración de una red para una empresa que posee tres sucursales en diferentes ciudades logrando así la aplicación del conocimiento adquirido durante las sesiones teórico-prácticas del diplomado.

INTRODUCCIÓN

El desarrollo de las habilidades prácticas forma parte de aplicación de conocimiento al momento de adquirirlo es por ende que, para dar comienzo al presente avance de habilidades prácticas, se desarrolló de manera sistemática un ejercicio de laboratorio mediante el aplicativo Packet Tracer v 6.0, detallando en pormenor los pasos, aplicaciones y comandos que dieron respuesta a preguntas con el ánimo de reforzar el procedimiento y afianzar la labor realizada.

A través del desarrollo del ejercicio se establecerá mediante ejecución las ordenes; tablas de enrutamiento, configuración de web server, enrutadores, switches OSPFV2 y lista de accesos ACL, que consiste en la decisión que emite el router en el momento de enviar o recibir paquetes, mediante el IOS realiza una verificación si cumple o no el paquete de manera satisfactoria el requerimiento, cuando se cumple la condición, no se seguirán ejecutando las verificaciones o las llamadas sentencias de condición.

Se estudia todo el comportamiento de una red al realizar las configuraciones solicitadas validando su importancia en el servicio para el bloqueo específico de una red o un Host, enlaces, Vlans, entre otros dando así el análisis del tráfico de una red

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

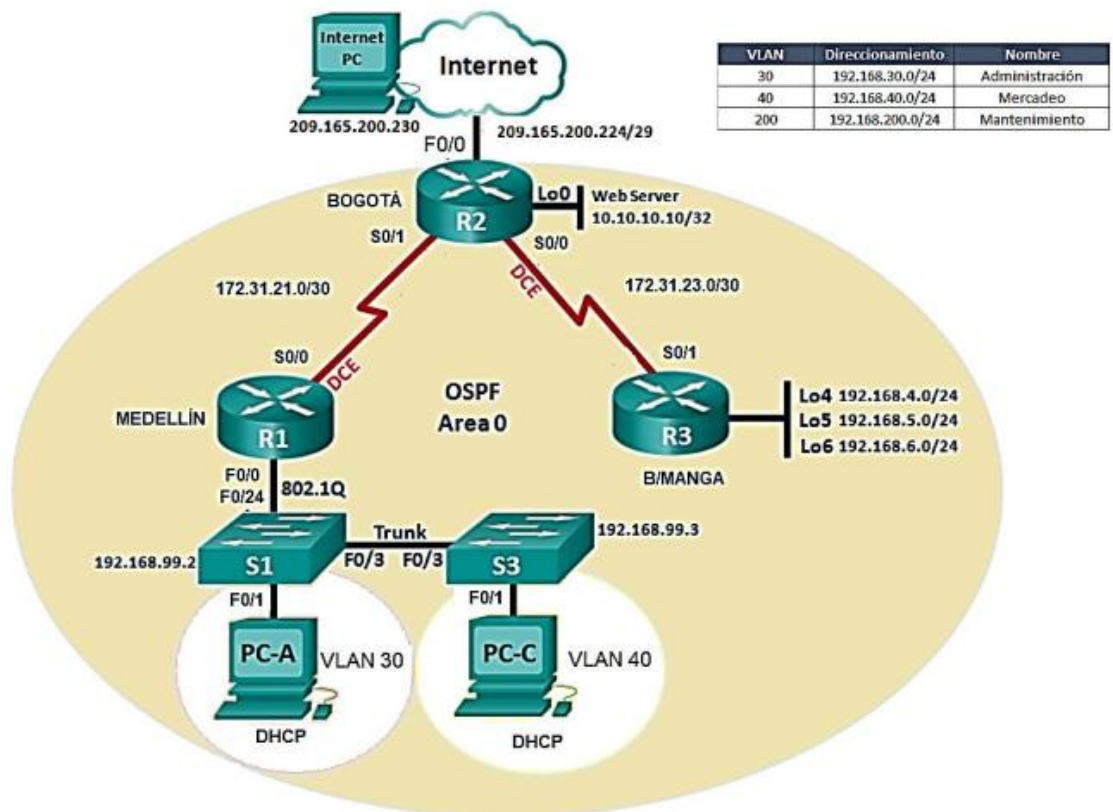


Figura 1 Topología de la red

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

✓ Configuración de internet pc

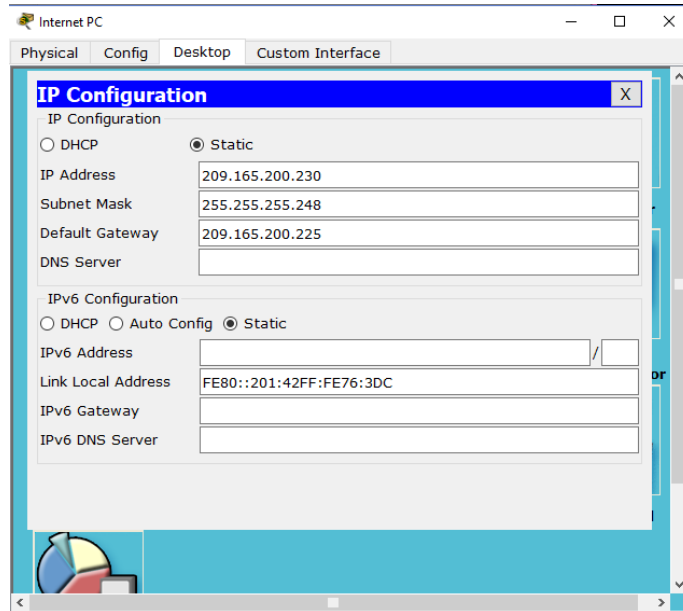


Figura 2 Configuración de internet pc

✓ Configuración de R1

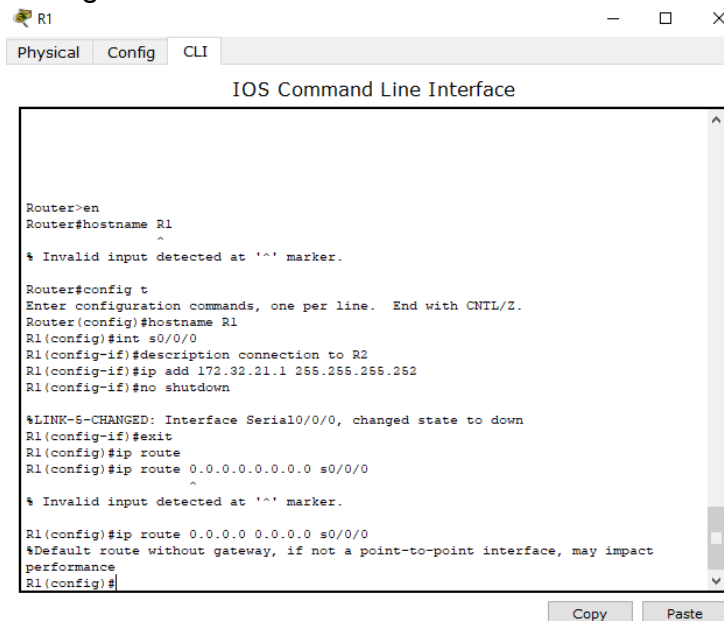
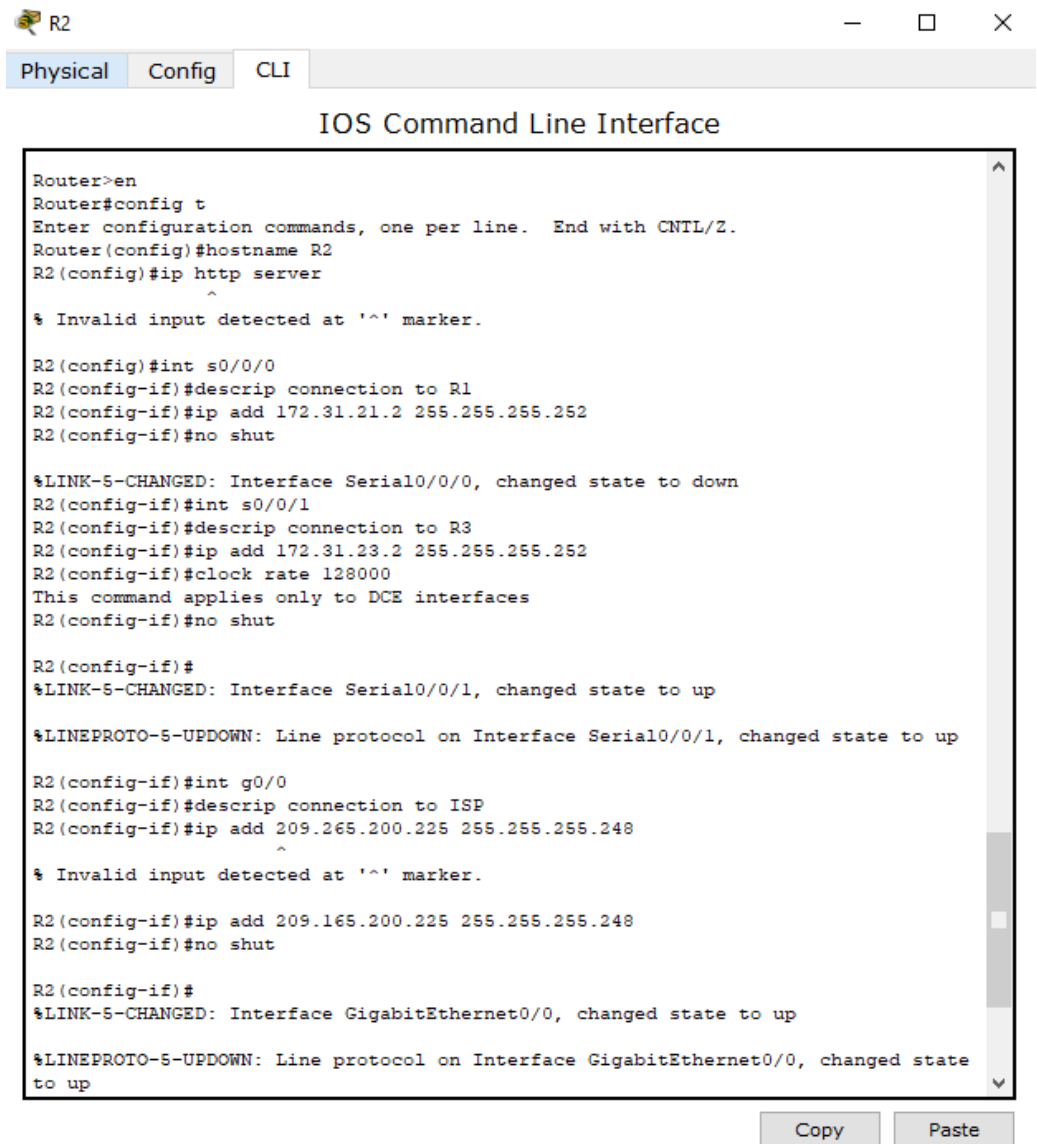


Figura 3 Configuración de R1

✓ Configuración de R2



```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R2(config)#ip http server
^
% Invalid input detected at '^' marker.

R2(config)#int s0/0/0
R2(config-if)#descrip connection to R1
R2(config-if)#ip add 172.31.21.2 255.255.255.252
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)#descrip connection to R3
R2(config-if)#ip add 172.31.23.2 255.255.255.252
R2(config-if)#clock rate 128000
This command applies only to DCE interfaces
R2(config-if)#no shut

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

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

R2(config-if)#int g0/0
R2(config-if)#descrip connection to ISP
R2(config-if)#ip add 209.265.200.225 255.255.255.248
^
% Invalid input detected at '^' marker.

R2(config-if)#ip add 209.165.200.225 255.255.255.248
R2(config-if)#no shut

R2(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state
to up
```

Copy Paste

Figura 4 Configuración de R2

```

R2
Physical Config CLI
IOS Command Line Interface

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R2(config-if)#int s0/0/1
R2(config-if)#descrip connection to R3
R2(config-if)#ip add 172.31.23.2 255.255.255.252
R2(config-if)#clock rate 128000
This command applies only to DCE interfaces
R2(config-if)#no shut

R2(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up
R2(config-if)#int g0/0
R2(config-if)#descrip connection to ISP
R2(config-if)#ip add 209.265.200.225 255.255.255.248
^
% Invalid input detected at '^' marker.
R2(config-if)#ip add 209.165.200.225 255.255.255.248
R2(config-if)#no shut

R2(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
R2(config-if)#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(config-if)#descrip connection to Web Server
R2(config-if)#
Copy Paste

```

Figura 5 Configuración de R2

```

R2
Physical Config CLI
IOS Command Line Interface

2 Low-speed serial(sync/async) network interface(s)
DRAM configuration is 64 bits wide with parity disabled.
255K bytes of non-volatile configuration memory.
249856K bytes of ATA System CompactFlash 0 (Read/Write)

Press RETURN to get started!

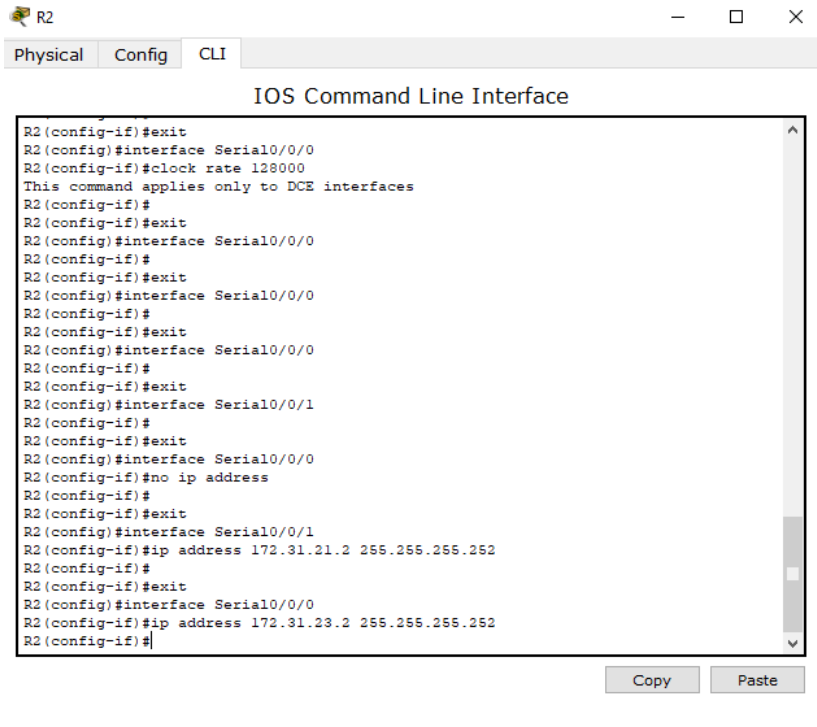
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up

R2>en
R2#config t
Enter configuration commands, one per line. End with CNTL/Z.
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)#exit
R2#
%SYS-5-CONFIG_I: Configured from console by console
|
Copy Paste

```

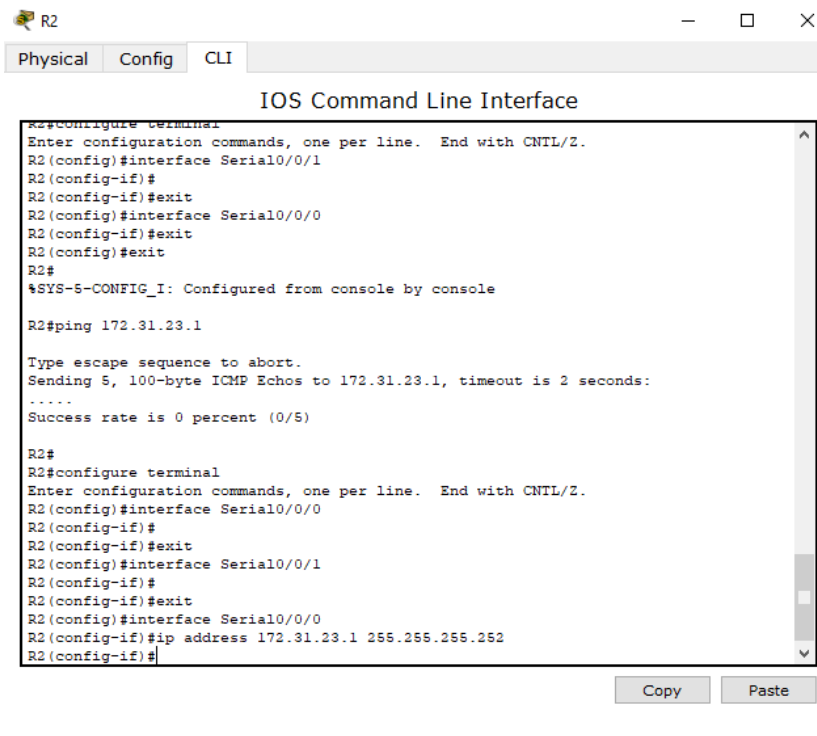
Figura 6 Configuración de R2

✓ Correcciones de Ip de acuerdo al routing en R2



```
R2 (config-if)#exit
R2 (config)#interface Serial0/0/0
R2 (config-if)#clock rate 128000
This command applies only to DCE interfaces
R2 (config-if)#
R2 (config-if)#exit
R2 (config)#interface Serial0/0/0
R2 (config-if)#
R2 (config-if)#exit
R2 (config)#interface Serial0/0/0
R2 (config-if)#
R2 (config-if)#exit
R2 (config)#interface Serial0/0/1
R2 (config-if)#
R2 (config-if)#exit
R2 (config)#interface Serial0/0/0
R2 (config-if)#no ip address
R2 (config-if)#
R2 (config-if)#exit
R2 (config)#interface Serial0/0/1
R2 (config-if)#ip address 172.31.21.2 255.255.255.252
R2 (config-if)#
R2 (config)#interface Serial0/0/0
R2 (config-if)#ip address 172.31.23.2 255.255.255.252
R2 (config-if)#
```

Figura 7 Correcciones de Ip de acuerdo al routing en R2



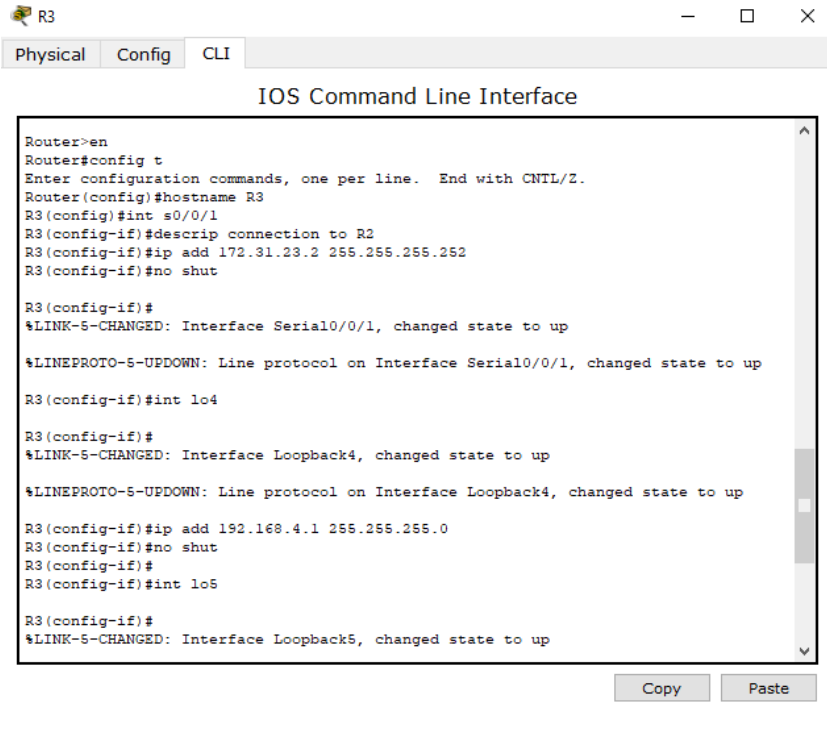
```
R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2 (config)#interface Serial0/0/1
R2 (config-if)#
R2 (config-if)#exit
R2 (config)#interface Serial0/0/0
R2 (config-if)#exit
R2 (config)#exit
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#ping 172.31.23.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.23.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)

R2#
R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2 (config)#interface Serial0/0/0
R2 (config-if)#
R2 (config-if)#exit
R2 (config)#interface Serial0/0/1
R2 (config-if)#
R2 (config-if)#exit
R2 (config)#interface Serial0/0/0
R2 (config-if)#ip address 172.31.23.1 255.255.255.252
R2 (config-if)#
```

Figura 8 Correcciones de Ip de acuerdo al routing en R2

✓ Configuración de R3



```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTRL/Z.
Router(config)#hostname R3
R3(config)#int s0/0/1
R3(config-if)#descrip 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

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

R3(config-if)#int lo4

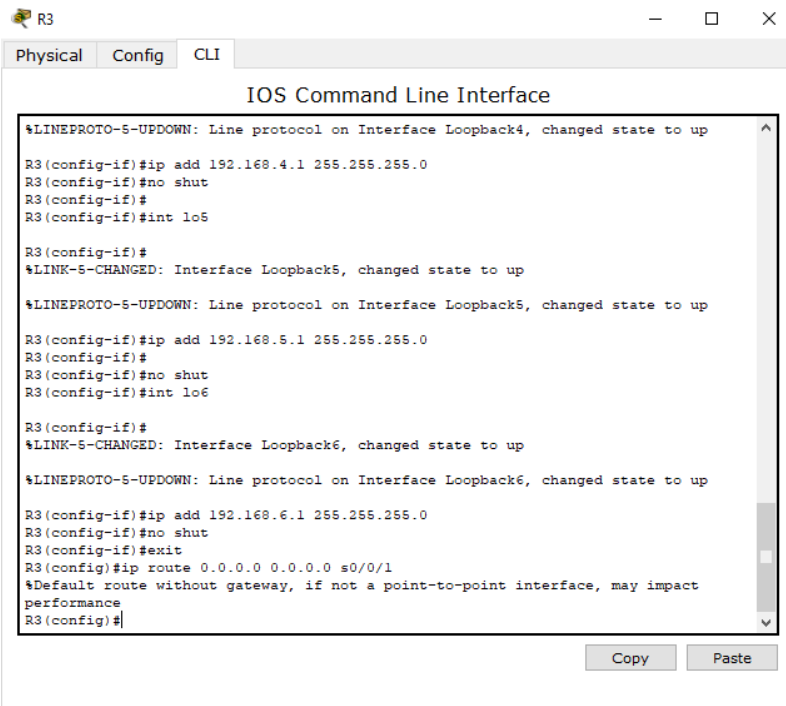
R3(config-if)#
%LINK-5-CHANGED: Interface Loopback4, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback4, changed state to up

R3(config-if)#ip add 192.168.4.1 255.255.255.0
R3(config-if)#no shut
R3(config-if)#
R3(config-if)#int lo5

R3(config-if)#
%LINK-5-CHANGED: Interface Loopback5, changed state to up
```

Figura 9 Configuración de R3



```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback4, changed state to up

R3(config-if)#ip add 192.168.4.1 255.255.255.0
R3(config-if)#no shut
R3(config-if)#
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)#
R3(config-if)#no shut
R3(config-if)#int lo6

R3(config-if)#
%LINK-5-CHANGED: Interface Loopback6, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback6, changed state to up

R3(config-if)#ip add 192.168.6.1 255.255.255.0
R3(config-if)#no shut
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)#
```

Figura 10 Configuración de R3

✓ Configuración de Web Server

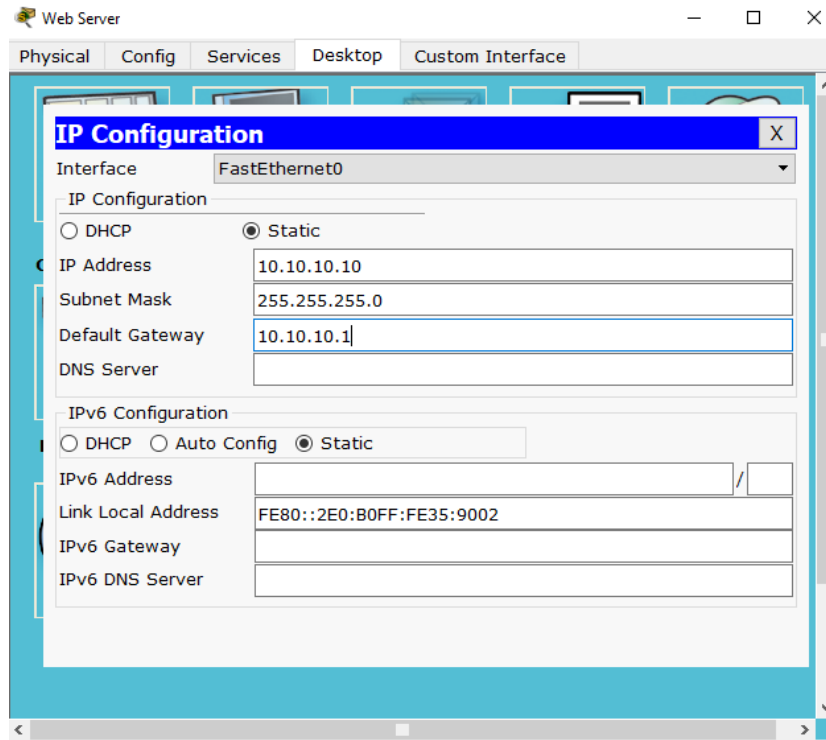


Figura 11 Configuración de Web Server

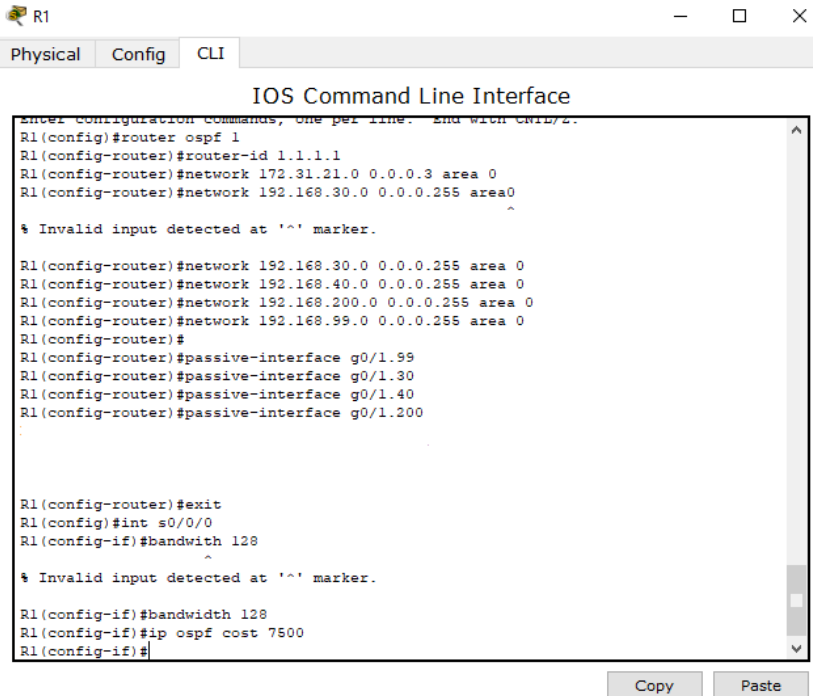
2. Configurar el protocolo de enrutamiento OSPFv2 bajo los siguientes criterios:

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

Tabla 1 OSPFv2 área 0

✓ Configuración de R1 OSPF



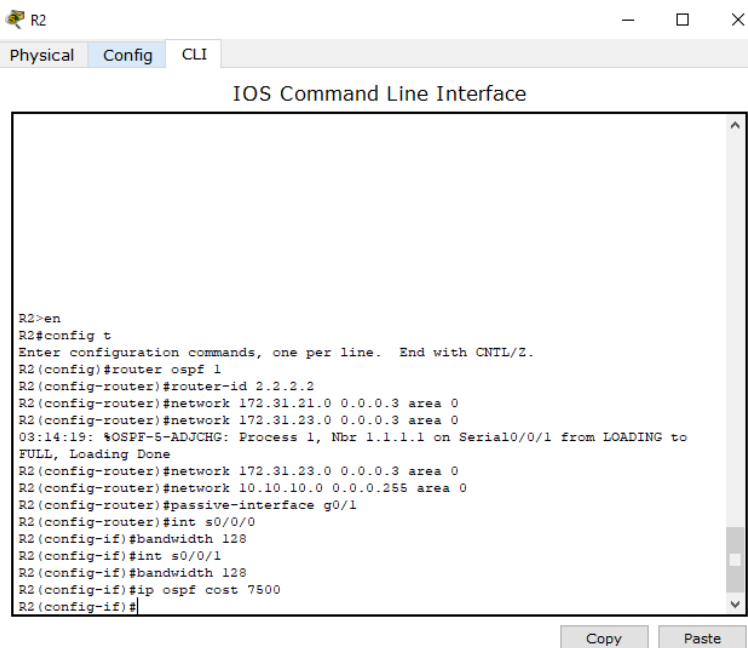
The screenshot shows the CLI interface for router R1. The configuration includes OSPF settings for area 0, passive interfaces, and serial interface bandwidth. The text is as follows:

```
R1
Physical Config CLI
IOS Command Line Interface
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router ospf 1
R1(config-router)#router-id 1.1.1.1
R1(config-router)#network 172.31.21.0 0.0.0.3 area 0
R1(config-router)#network 192.168.30.0 0.0.0.255 area 0
^
% Invalid input detected at '^' marker.
R1(config-router)#network 192.168.30.0 0.0.0.255 area 0
R1(config-router)#network 192.168.40.0 0.0.0.255 area 0
R1(config-router)#network 192.168.200.0 0.0.0.255 area 0
R1(config-router)#network 192.168.99.0 0.0.0.255 area 0
R1(config-router)#
R1(config-router)#passive-interface g0/1.99
R1(config-router)#passive-interface g0/1.30
R1(config-router)#passive-interface g0/1.40
R1(config-router)#passive-interface g0/1.200
.
R1(config-router)#exit
R1(config)#int s0/0/0
R1(config-if)#bandwidth 128
^
% Invalid input detected at '^' marker.
R1(config-if)#bandwidth 128
R1(config-if)#ip ospf cost 7500
R1(config-if)#
```

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Figura 12 Configuración de R1 OSPF

✓ Configuración de R2 OSPF



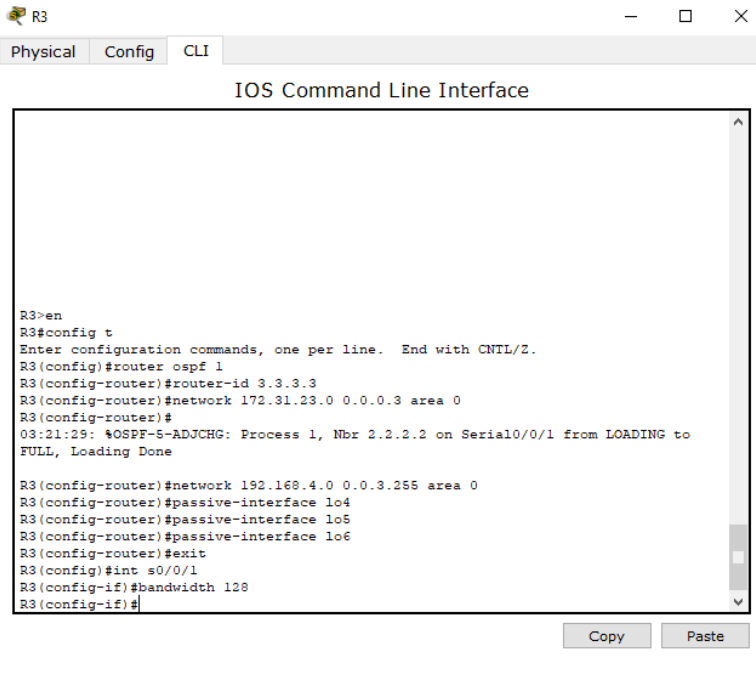
The screenshot shows the CLI interface for router R2. The configuration includes OSPF settings for area 0, passive interfaces, and serial interface bandwidth. The text is as follows:

```
R2
Physical Config CLI
IOS Command Line Interface
R2>en
R2#config t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router ospf 1
R2(config-router)#router-id 2.2.2.2
R2(config-router)#network 172.31.21.0 0.0.0.3 area 0
R2(config-router)#network 172.31.23.0 0.0.0.3 area 0
03:14:19: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial0/0/1 from LOADING to FULL, Loading Done
R2(config-router)#network 172.31.23.0 0.0.0.3 area 0
R2(config-router)#network 10.10.10.0 0.0.0.255 area 0
R2(config-router)#passive-interface g0/1
R2(config-router)#int s0/0/0
R2(config-if)#bandwidth 128
R2(config-if)#int s0/0/1
R2(config-if)#bandwidth 128
R2(config-if)#ip ospf cost 7500
R2(config-if)#
```

Copy Paste

Figura 13 Configuración de R2 OSPF

✓ Configuración de R3



The screenshot shows the CLI of router R3. The user has entered the following commands:

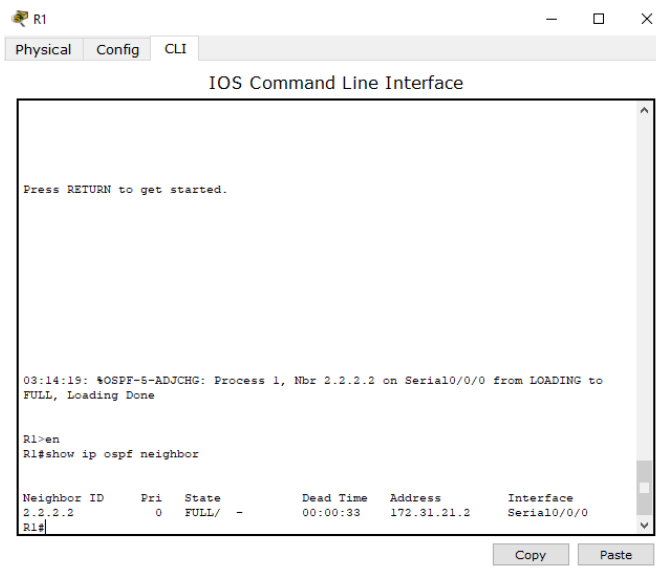
```
R3>en
R3#config t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#router-id 3.3.3.3
R3(config-router)#network 172.31.23.0 0.0.0.3 area 0
R3(config-router)#
03:21:29: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on Serial0/0/1 from LOADING to FULL, Loading Done
R3(config-router)#network 192.168.4.0 0.0.3.255 area 0
R3(config-router)#passive-interface lo4
R3(config-router)#passive-interface lo5
R3(config-router)#passive-interface lo6
R3(config-router)#exit
R3(config)#int s0/0/1
R3(config-if)#bandwidth 128
R3(config-if)#
```

Figura 14 Configuración de R3 OSPF

Verificar información de OSPF

- Visualizar tablas de enrutamiento y routers conectados por OSPFv2

✓ Tabla de R1



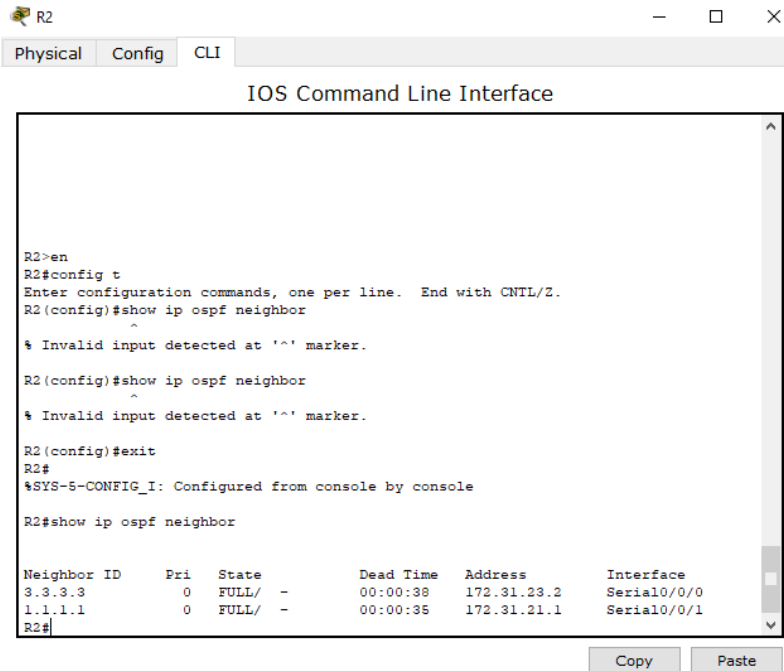
The screenshot shows the CLI of router R1. The user has entered the following commands:

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

Neighbor ID	Pri	State	Dead Time	Address	Interface
2.2.2.2	0	FULL/ -	00:00:33	172.31.21.2	Serial0/0/0

Figura 15 Tabla de R1 OSPF

✓ Tabla de R2



```
R2
Physical Config CLI
IOS Command Line Interface

R2>en
R2#config t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#show ip ospf neighbor
^
% Invalid input detected at '^' marker.
R2(config)#show ip ospf neighbor
^
% Invalid input detected at '^' marker.
R2(config)#exit
R2#
%SYS-5-CONFIG_I: Configured from console by console

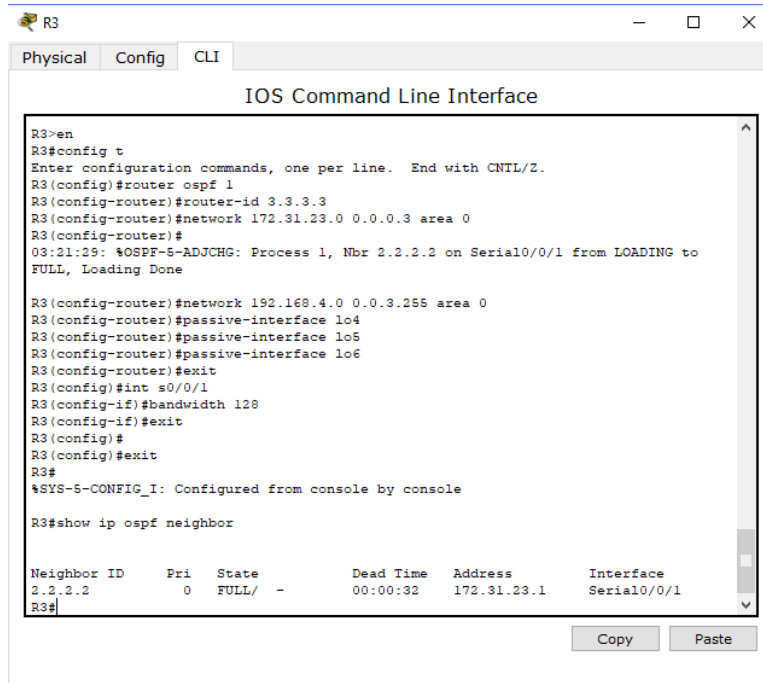
R2#show ip ospf neighbor

Neighbor ID      Pri   State           Dead Time   Address        Interface
3.3.3.3          0    FULL/ -         00:00:38   172.31.23.2   Serial0/0/0
1.1.1.1          0    FULL/ -         00:00:35   172.31.21.1   Serial0/0/1
R2#
```

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Figura 16 Tabla de R2 OSPF

✓ Tabla de R3



```
R3
Physical Config CLI
IOS Command Line Interface

R3>en
R3#config t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#router-id 3.3.3.3
R3(config-router)#network 172.31.23.0 0.0.0.3 area 0
R3(config-router)#
03:21:29: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on Serial0/0/1 from LOADING to FULL, Loading Done
R3(config-router)#network 192.168.4.0 0.0.3.255 area 0
R3(config-router)#passive-interface 104
R3(config-router)#passive-interface 105
R3(config-router)#passive-interface 106
R3(config-router)#exit
R3(config)#int s0/0/1
R3(config-if)#bandwidth 128
R3(config-if)#exit
R3(config)#
R3(config)#exit
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#show ip ospf neighbor

Neighbor ID      Pri   State           Dead Time   Address        Interface
2.2.2.2          0    FULL/ -         00:00:32   172.31.23.1   Serial0/0/1
R3#
```

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Figura 17 Tabla de R3 OSPF

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

✓ Configuración R1

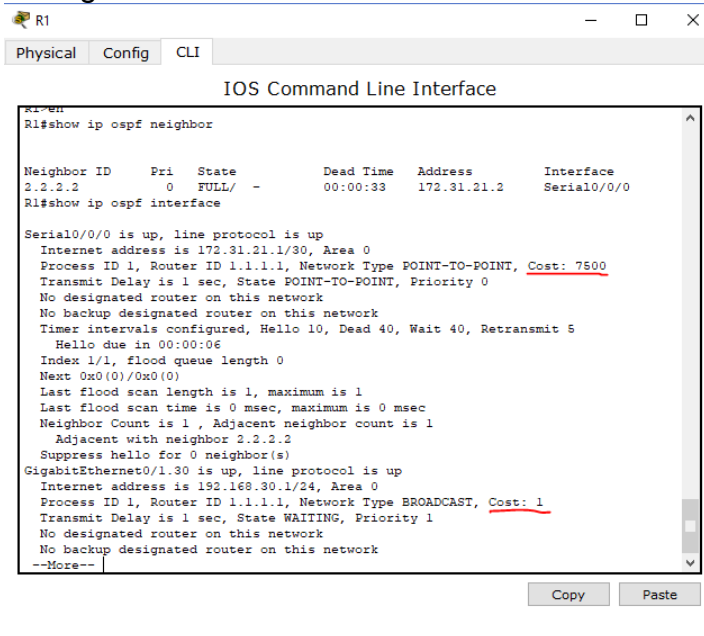


Figura 18 lista resumida de interfaces por OSPF R1

✓ Configuración R2

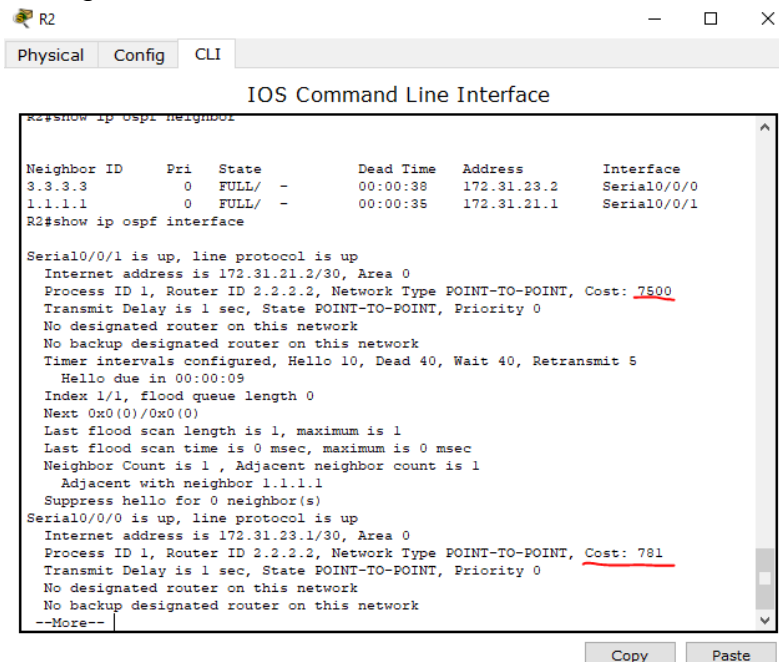
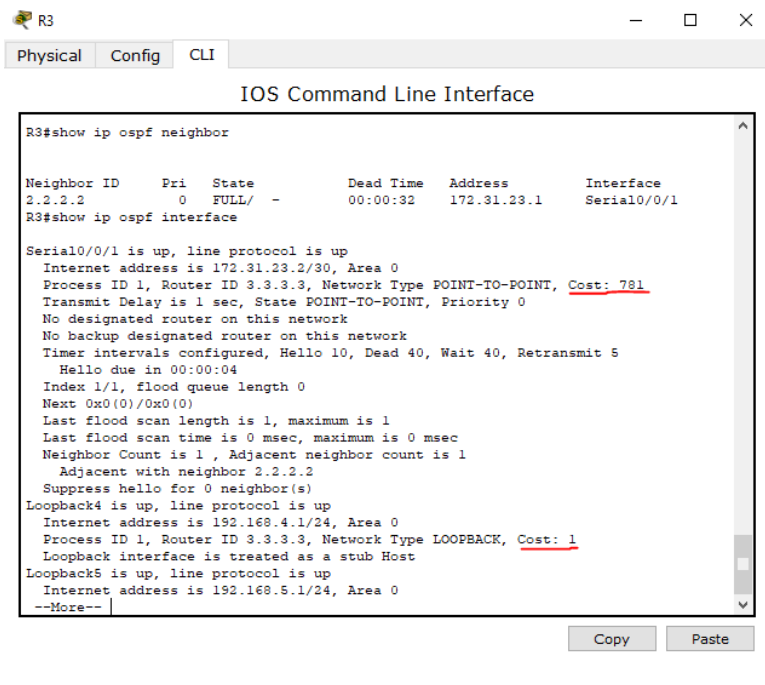


Figura 19 lista resumida de interfaces por OSPF R2

✓ Configuración R3



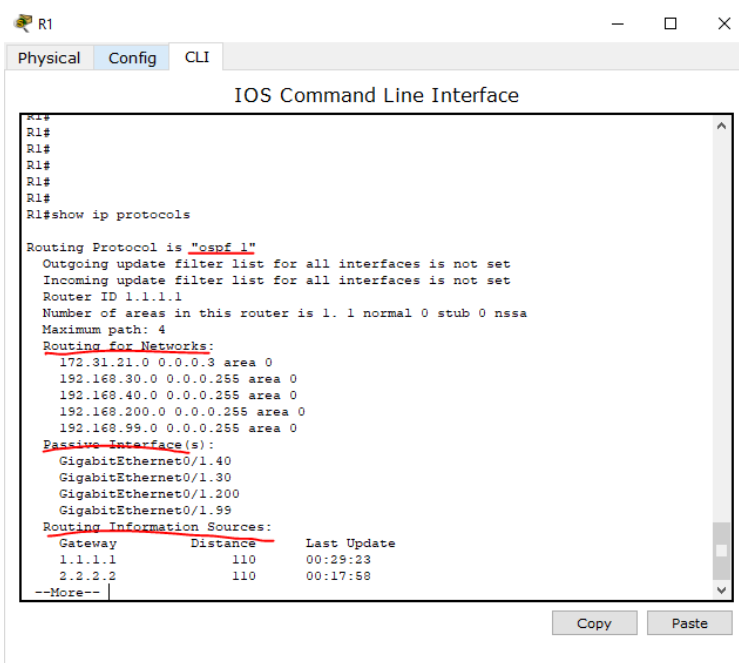
```
R3#show ip ospf neighbor

Neighbor ID    Pri  State           Dead Time   Address      Interface
2.2.2.2        0   FULL/ -         00:00:32   172.31.23.1  Serial0/0/1
R3#show ip ospf interface

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 00:00:04
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1, Adjacent neighbor count is 1
  Adjacent with neighbor 2.2.2.2
Suppress hello for 0 neighbor(s)
Loopback4 is up, line protocol is up
Internet address is 192.168.4.1/24, Area 0
Process ID 1, Router ID 3.3.3.3, Network Type LOOPBACK, Cost: 1
Loopback interface is treated as a stub Host
Loopback5 is up, line protocol is up
Internet address is 192.168.5.1/24, Area 0
--More--
```

Figura 20 lista resumida de interfaces por OSPF R3

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



```
R1#
R1#
R1#
R1#
R1#
R1#show ip protocols

Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 1.1.1.1
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.31.21.0 0.0.0.3 area 0
    192.168.30.0 0.0.0.255 area 0
    192.168.40.0 0.0.0.255 area 0
    192.168.200.0 0.0.0.255 area 0
    192.168.99.0 0.0.0.255 area 0
  Passive Interface(s):
    GigabitEthernet0/1.40
    GigabitEthernet0/1.30
    GigabitEthernet0/1.200
    GigabitEthernet0/1.99
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1           110          00:29:23
    2.2.2.2           110          00:17:58
--More--
```

Figura 21 OSPF Process ID R1

The screenshot shows the CLI of router R2. The user has entered the command 'show ip protocols'. The output displays OSPF configuration details for process ID 1, including Router ID 2.2.2.2, three network areas (172.31.21.0, 172.31.23.0, and 10.10.10.0), and three routing information sources (1.1.1.1, 2.2.2.2, and 3.3.3.3).

```

R2#
R2#
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          00:00:27
    2.2.2.2          110          00:19:03
    3.3.3.3          110          00:14:11
  Distance: (default is 110)

R2#
  
```

Figura 22 OSPF Process ID R2

The screenshot shows the CLI of router R3. The user has entered the command 'show ip protocols'. The output displays OSPF configuration details for process ID 1, including Router ID 3.3.3.3, two network areas (172.31.23.0 and 192.168.4.0), and three routing information sources (1.1.1.1, 2.2.2.2, and 3.3.3.3).

```

R3#
R3#
R3#
R3#
R3#show ip protocols

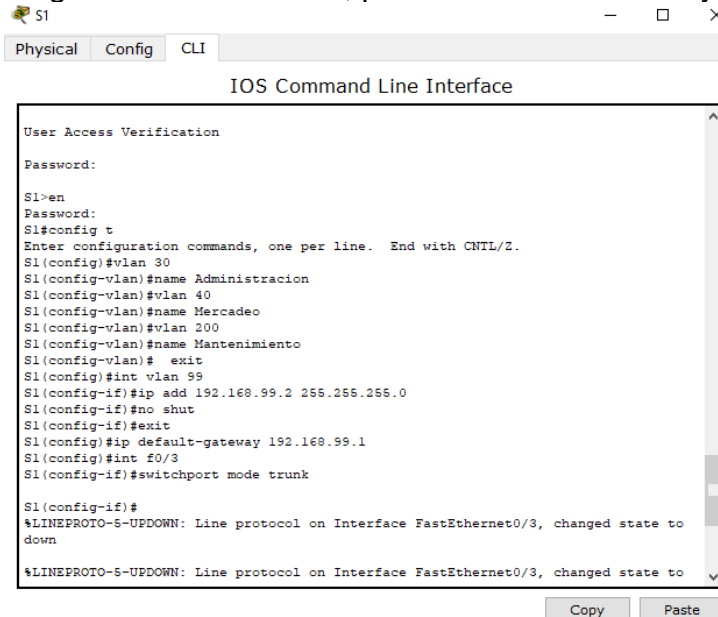
Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 3.3.3.3
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.31.23.0 0.0.0.3 area 0
    192.168.4.0 0.0.3.255 area 0
  Passive Interface(s):
    Loopback4
    Loopback5
    Loopback6
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110          00:01:01
    2.2.2.2          110          00:19:37
    3.3.3.3          110          00:14:45
  Distance: (default is 110)

R3#
  
```

Figura 23 OSPF Process ID R3

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

- ✓ Asignación de troncales, puertos de acceso vlan y seguridad del S1



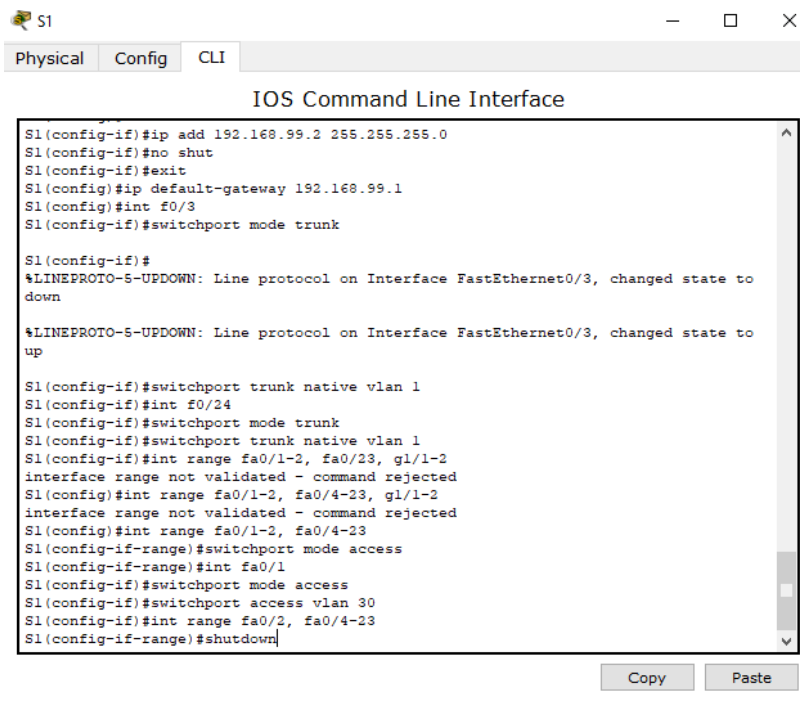
```
Physical Config CLI
IOS Command Line Interface

User Access Verification
Password:
S1>en
Password:
S1#config t
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#vlan 30
S1(config-vlan)#name Administracion
S1(config-vlan)#vlan 40
S1(config-vlan)#name Mercadeo
S1(config-vlan)#vlan 200
S1(config-vlan)#name Mantenimiento
S1(config-vlan)# exit
S1(config)#int vlan 99
S1(config-if)#ip add 192.168.99.2 255.255.255.0
S1(config-if)#no shut
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
```

Figura 24 Troncales, puertos de acceso vlan y seguridad del S1



```
Physical Config CLI
IOS Command Line Interface

S1(config-if)#ip add 192.168.99.2 255.255.255.0
S1(config-if)#no shut
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

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, fa0/23, g1/1-2
interface range not validated - command rejected
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)#switchport mode access
S1(config-if-range)#int fa0/1
S1(config-if)#switchport mode access
S1(config-if)#switchport access vlan 30
S1(config-if)#int range fa0/2, fa0/4-23
S1(config-if-range)#shutdown
```

Figura 25 Troncales, puertos de acceso vlan y seguridad del S1

```

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, 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

Switch>en
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S1
S1(config)#enable secret class
S1(config)#line con 0
S1(config-line)#pass cisco
S1(config-line)#login
S1(config-line)#line vty 0 4
S1(config-line)#pass cisco
S1(config-line)#login
S1(config-line)#service
~
% Invalid input detected at '^' marker.

S1(config-line)#
S1(config-line)#service pass
S1(config)#service password-encryption
S1(config)#
S1(config)#banner motd =Unauthorized Acces is Prohibited=
S1(config)#

```

Figura 26 Troncales, puertos de acceso vlan y seguridad del S1

✓ Asignación de troncales, puertos de acceso vlan y seguridad del S3

```

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, 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

Switch>
Switch>en
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S3
S3(config)#enable secret class
S3(config)#enable secret classline con 0
S3(config)#line con 0
S3(config-line)#pass cisco
S3(config-line)#login
S3(config-line)#line vty 0 4
S3(config-line)#pass cisco
S3(config-line)#login
S3(config-line)#
S3(config-line)#service password-encryption
S3(config)#banner motd =Unauthorized Acces is Prohibited=
S3(config)#end
S3#
%SYS-5-CONFIG_I: Configured from console by console

```

Figura 27 Troncales, puertos de acceso vlan y seguridad del S3

```
S3>en
Password:
S3#config 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)#
S3 (config-vlan)#vlan 200
S3 (config-vlan)#Mantenimiento
% Invalid input detected at '^' marker.
S3 (config-vlan)#name Mantenimiento
S3 (config-vlan)#exit
S3 (config)#int vlan 99
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)#switchport trunk native vlan 1
S3 (config-if)#int range fa0/1-2, fa0/4-24
S3 (config-if-range)#switchport mode access
S3 (config-if-range)#int fa0/1
S3 (config-if)#switchport mode access
S3 (config-if)#switchport access vlan 40
```

Figura 28 Troncales, puertos de acceso vlan y seguridad del S3

4. En el switch 3 deshabilitar DNS lookup

```
SOFTWARE (CLI)
Copyright (c) 1986-2005 by Cisco Systems, Inc.
Compiled Wed 12-Oct-05 22:05 by pt_team

Press RETURN to get started!

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

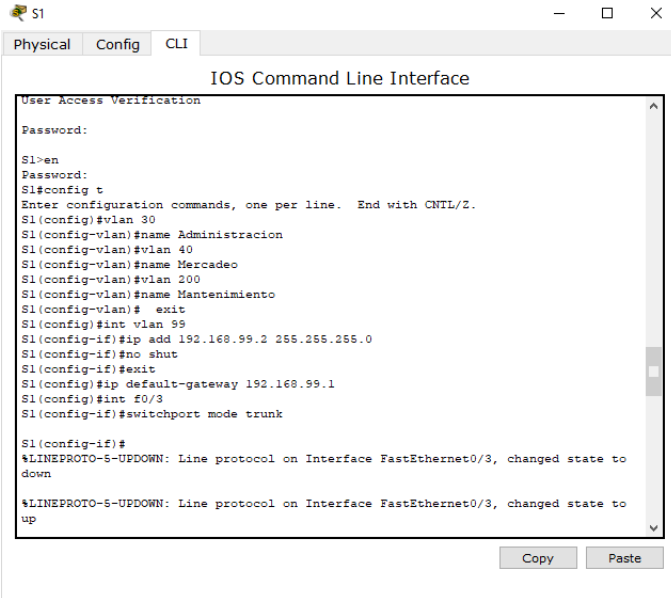
Switch>en
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch (config)#no ip domain-lookup
Switch (config)# no shutdown
^
% Invalid input detected at '^' marker.

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

Figura 29 Switch 3 DNS lookup deshabilitado

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

- ✓ Asignación de Ip al S1 de acuerdo a la tabla de routing



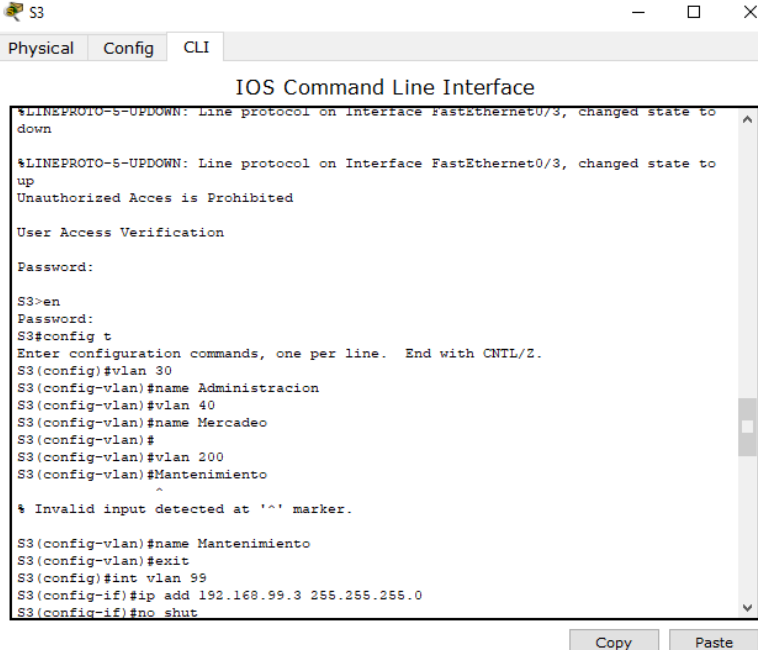
```
S1
Physical Config CLI
IOS Command Line Interface
User Access Verification
Password:
S1>en
Password:
S1#config t
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#vlan 30
S1(config-vlan)#name Administracion
S1(config-vlan)#vlan 40
S1(config-vlan)#name Mercadeo
S1(config-vlan)#vlan 200
S1(config-vlan)#name Mantenimiento
S1(config-vlan)# exit
S1(config)#int vlan 99
S1(config-if)#ip add 192.168.99.2 255.255.255.0
S1(config-if)#no shut
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

Copy Paste
```

Figura 30 Asignación de Ip al S1 de acuerdo a la tabla de routing

- ✓ Asignación de Ip al S3 de acuerdo a la tabla de routing



```
S3
Physical Config CLI
IOS Command Line Interface
%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
Unauthorized Access is Prohibited

User Access Verification
Password:

S3>en
Password:
S3#config 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)#
S3(config-vlan)#vlan 200
S3(config-vlan)#Mantenimiento
^
% Invalid input detected at '^' marker.

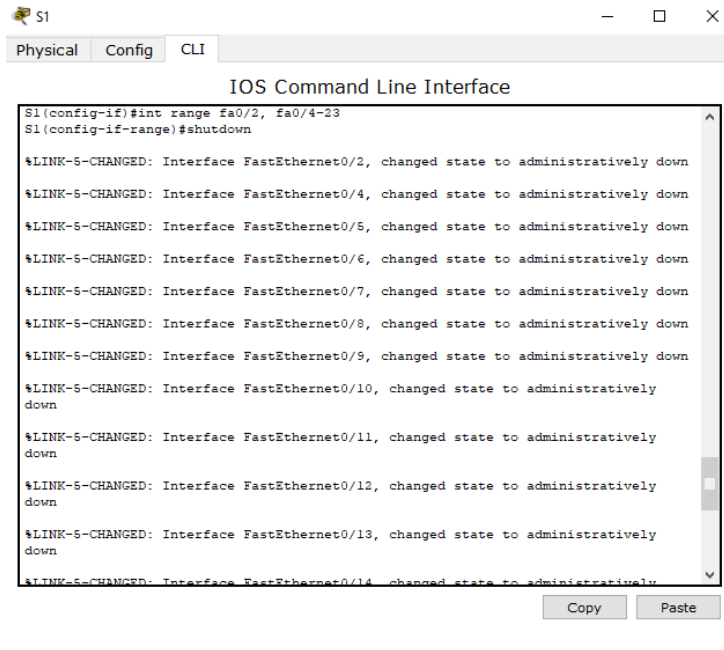
S3(config-vlan)#name Mantenimiento
S3(config-vlan)#exit
S3(config)#int vlan 99
S3(config-if)#ip add 192.168.99.3 255.255.255.0
S3(config-if)#no shut

Copy Paste
```

Figura 31 Asignación de Ip al S3 de acuerdo a la tabla de routing

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

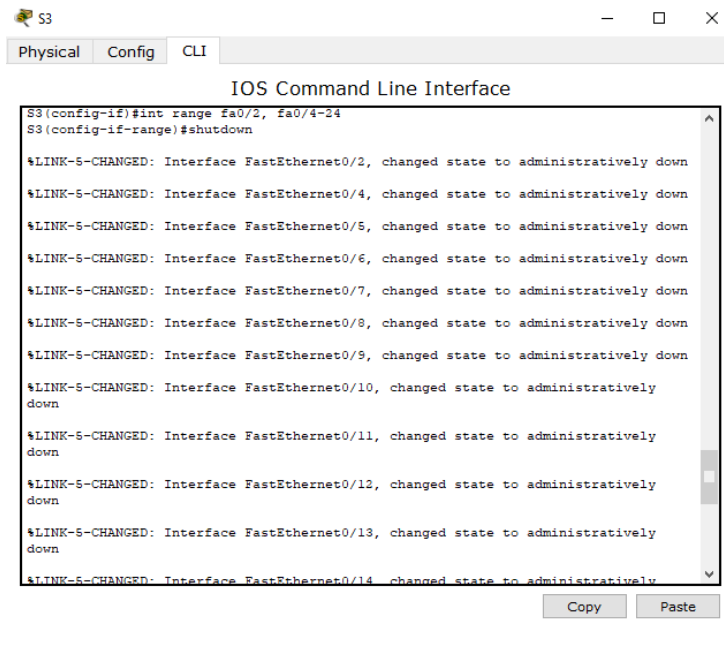
- ✓ Desactivación de puertos no usado en S1



```
S1
Physical Config CLI
IOS Command Line Interface
S1(config-if)#int range fa0/2, fa0/4-23
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 FastEthernet0/6, 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
Copy Paste
```

Figura 32 Desactivación de puertos no usado en S1

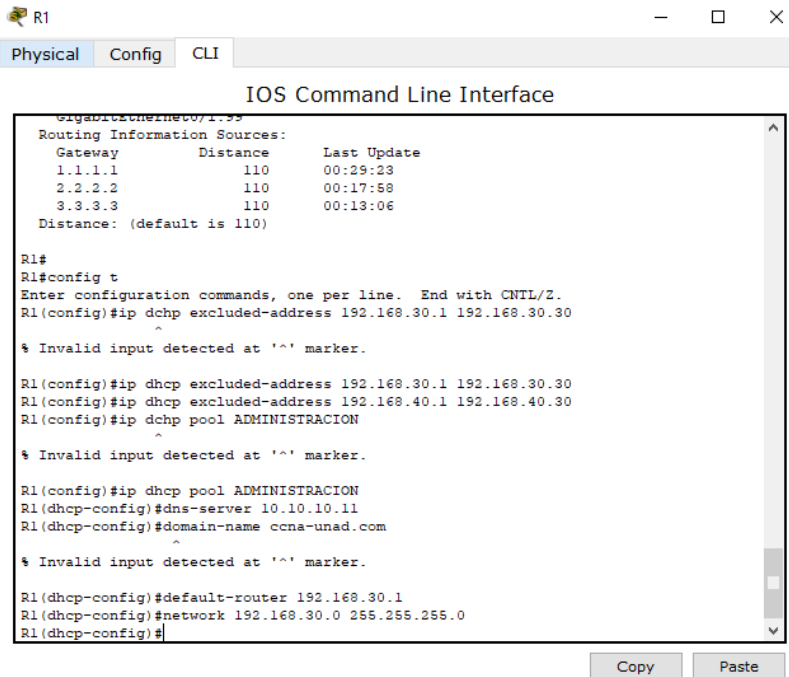
- ✓ Desactivación de puertos no usado en S3



```
S3
Physical Config CLI
IOS Command Line Interface
S3(config-if)#int 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
%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
Copy Paste
```

Figura 33 Desactivación de puertos no usado en S3

7. Implementar DHCP y NAT para IPv4



The screenshot shows the CLI of a Cisco router (R1) in configuration mode. The user has entered several commands to configure DHCP and NAT. The output shows the routing information sources and the configuration of two DHCP pools: 'ADMINISTRACION' and 'MERCADON'. The NAT configuration is also visible, showing the default router and network for each pool.

```
IOS Command Line Interface
GigabitEthernet0/1:33
Routing Information Sources:
  Gateway         Distance      Last Update
  1.1.1.1         110          00:29:23
  2.2.2.2         110          00:17:58
  3.3.3.3         110          00:13:06
Distance: (default is 110)

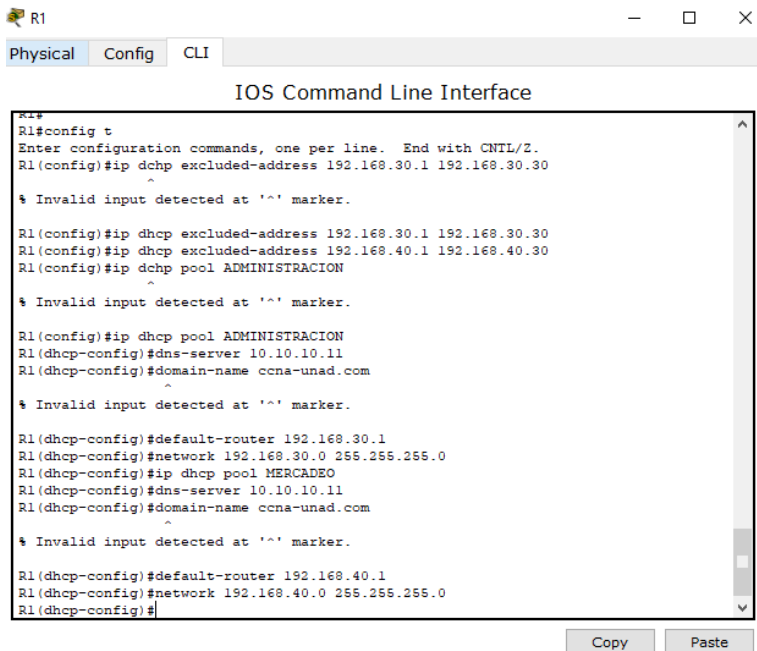
R1#
R1#config t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30
^
% Invalid input detected at '^' marker.

R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.30
R1(config)#ip dhcp pool ADMINISTRACION
^
% Invalid input detected at '^' marker.

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

Figura 34 Implementación DHCP y NAT para IPv4



The screenshot shows the CLI of a Cisco router (R1) in configuration mode. The user has entered several commands to configure DHCP and NAT. The output shows the configuration of two DHCP pools: 'ADMINISTRACION' and 'MERCADON'. The NAT configuration is also visible, showing the default router and network for each pool.

```
IOS Command Line Interface
R1#
R1#config 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
^
% Invalid input detected at '^' marker.

R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.30
R1(config)#ip dhcp pool ADMINISTRACION
^
% Invalid input detected at '^' marker.

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

Figura 35 Implementación DHCP y NAT para IPv4

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

```

R1
Physical Config CLI
IOS Command Line Interface
R1(config)#int g0/1.30
R1(config-subif)#description Administracion LAN
R1(config-subif)#
R1(config-subif)#ip add 192.168.30.1 255.255.255.0

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

R1(config-subif)#encapsulation dot1q 30
R1(config-subif)#int g0/1.40
R1(config-subif)#description Mercadeo LAN
R1(config-subif)#
R1(config-subif)#encapsulation dot1q 40
R1(config-subif)#ip add 192.168.40.1 255.255.255.0
R1(config-subif)#int g0/1.200
R1(config-subif)#description Mantenimiento LAN
R1(config-subif)#encapsulation dot1q 200
R1(config-subif)#ip add 192.168.200.1 255.255.255.0
R1(config-subif)#int g0/1.99
R1(config-subif)#description interfase LAN
R1(config-subif)#encapsulation dot1q 99
R1(config-subif)#ip add 192.168.99.1 255.255.255.0
R1(config-subif)#exit
R1(config)#int g0/1
R1(config-if)#no shut

R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up
Copy Paste

```

Figura 36 Configuración 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.

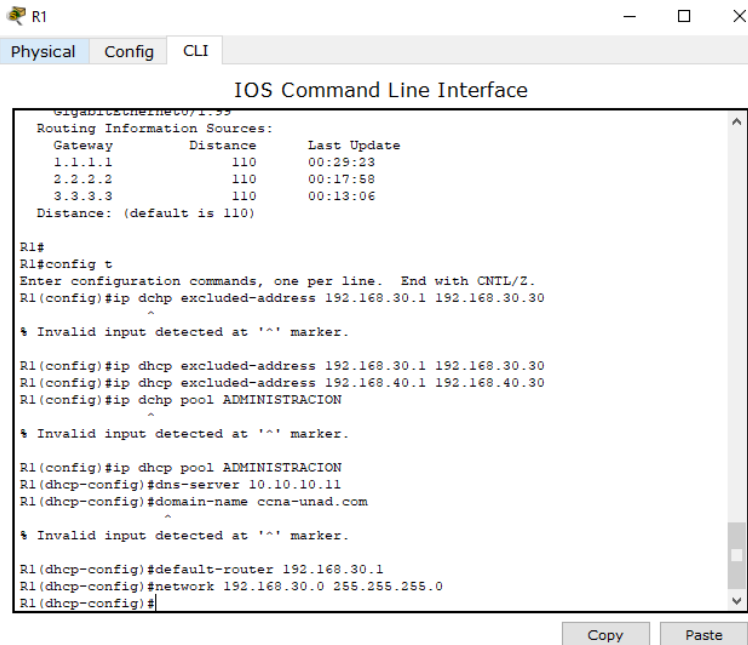
Configurar DHCP pool para VLAN 30	Name: ADMINISTRACION DNS-Server: 10.10.10.11 Domain-Name: ccna-unad.com Establecer default gateway.
-----------------------------------	--

Tabla 2 DHCP pool para vlan 30

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

Tabla 3 DHCP pool para vlan 40

✓ Dhcp pool para vlan 30



The screenshot shows the IOS Command Line Interface for router R1. The CLI is in configuration mode. The user has entered the following commands:

```
R1#  
R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30  
^  
% Invalid input detected at '^' marker.  
R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30  
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.30  
R1(config)#ip dhcp pool ADMINISTRACION  
^  
% Invalid input detected at '^' marker.  
R1(dhcp-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)#
```

The output shows the Routing Information Sources table:

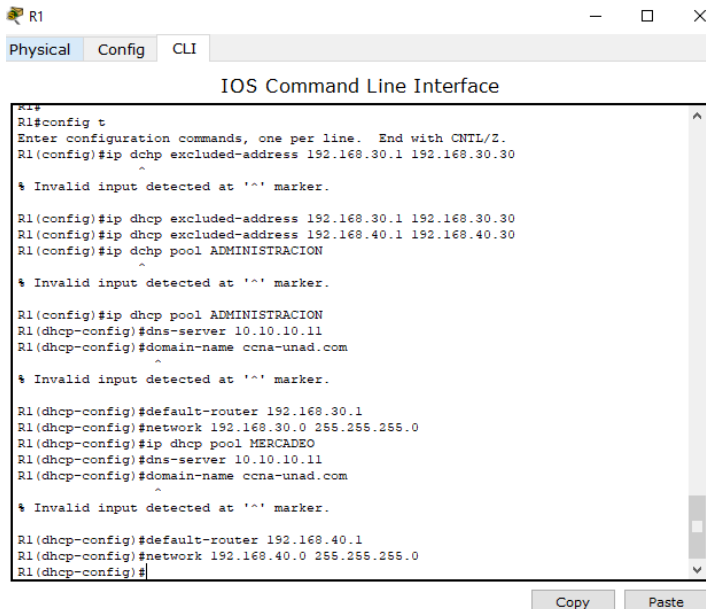
Gateway	Distance	Last Update
1.1.1.1	110	00:29:23
2.2.2.2	110	00:17:58
3.3.3.3	110	00:13:06

Distance: (default is 110)

Buttons: Copy, Paste

Figura 37 Dhcp pool para vlan 30

✓ Dhcp pool para vlan 40



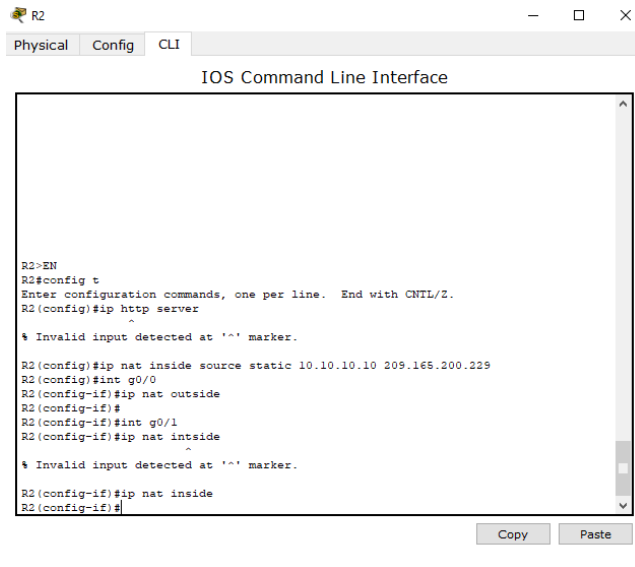
The screenshot shows the IOS Command Line Interface for router R1. The CLI is in configuration mode. The user has entered the following commands:

```
R1#  
R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30  
^  
% Invalid input detected at '^' marker.  
R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30  
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.30  
R1(config)#ip dhcp pool ADMINISTRACION  
^  
% Invalid input detected at '^' marker.  
R1(dhcp-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)#
```

Buttons: Copy, Paste

Figura 38 Dhcp pool para vlan 40

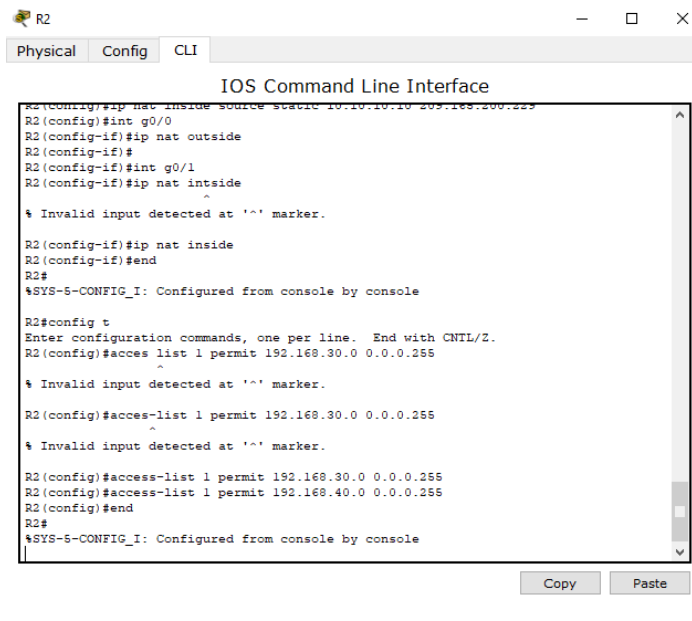
10. Configurar NAT en R2 para permitir que los hosts puedan salir a internet



```
R2>EN
R2#config t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip http server
^
% Invalid input detected at '^' marker.
R2(config)#ip nat inside source static 10.10.10.10 209.165.200.229
R2(config)#int g0/0
R2(config-if)#ip nat outside
R2(config-if)#
R2(config-if)#int g0/1
R2(config-if)#ip nat inside
^
% Invalid input detected at '^' marker.
R2(config-if)#ip nat inside
R2(config-if)#
```

Figura 39 Configuración NAT en R2

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(config)#ip nat inside source static 10.10.10.10 209.165.200.229
R2(config)#int g0/0
R2(config-if)#ip nat outside
R2(config-if)#
R2(config-if)#int g0/1
R2(config-if)#ip nat inside
^
% Invalid input detected at '^' marker.
R2(config-if)#ip nat inside
R2(config-if)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console
R2#config t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#access list 1 permit 192.168.30.0 0.0.0.255
^
% Invalid input detected at '^' marker.
R2(config)#access-list 1 permit 192.168.30.0 0.0.0.255
^
% Invalid input detected at '^' marker.
R2(config)#access-list 1 permit 192.168.30.0 0.0.0.255
R2(config)#access-list 1 permit 192.168.40.0 0.0.0.255
R2(config)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console
```

Figura 40 Listas de acceso

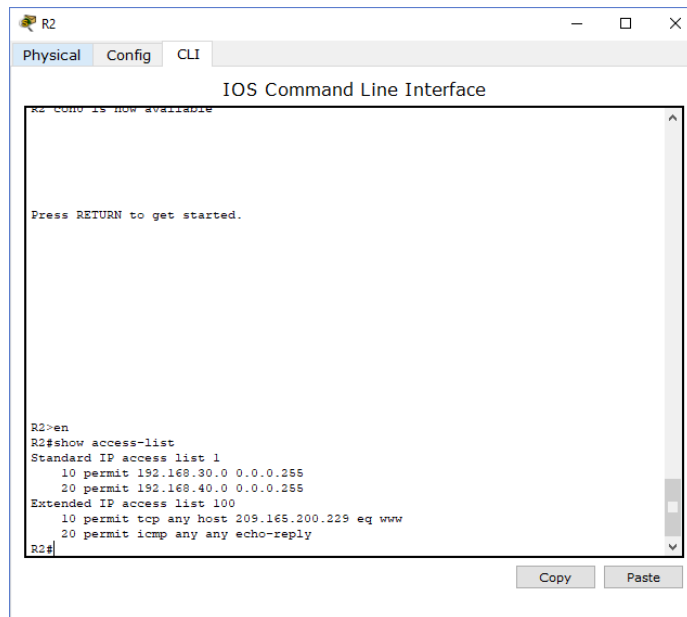


Figura 41 Listas de acceso

12. Configurar al menos dos listas de acceso de tipo extendido o nombradas a su criterio en para restringir o permitir tráfico desde R1 o R3 hacia R2.

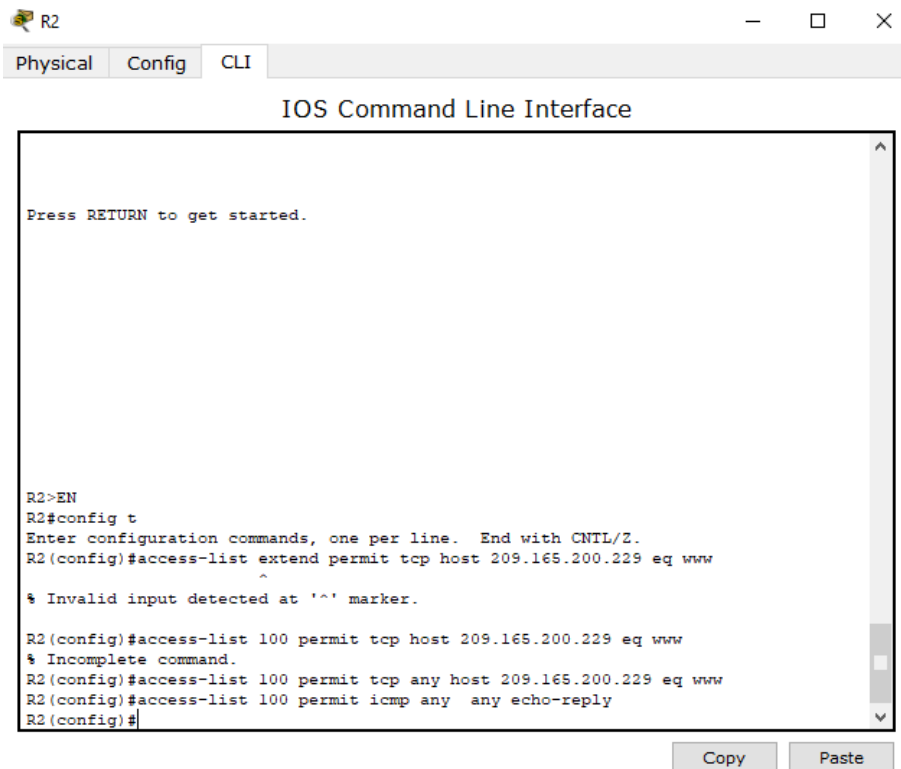


Figura 42 Listas de acceso extendido

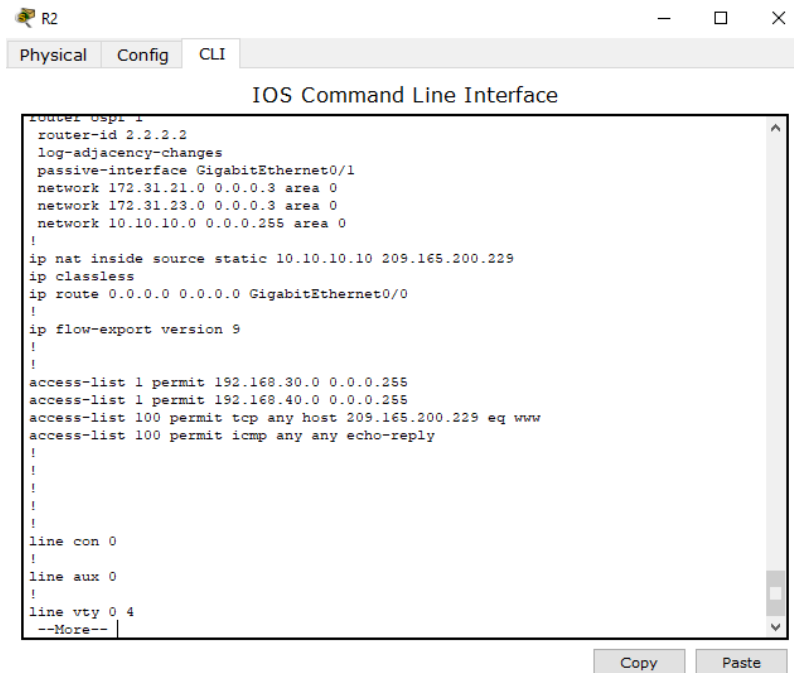


Figura 43 Lista de acceso extendido en R2

✓ Verificación de funcionamiento de lista de acceso

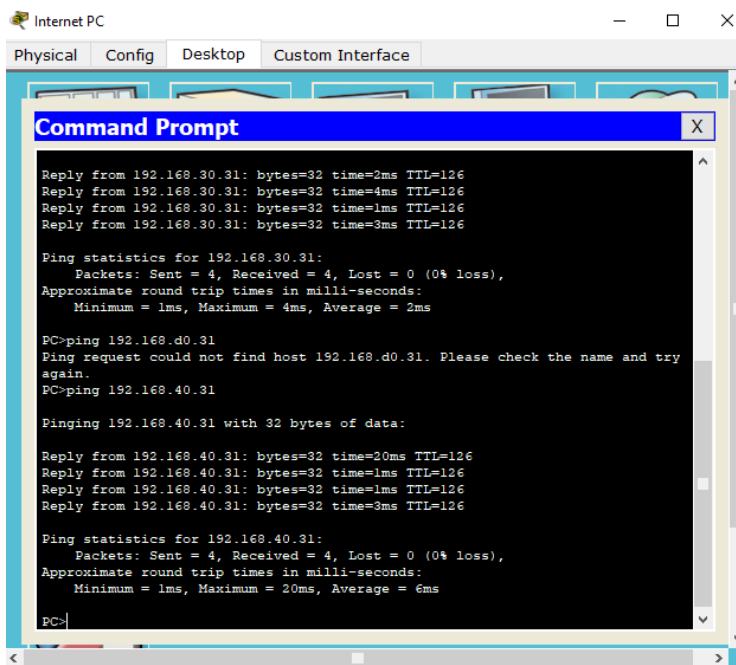
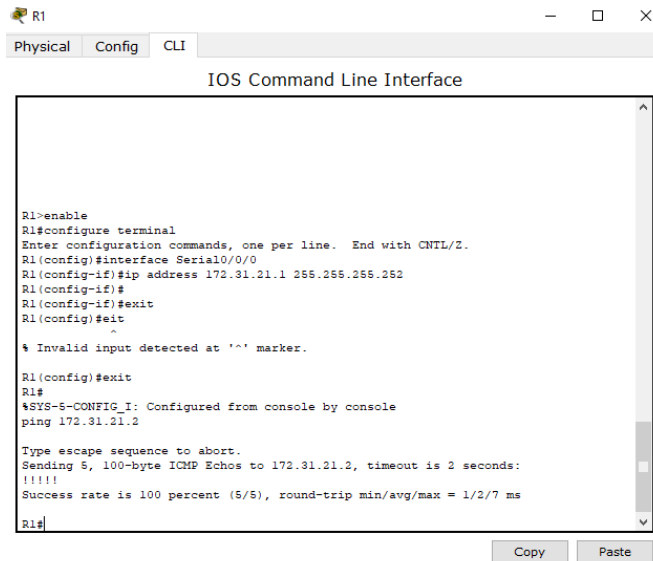


Figura 44 Verificación de funcionamiento de lista de acceso

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

✓ Ping de R1 a R2



```
R1
Physical Config CLI
IOS Command Line Interface

R1>enable
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface Serial0/0/0
R1(config-if)#ip address 172.31.21.1 255.255.255.252
R1(config-if)#
R1(config-if)#exit
R1(config)#exit
^
% Invalid input detected at '^' marker.

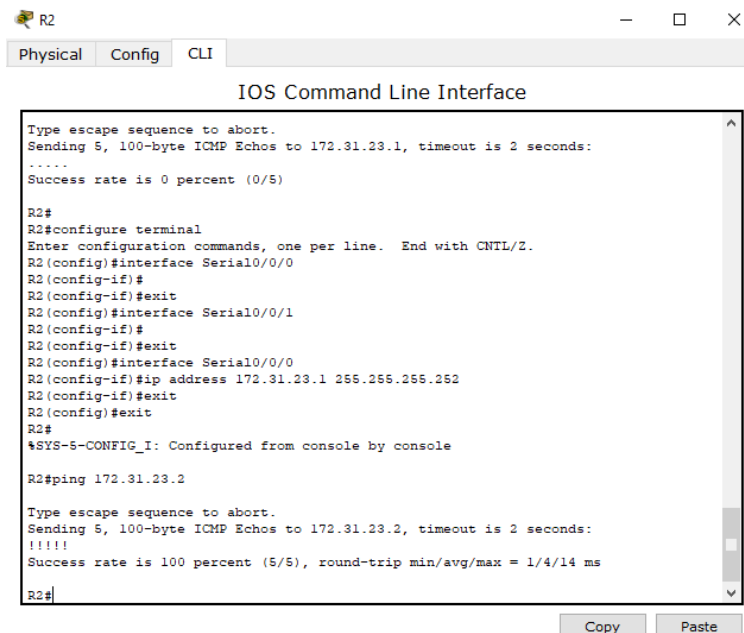
R1(config)#exit
R1#
*SYS-5-CONFIG_I: Configured from console by console
ping 172.31.21.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.21.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/7 ms

R1#
```

Figura 45 Ping de R1 a R2

✓ Ping de R2 a R3



```
R2
Physical Config CLI
IOS Command Line Interface

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.23.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)

R2#
R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#interface Serial0/0/0
R2(config-if)#
R2(config-if)#exit
R2(config)#interface Serial0/0/1
R2(config-if)#
R2(config-if)#exit
R2(config)#interface Serial0/0/0
R2(config-if)#ip address 172.31.23.1 255.255.255.252
R2(config-if)#exit
R2(config)#exit
R2#
*SYS-5-CONFIG_I: Configured from console by console

R2#ping 172.31.23.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.23.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/4/14 ms

R2#
```

Figura 46 Ping de R2 a R3

✓ Ping de Internet Pc a su puerta de enlace o Gateway

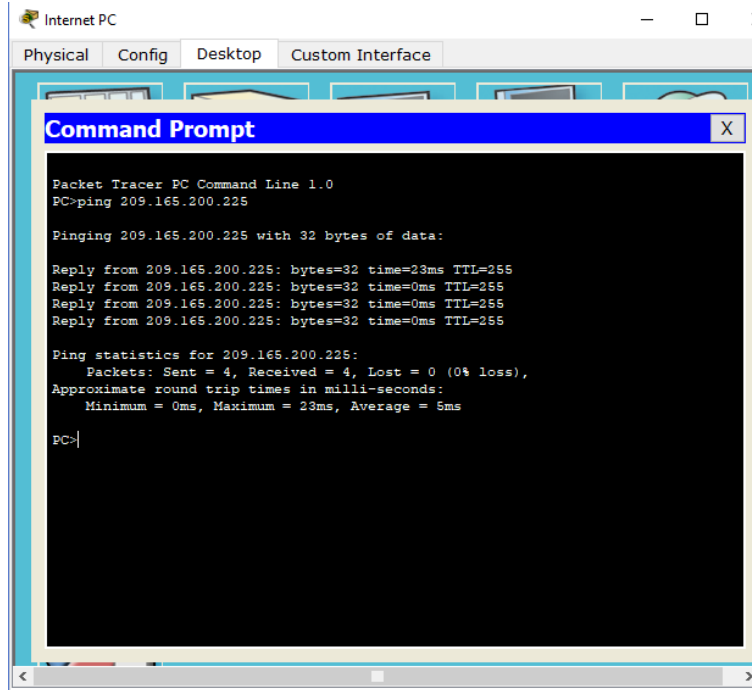


Figura 47 Ping de Internet Pc a su puerta de enlace o Gateway

✓ Ping del web server a su Gateway

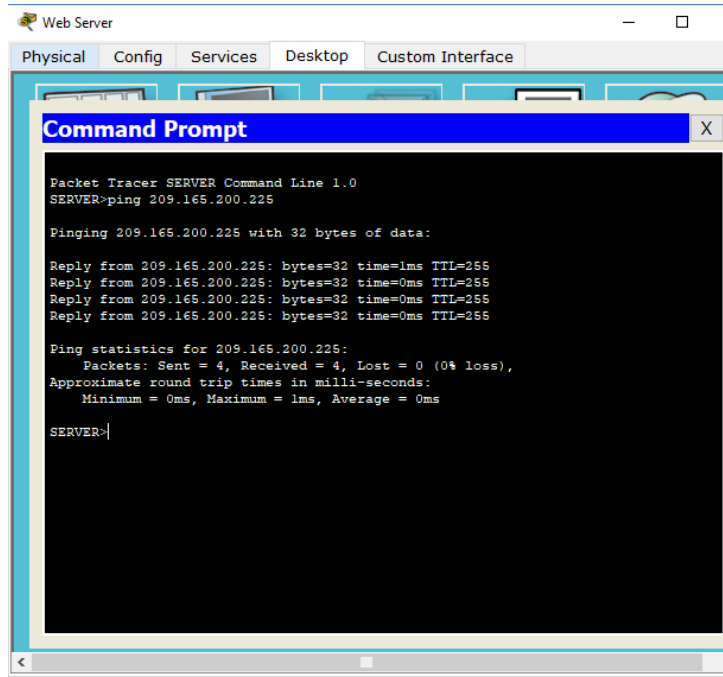
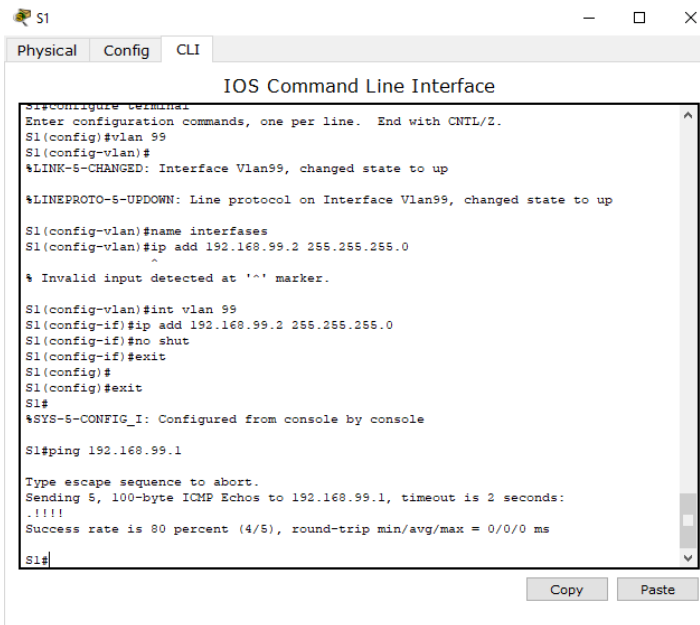


Figura 48 Ping del web server a su Gateway

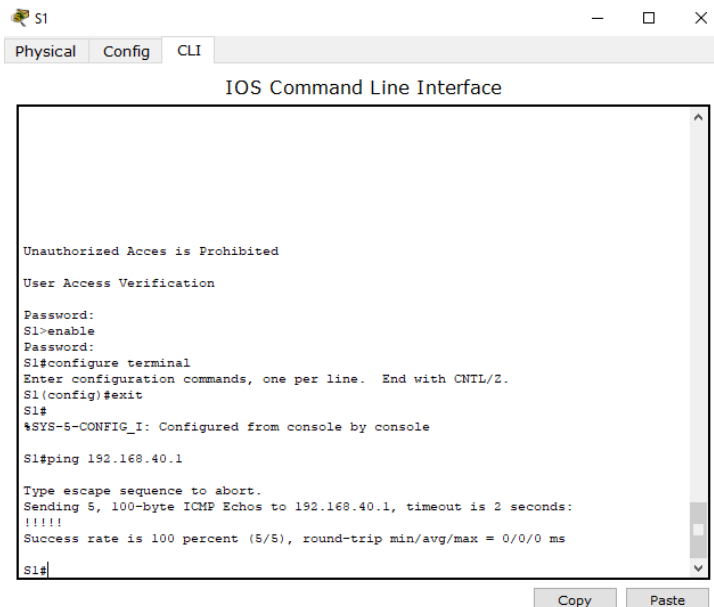
✓ Ping de S1 a R1 a través de la vlan 99



```
S1
Physical Config CLI
IOS Command Line Interface
S1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#vlan 99
S1(config-vlan)#
%LINK-5-CHANGED: Interface Vlan99, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan99, changed state to up
S1(config-vlan)#name interfaces
S1(config-vlan)#ip add 192.168.99.2 255.255.255.0
^
% Invalid input detected at '^' marker.
S1(config-vlan)#int vlan 99
S1(config-if)#ip add 192.168.99.2 255.255.255.0
S1(config-if)#no shut
S1(config-if)#exit
S1(config)#
S1(config)#exit
S1#
%SYS-5-CONFIG_I: 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 = 0/0/0 ms
S1#
```

Figura 49 Ping de S1 a R1 a través de la vlan 99

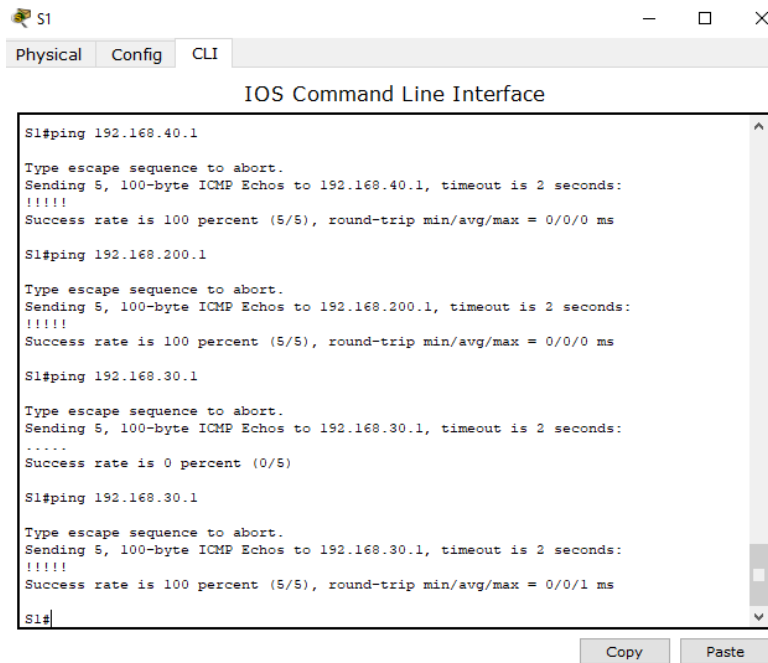
✓ Ping de S1 a R1 a través de la vlan 40



```
S1
Physical Config CLI
IOS Command Line Interface
Unauthorized Access is Prohibited
User Access Verification
Password:
S1>enable
Password:
S1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#exit
S1#
%SYS-5-CONFIG_I: Configured from console by console
S1#ping 192.168.40.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.40.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
S1#
```

Figura 50 Ping de S1 a R1 a través de la vlan 40

✓ Ping de S1 a R1 a través de vlans 200 y 30



```
S1#ping 192.168.40.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.40.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

S1#ping 192.168.200.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.200.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms

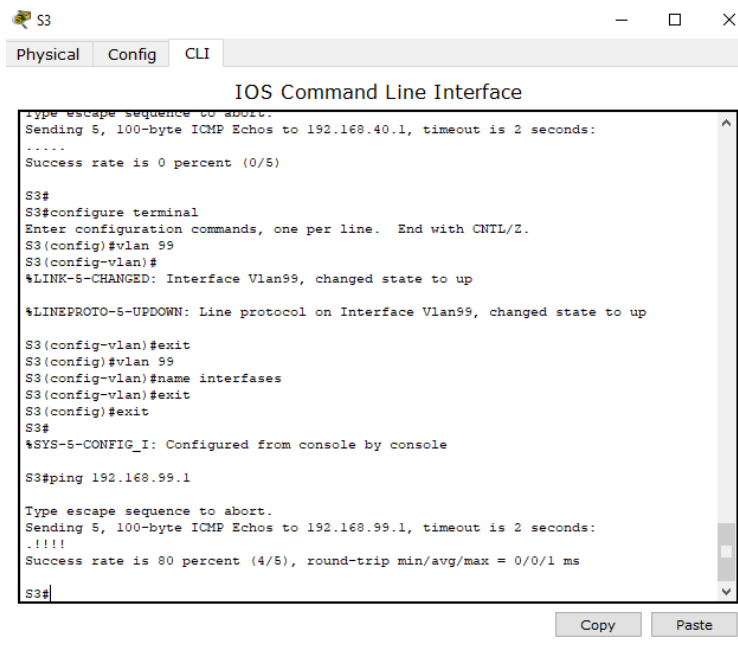
S1#ping 192.168.30.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.30.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)

S1#ping 192.168.30.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.30.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms

S1#
```

Figura 51 Ping de S1 a R1 a través de vlans 200 y 30

✓ Ping desde S3 a R1 a través de la vlan 99



```
S3#
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.40.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)

S3#
S3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#vlan 99
S3(config-vlan)#
%LINK-5-CHANGED: Interface Vlan99, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan99, changed state to up

S3(config-vlan)#exit
S3(config)#vlan 99
S3(config-vlan)#name interfaces
S3(config-vlan)#exit
S3(config)#exit
S3#
%SYS-5-CONFIG_I: Configured from console by console

S3#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 = 0/0/1 ms

S3#
```

Figura 52 Ping desde S3 a R1 a través de la vlan 99

✓ Ping de S3 a R1 a través de las vlans 30,40 y 200

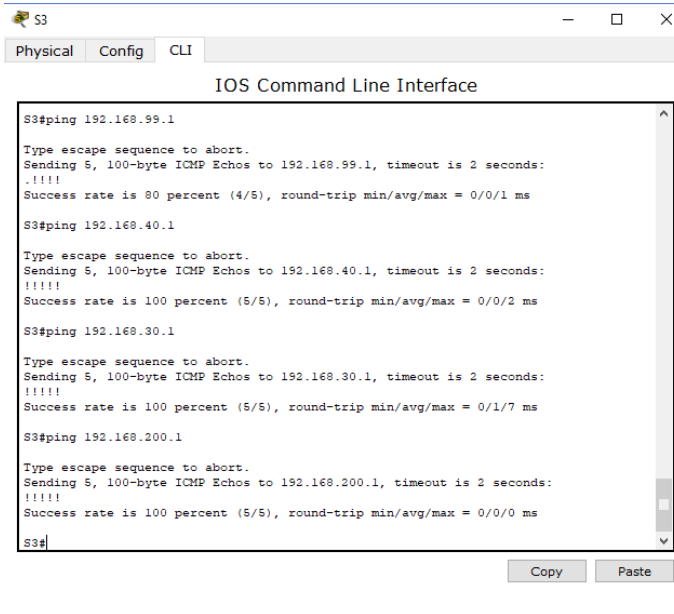


Figura 53 Ping de S3 a R1 a través de las vlans 30,40 y 200

✓ Ping de PCA a PCC

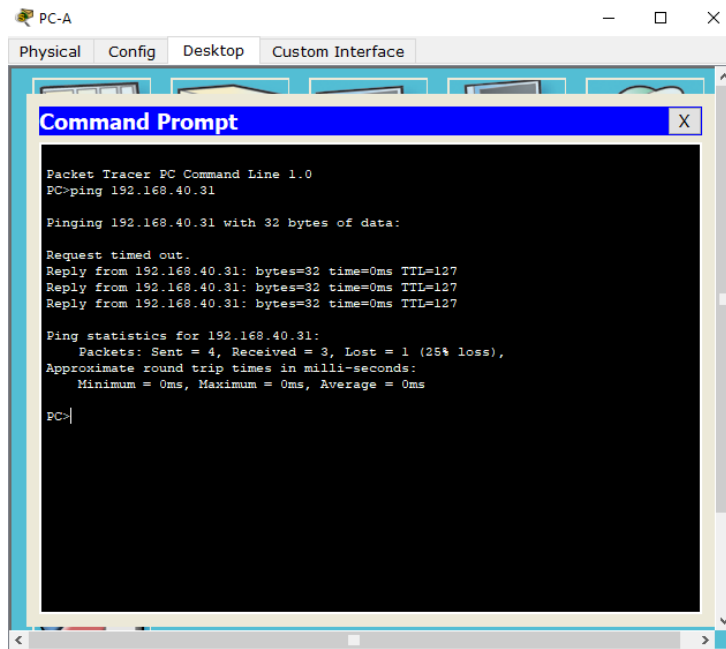


Figura 54 Ping de PCA a PCC

- ✓ Prueba de acceso desde PC-INTERNET a WEB SERVER

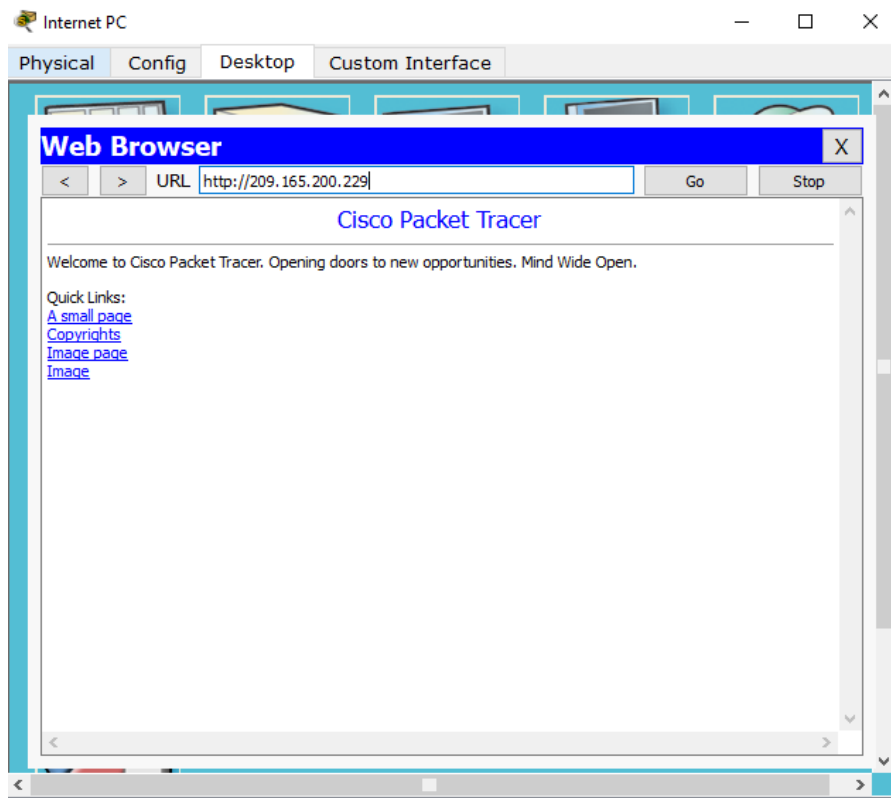


Figura 55 Prueba de acceso desde PC-INTERNET a WEB SERVER

CONCLUSIONES

- Se utilizó la herramienta de simulación Packet Tracer y se establecieron escenarios LAN/WAN que nos permitieron realizar un análisis sobre el comportamiento de diversos protocolos y métricas de enrutamiento, evaluando el comportamiento de enrutadores, mediante el uso de comandos de administración de tablas de enrutamiento, bajo el uso de protocolos de vector distancia y estado enlace. Se utilizó comandos de configuración avanzada en Router y switch y se implementó OSPFV2 en la topología de red presentada
- Se implementaron las vlan requeridas, sin embargo, la vlan 99 no se encontraba en la tabla de vlans, pero si se encontraba en el direccionamiento de los switch 1 y 3 por lo cual se deja con nombre interfaces
- No se implementó el web server a través de la conexión lo0 se implementó a través de un servidor normal y a este se les aplicaron las configuraciones pertinentes debido a conflictos con Packet Tracer al momento de crearlo con lo0
- Se realizaron pruebas de conexión entre Pcs, router, web server y pc internet de manera satisfactoria
- Las listas de acceso creadas funcionaron correctamente de acuerdo a las directrices dadas, también se evidencio a través del comando *sh run* el estado de cada uno de los puertos de acceso

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[<http://www.ciscopress.com/articles/article.asp?p=24090>] – Consultado el 25 de mayo de 2018