PRUEBA DE HABILIDADES PRÁCTICAS CCNA

Presentado a:

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BOGOTA

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ABSTRAC

During the last semester we worked with the advice of our tutor, and the reading of the material provided by Cisco Networking Academy going into the different cases and examples of configuration of telecommunications devices where practices were carried out through the Cisco Packet Tracer application giving solution to different cases and problems in a real environment this did not recognize the different devices along with their functions such as ping, show, ip, route, tracerouter and their management.

Through the following exercises we will test the knowledge and skills obtained through the execution of the described problems giving the correct solution.

INTRODUCCION

La introducción de las tecnologías de la informática y las comunicaciones en el proceso de enseñanza y aprendizaje adquiere cada día mayor importancia por el impacto positivo que tiene. El avance en nuestra sociedad de las redes de computadoras ha generado una verdadera evolución en el estudio y trabajo de estas, los sistemas de comunicación juegan un papel importante ya que cada día se hace más fácil acceder a la información mediante sistemas de información que nos permite tener acceso y comunicación para obtener el conocimiento necesario para analizarlo y ponerlo en práctica para sobresalir y conocer la situación y el empleo de las mismas.

El objetivo del presente trabajo consiste en realizar prácticas con el fin de tener en cuenta aspectos básicos de networking, como también temas fundamentales de la comunicación y las redes de area local (LAN) y redes de area extensa (WAN) vistas durante el proceso de formación sobre el tema.

En las prácticas se utilizaron herramientas como equipos, dispositivos routers, switch, servidores y cables trenzado y directo, con el fin de lograr la simulación en Packet Tracer.

La solución del presente trabajo mediante la estrategia de aprendizaje basado en Tareas favorece el desarrollo de competencias y se nota una planeación al tener un orden lógico de ejecución claramente establecidos, facilitando el proceso de aprendizaje a través de espacios e interacción.

Descripción de escenarios propuestos para la prueba de habilidades

Escenario 1

Tabla de direccionamiento

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

PC20	NIC	DHCP	DHCP	DHCP
PC21	NIC	DHCP	DHCP	DHCP
PC30	NIC	DHCP	DHCP	DHCP
PC31	NIC	DHCP	DHCP	DHCP
Laptop20	NIC	DHCP	DHCP	DHCP
Laptop21	NIC	DHCP	DHCP	DHCP
Laptop30	NIC	DHCP	DHCP	DHCP

Laptop31	NIC	DHCP	DHCP	DHCP

Tabla de asignación de VLAN y de puertos

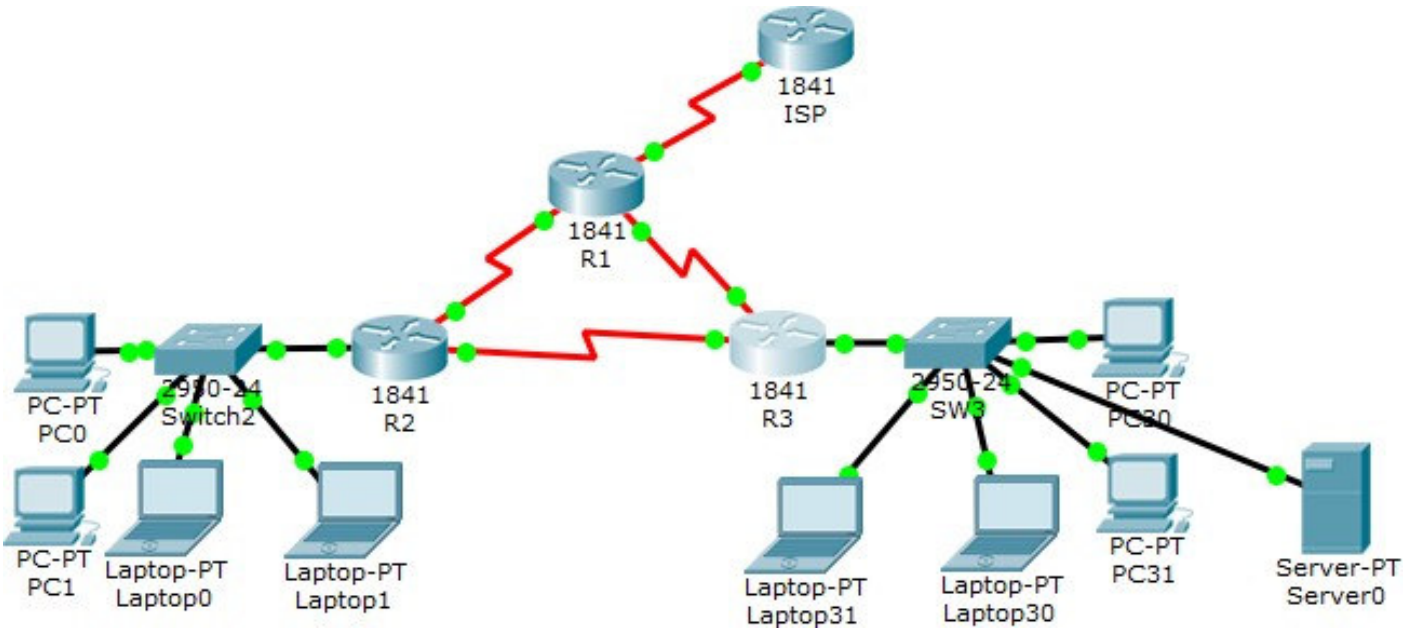
Dispositivo	VLAN	Nombre	Interfaz
SW2	100	LAPTOPS	Fa0/2-3
SW2	200	DESTOPS	Fa0/4-5
SW3	1	-	Todas las interfaces

Tabla de enlaces troncales

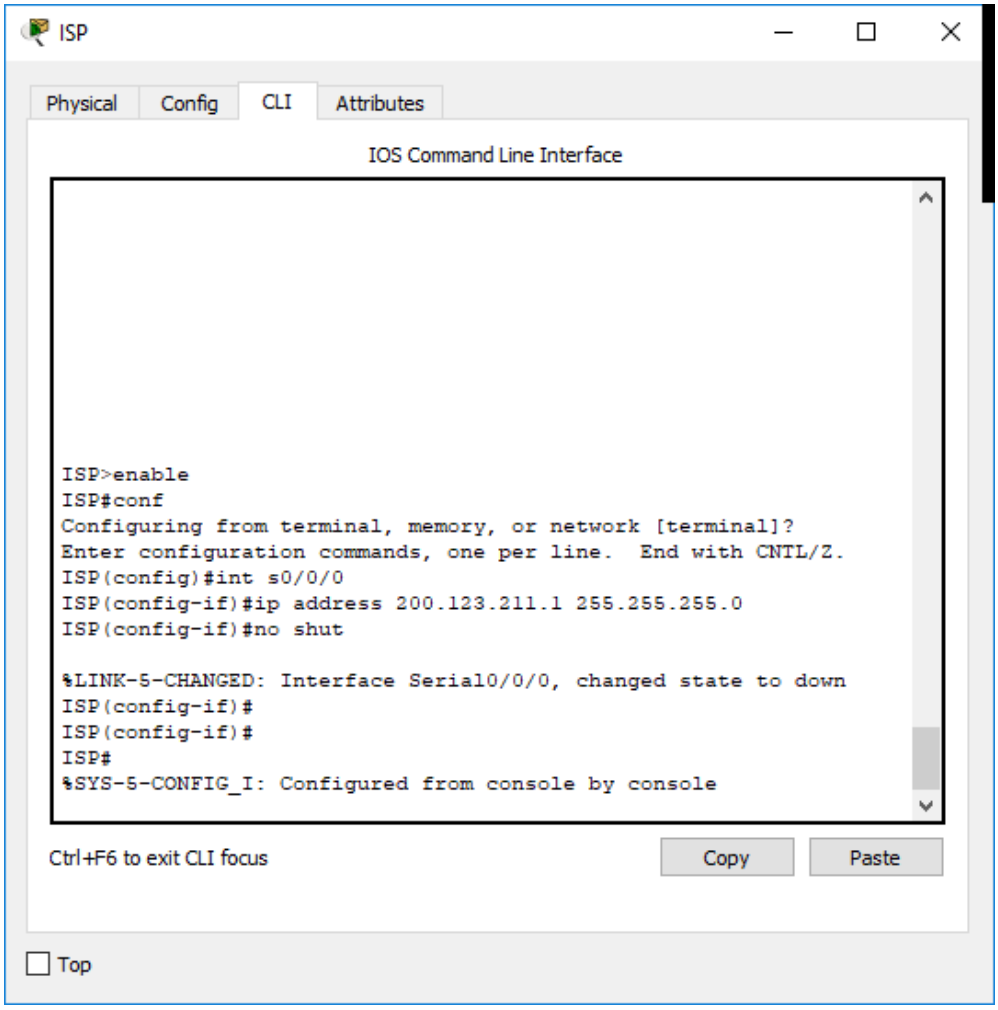
Dispositivo local	Interfaz local	Dispositivo remoto
SW2	Fa0/2-3	100

Situación

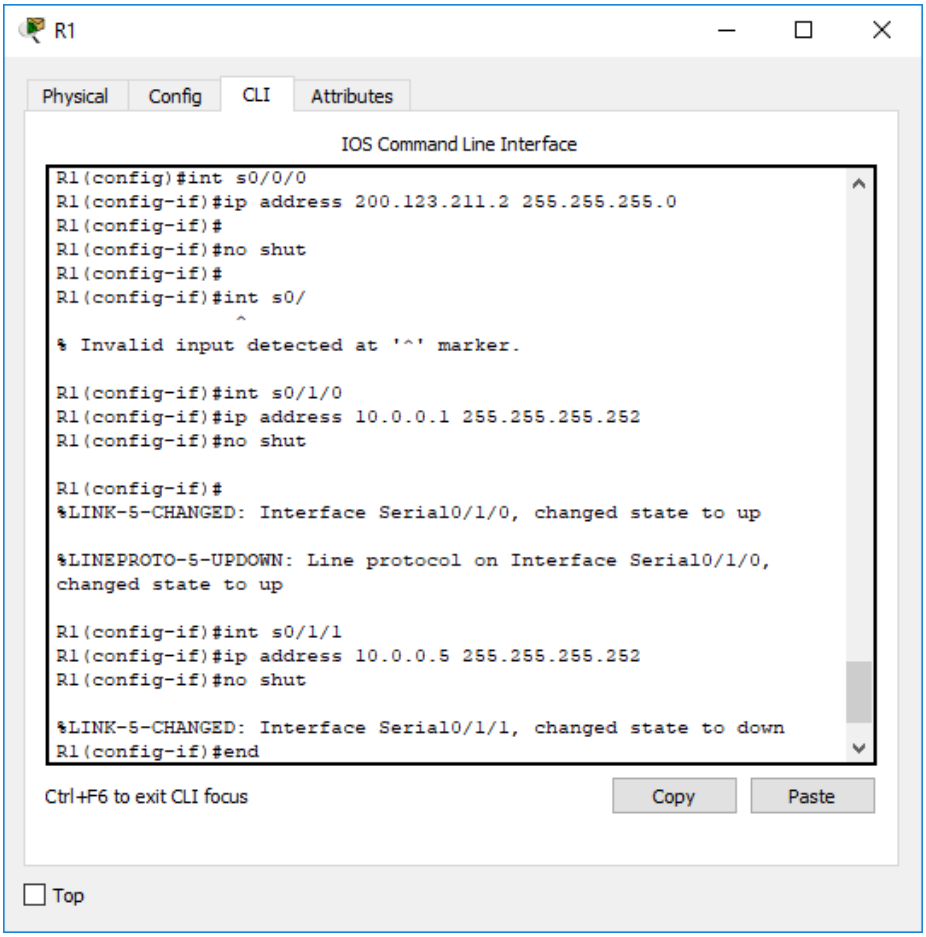
En esta actividad, demostrará y reforzará su capacidad para implementar NAT, servidor de DHCP, RIPV2 y el routing entre VLAN, incluida la configuración de direcciones IP, las VLAN, los enlaces troncales y las subinterfaces. Todas las pruebas de alcance deben realizarse a través de ping únicamente.



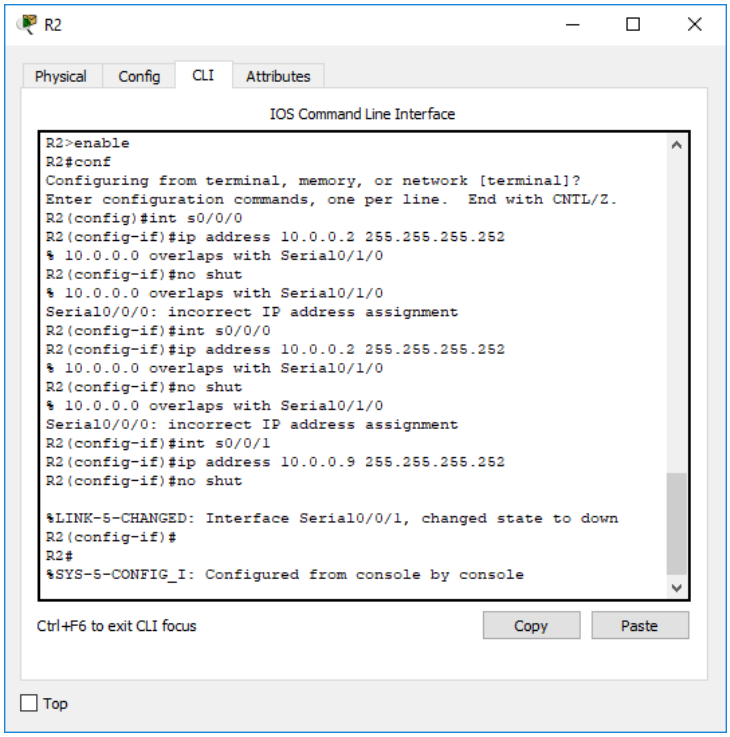
```
ISP>enable

ISP#conf
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
ISP(config)#int s0/0/0
ISP(config-if)#ip address 200.123.211.1 255.255.255.0
ISP(config-if)#no shut

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
ISP(config-if)#
ISP(config-if)#
ISP#
%SYS-5-CONFIG_I: Configured from console by console
```



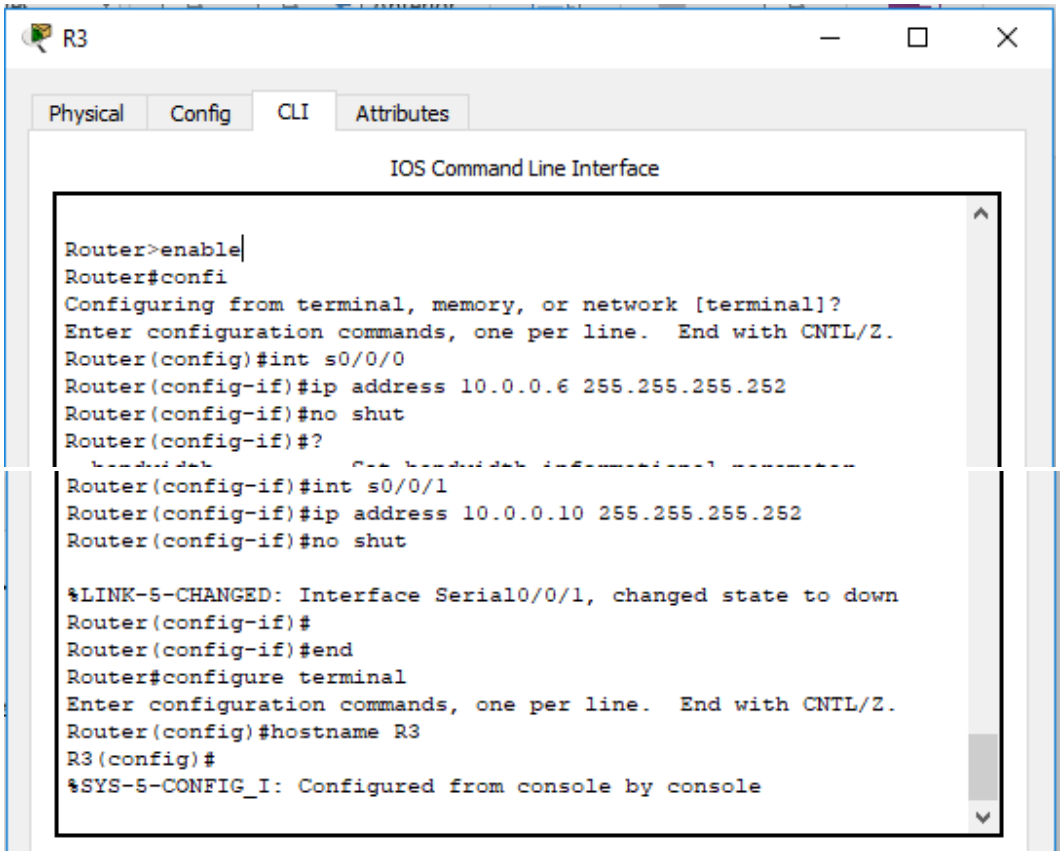
```
R1(config-if)#int s0/1/0
R1(config-if)#ip address 10.0.0.1 255.255.255.252
R1(config-if)#no shut

R1(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up

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

R1(config-if)#int s0/1/1
R1(config-if)#ip address 10.0.0.5 255.255.255.252
R1(config-if)#no shut

%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
R1(config-if)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console
```



```
R2>enable
R2#conf
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#int s0/0/0
R2(config-if)#ip address 10.0.0.2 255.255.255.252
% 10.0.0.0 overlaps with Serial0/1/0
R2(config-if)#no shut
% 10.0.0.0 overlaps with Serial0/1/0
Serial0/0/0: incorrect IP address assignment
R2(config-if)#int s0/0/0
R2(config-if)#ip address 10.0.0.2 255.255.255.252
% 10.0.0.0 overlaps with Serial0/1/0
R2(config-if)#no shut
% 10.0.0.0 overlaps with Serial0/1/0
Serial0/0/0: incorrect IP address assignment
R2(config-if)#int s0/0/1
R2(config-if)#ip address 10.0.0.9 255.255.255.252
R2(config-if)#no shut

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
R2(config-if)#
R2#
%SYS-5-CONFIG_I: Configured from console by console
```

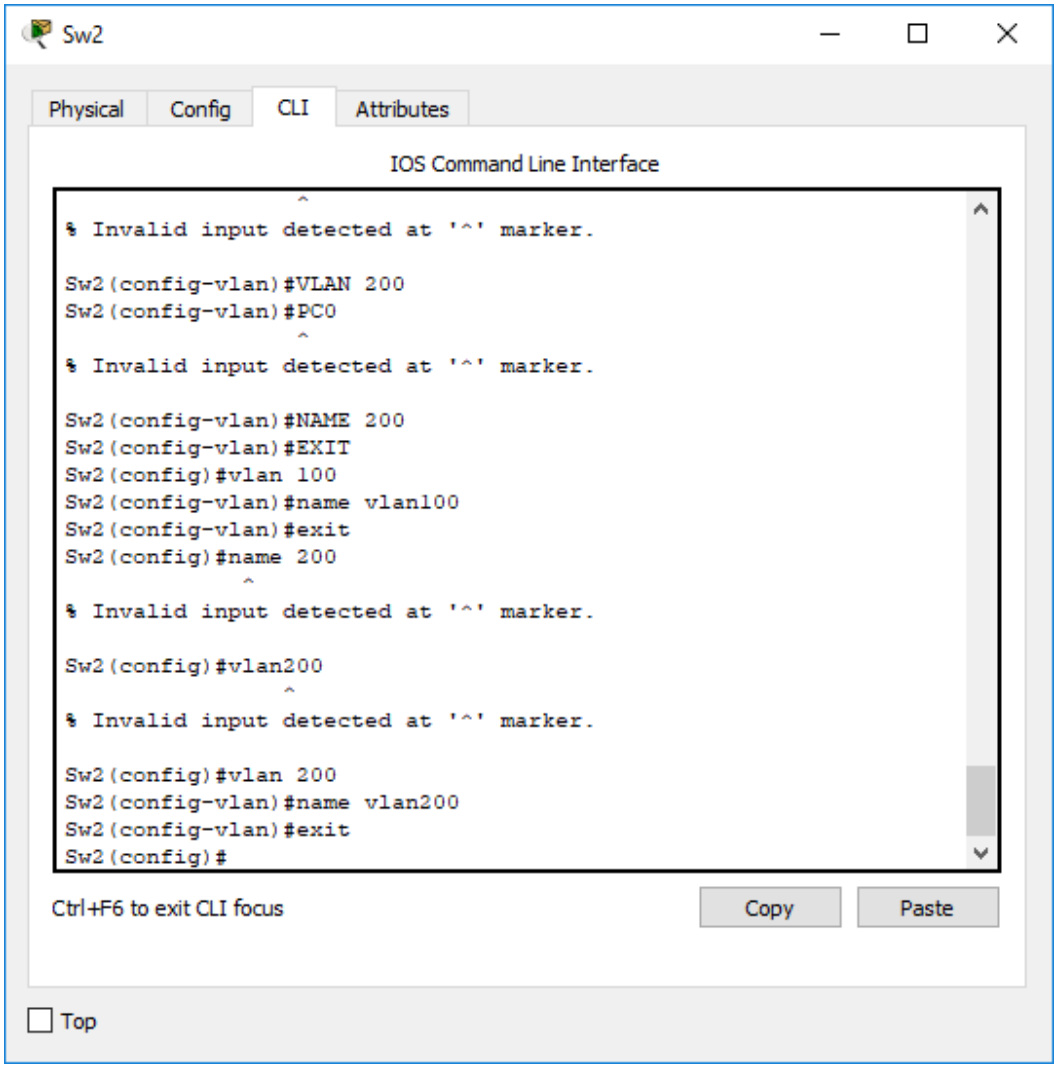


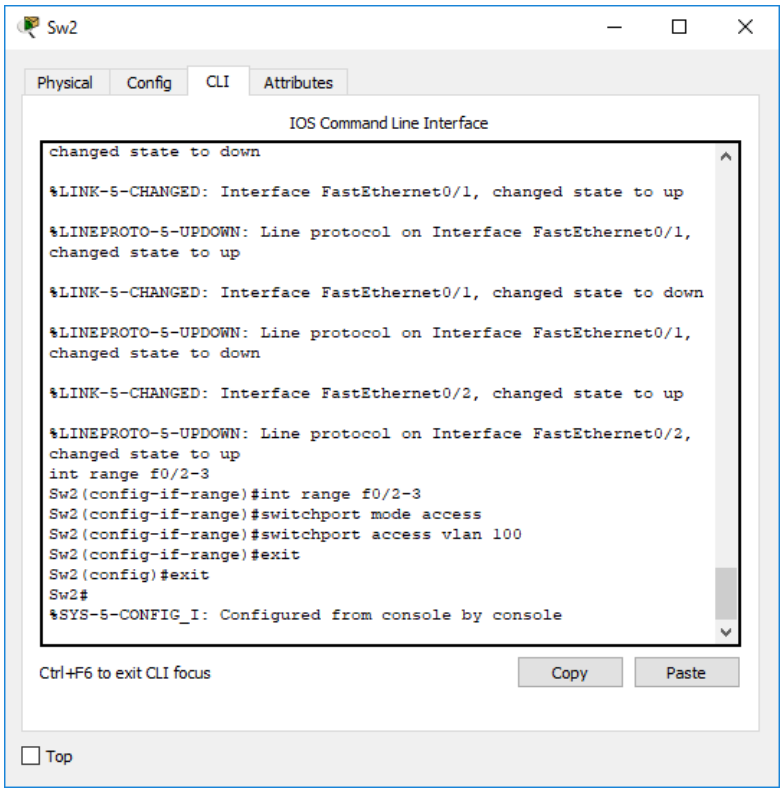
```
Router>enable
Router#confi
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 10.0.0.6 255.255.255.252
Router(config-if)#no shut
Router(config-if)#?
Router(config-if)#int s0/0/1
Router(config-if)#ip address 10.0.0.10 255.255.255.252
Router(config-if)#no shut

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
Router(config-if)#
Router(config-if)#end
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R3
R3(config)#
%SYS-5-CONFIG_I: Configured from console by console
```

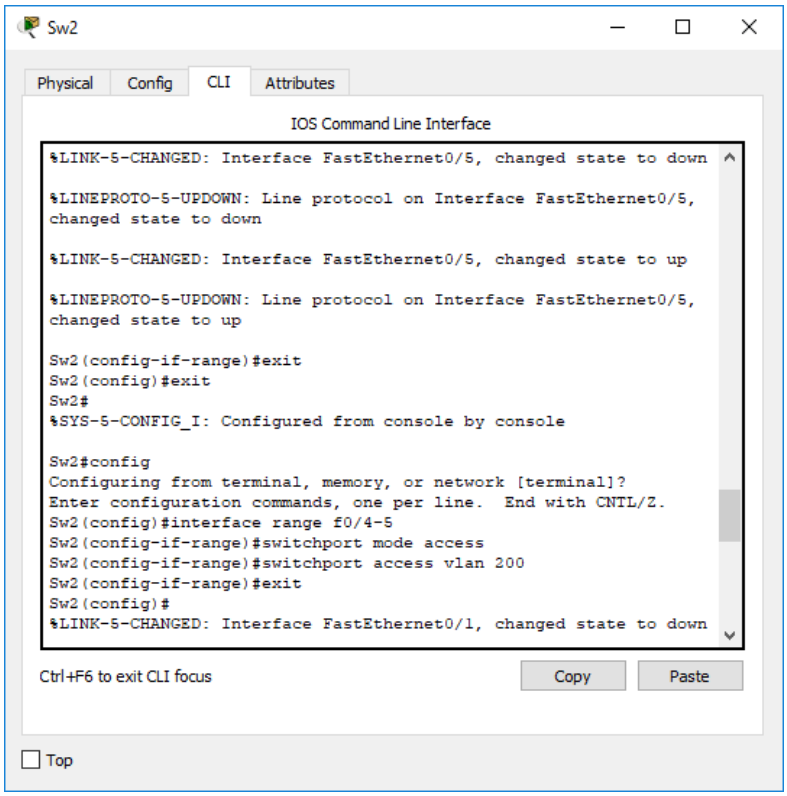


Descripción de las actividades

- **SW1** VLAN y las asignaciones de puertos de VLAN deben cumplir con la tabla 1. Se habilitan las vlan 100 y 200.




Sw2
Physical
Config
CLI
Attributes
IOS Command Line Interface
changed state to down
%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 FastEthernet0/1, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up
int range f0/2-3
Sw2(config-if-range)#int range f0/2-3
Sw2(config-if-range)#switchport mode access
Sw2(config-if-range)#switchport access vlan 100
Sw2(config-if-range)#exit
Sw2(config)#exit
Sw2#
%SYS-5-CONFIG_I: Configured from console by console
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


Sw2
Physical
Config
CLI
Attributes
IOS Command Line Interface
%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/5, changed state to down
%LINK-5-CHANGED: Interface FastEthernet0/5, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/5, changed state to up
Sw2(config-if-range)#exit
Sw2(config)#exit
Sw2#
%SYS-5-CONFIG_I: Configured from console by console
Sw2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Sw2(config)#interface range f0/4-5
Sw2(config-if-range)#switchport mode access
Sw2(config-if-range)#switchport access vlan 200
Sw2(config-if-range)#exit
Sw2(config)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to down
Ctrl+F6 to exit CLI focus
Copy
Paste
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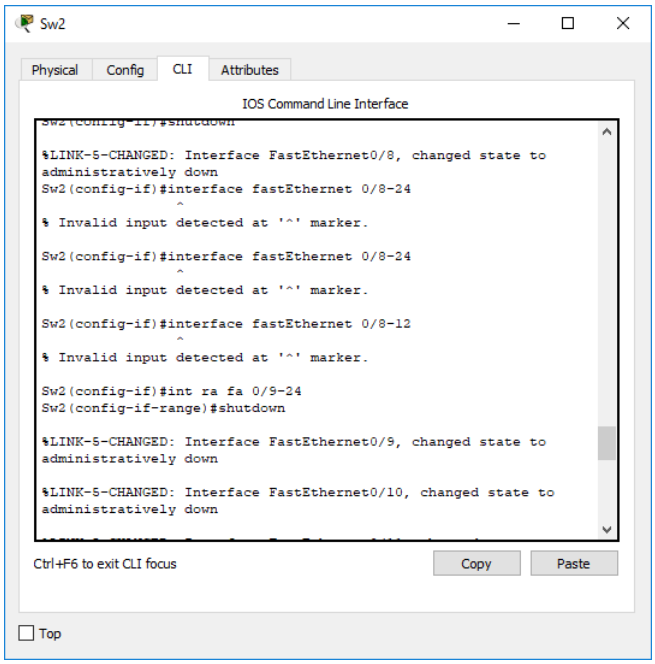
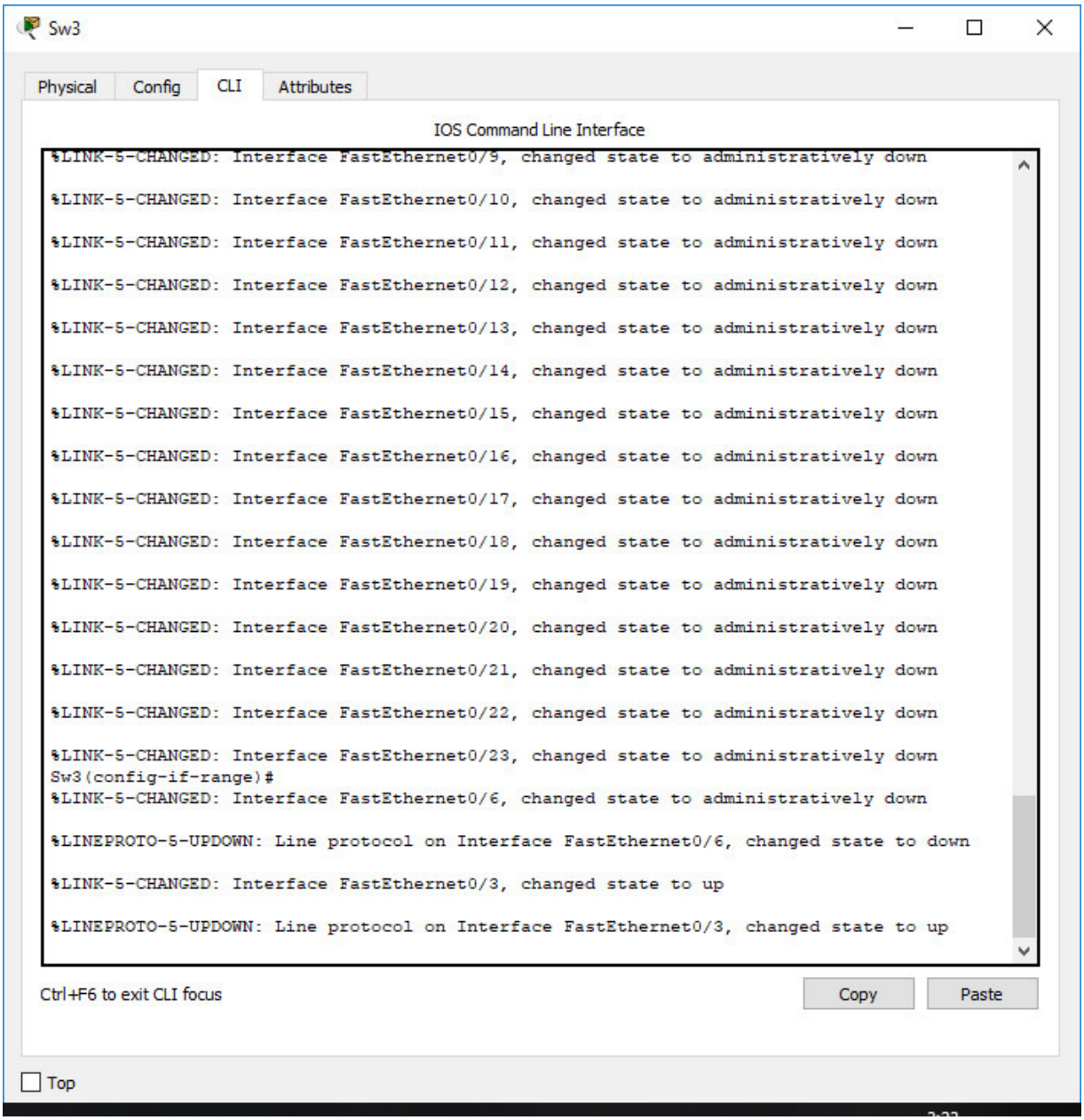
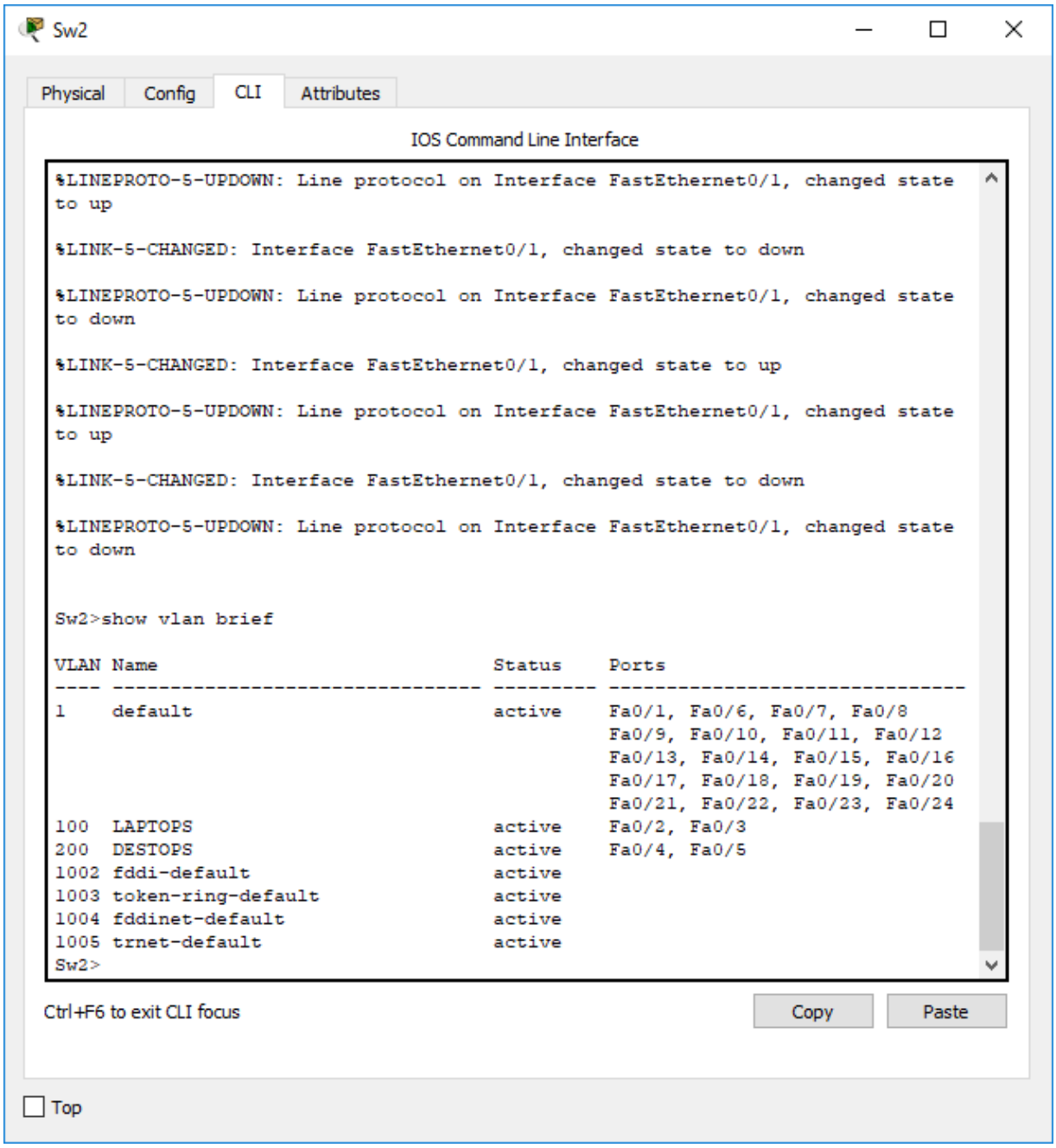
- Los puertos de red que no se utilizan se deben deshabilitar.



Se verifica que las vlan y puertos queden asignados y activas.



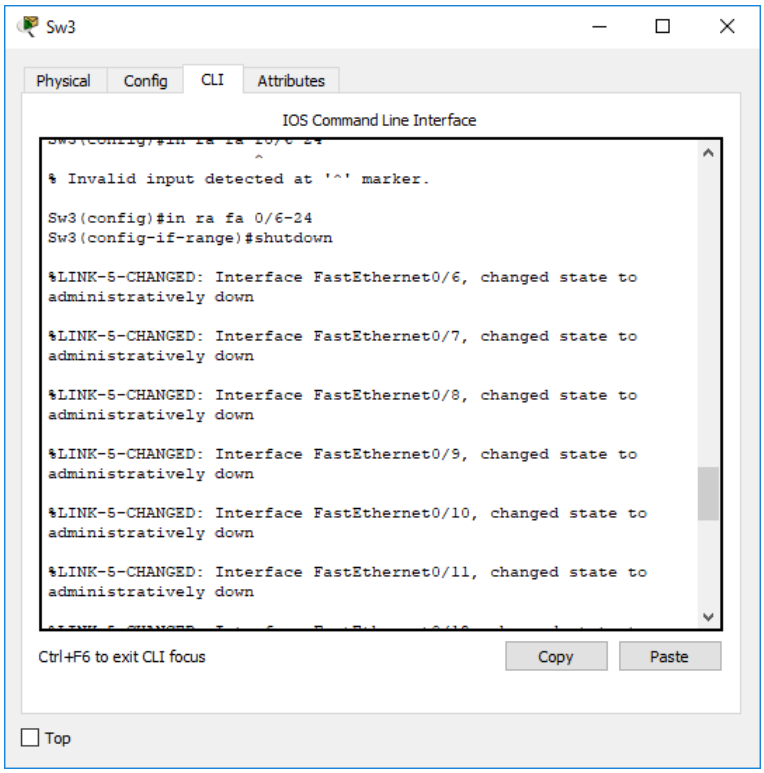
Se realiza configuración de SW2 verificando las Vlan activas.

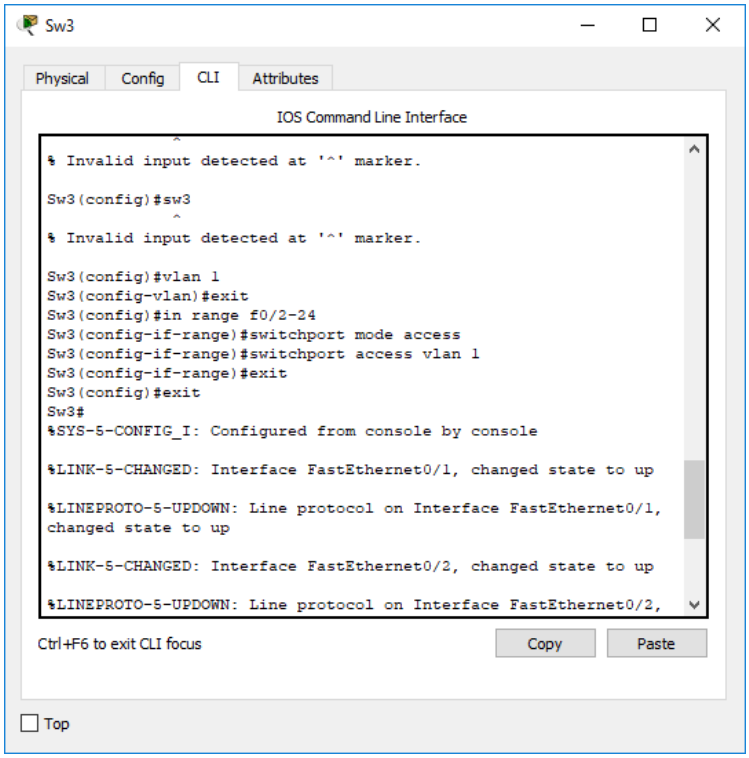


Se configura SW3 con los parámetros de la tabla y se deshabilitan los puertos que no se usaran

```
Sw3>enable
Sw3#conf
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Sw3(config)#vlan 1
Sw3(config-vlan)#exit
Sw3(config)#int range fa0/1-24
Sw3(config-if-range)#swichport mode access
^
% Invalid input detected at '^' marker.
Sw3(config-if-range)#switchport mode access
Sw3(config-if-range)#switchport access vlan 1
Sw3(config-if-range)#exit
Sw3(config)#int range fa0/7.24
interface range not validated - command rejected
Sw3(config)#int range fa0/7-24
Sw3(config-if-range)#shut
Sw3(config-if-range)#shutdown

Sw3(config-if-range)#
```




Sw3
Physical
Config
CLI
Attributes
IOS Command Line Interface
% Invalid input detected at '^' marker.
Sw3(config)#sw3
% Invalid input detected at '^' marker.
Sw3(config)#vlan 1
Sw3(config-vlan)#exit
Sw3(config)#in range f0/2-24
Sw3(config-if-range)#switchport mode access
Sw3(config-if-range)#switchport access vlan 1
Sw3(config-if-range)#exit
Sw3(config)#exit
Sw3#
%SYS-5-CONFIG_I: Configured from console by console
%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 FastEthernet0/2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2,
Ctrl+F6 to exit CLI focus
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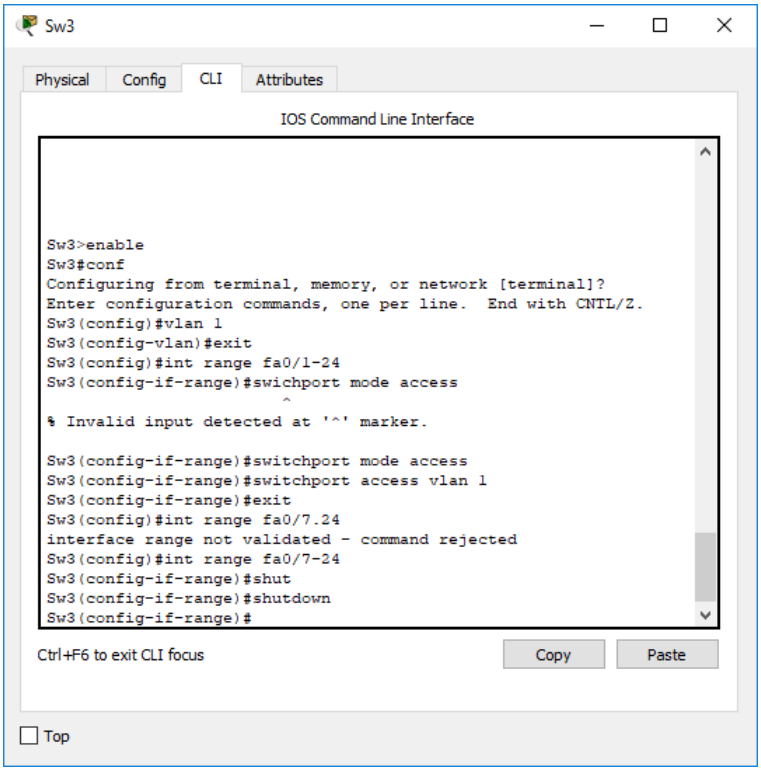
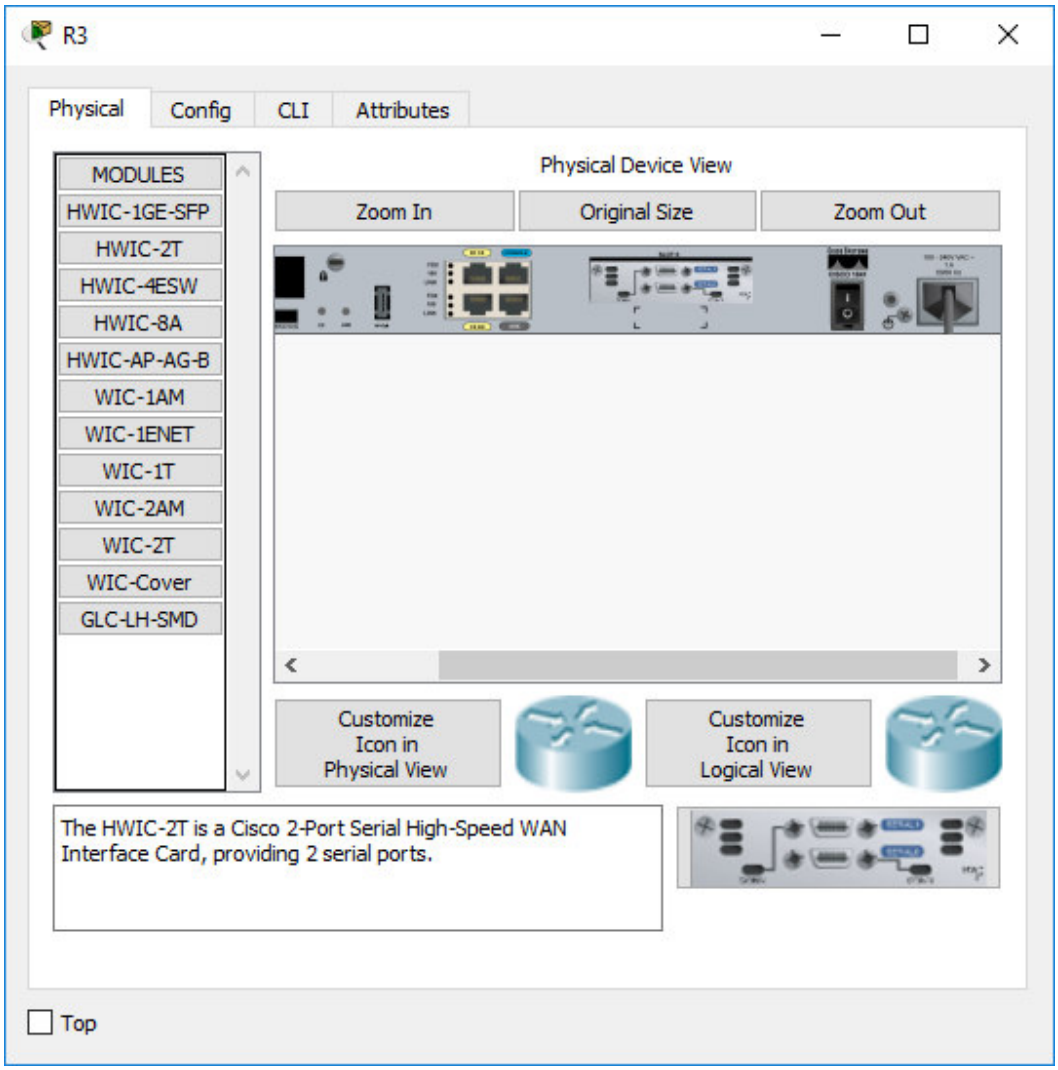
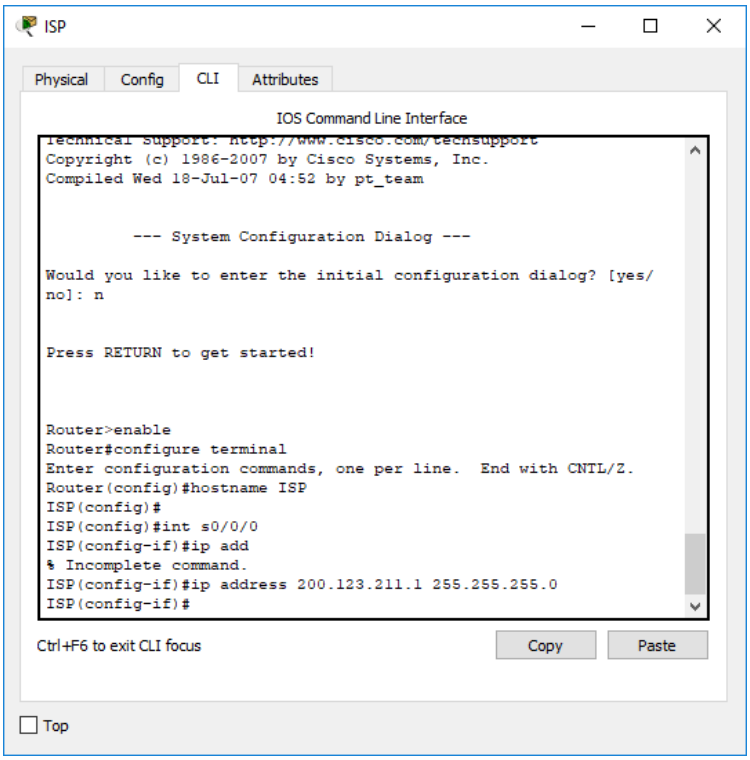

Sw3
Physical
Config
CLI
Attributes
IOS Command Line Interface
Sw3>enable
Sw3#conf
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Sw3(config)#vlan 1
Sw3(config-vlan)#exit
Sw3(config)#int range fa0/1-24
Sw3(config-if-range)#swichport mode access
% Invalid input detected at '^' marker.
Sw3(config-if-range)#switchport mode access
Sw3(config-if-range)#switchport access vlan 1
Sw3(config-if-range)#exit
Sw3(config)#int range fa0/7.24
interface range not validated - command rejected
Sw3(config)#int range fa0/7-24
Sw3(config-if-range)#shut
Sw3(config-if-range)#shutdown
Sw3(config-if-range)#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

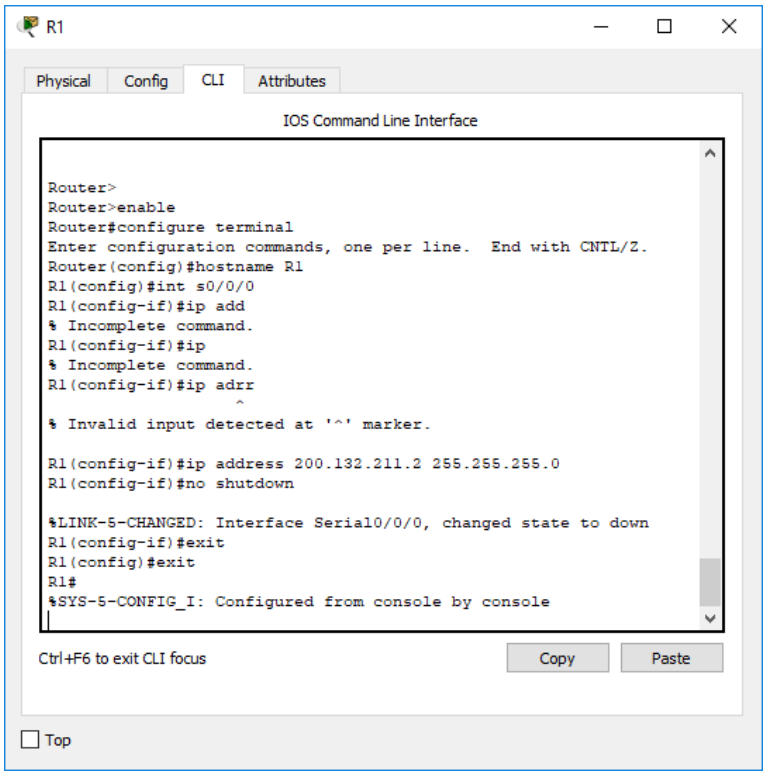
- **La información** de dirección **IP R1**, **R2** y R3 debe cumplir con la tabla 1.

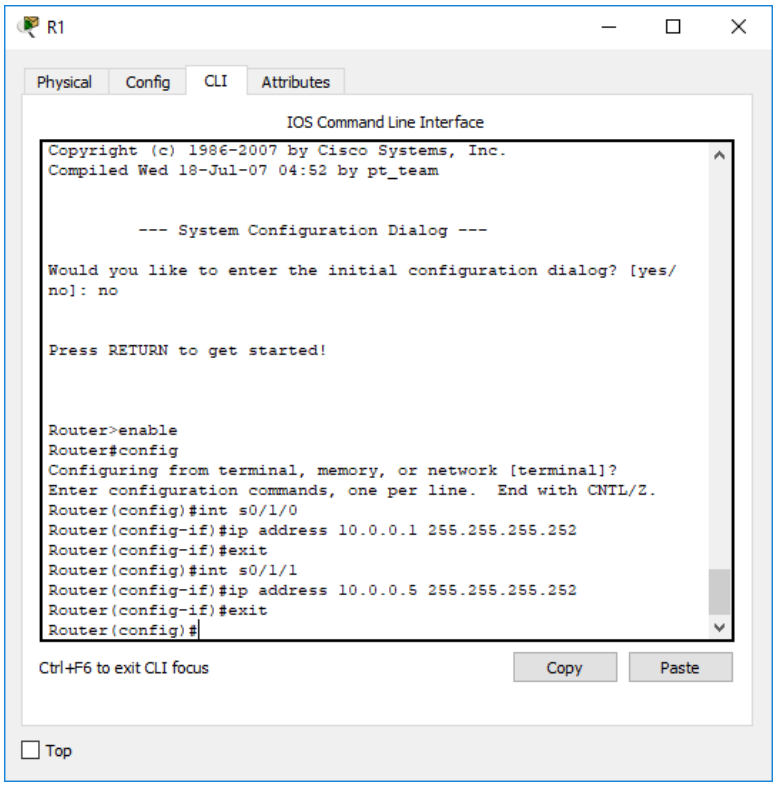
Para poder configurar los puertos seriales se debe instalar la tarjeta

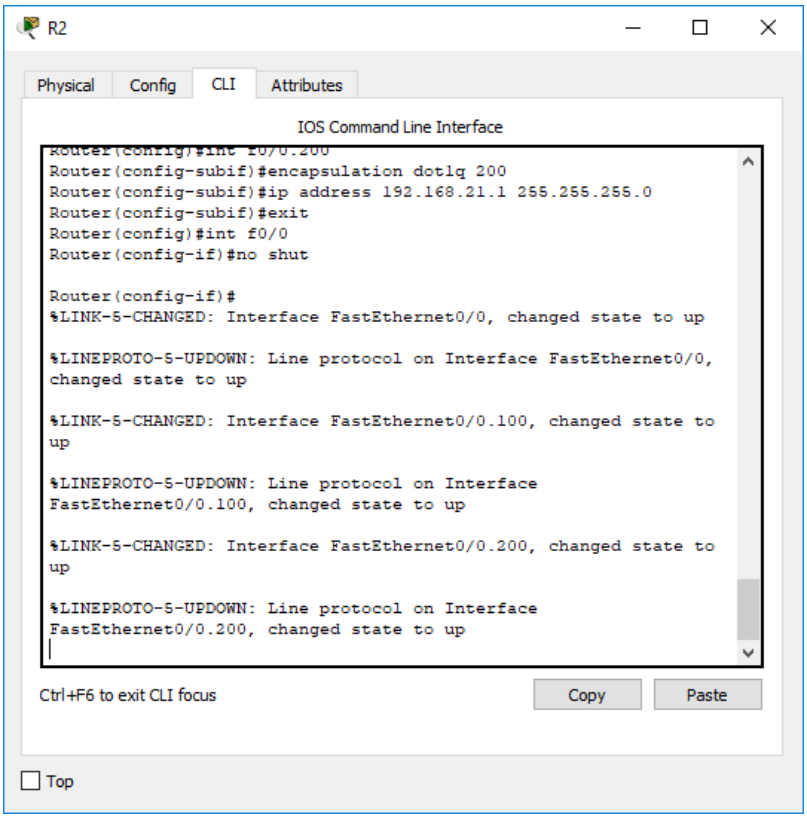


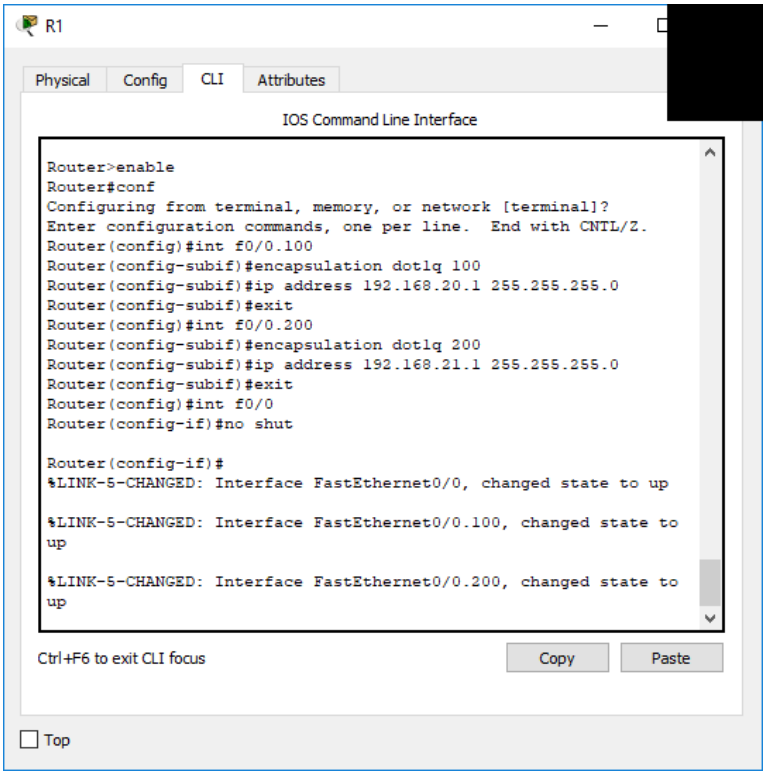
Se configura los puertos con las ip asignadas.

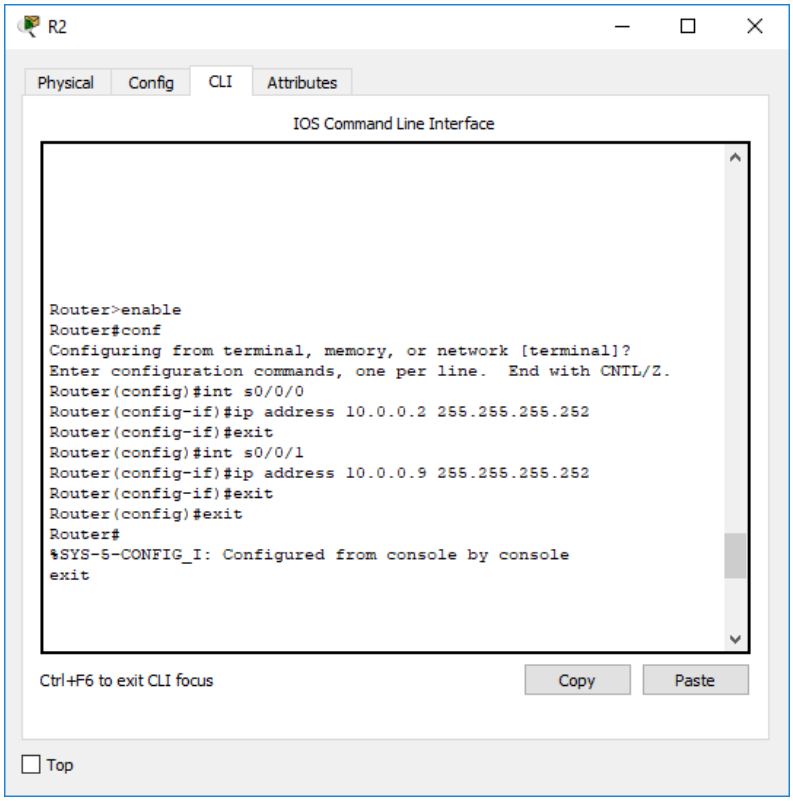


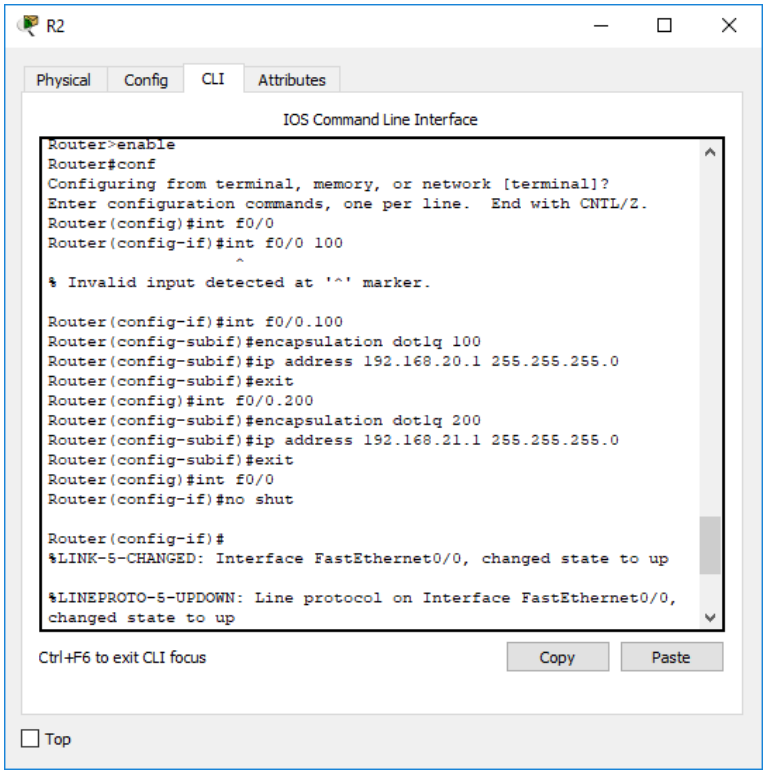


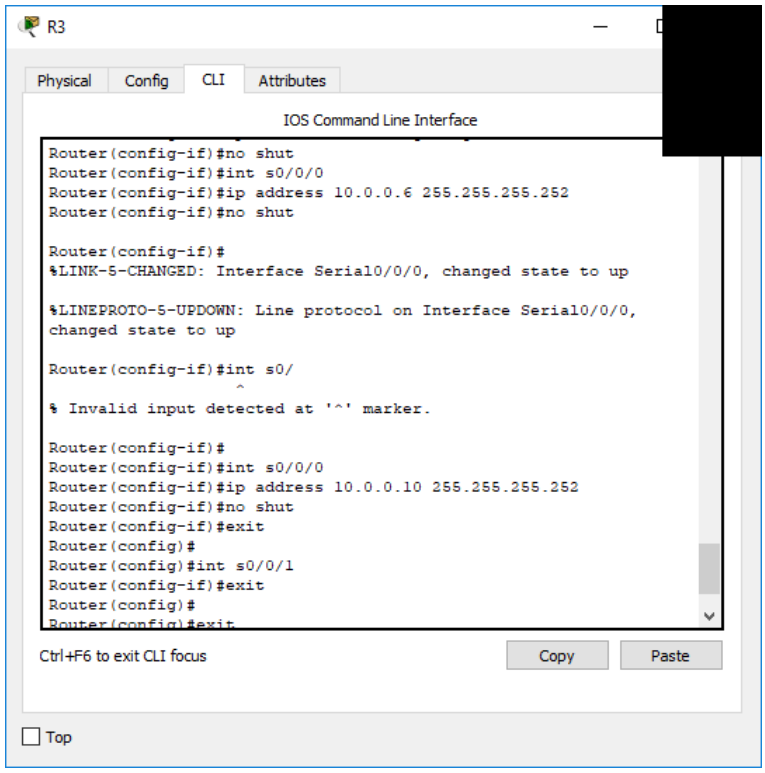

R1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Copyright (c) 1986-2007 by Cisco Systems, Inc.
Compiled Wed 18-Jul-07 04:52 by pt_team
--- System Configuration Dialog ---
Would you like to enter the initial configuration dialog? [yes/
no]: no
Press RETURN to get started!
Router>enable
Router#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/1/0
Router(config-if)#ip address 10.0.0.1 255.255.255.252
Router(config-if)#exit
Router(config)#int s0/1/1
Router(config-if)#ip address 10.0.0.5 255.255.255.252
Router(config-if)#exit
Router(config)#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router(config-subif)#encapsulation dot1q 200
Router(config-subif)#ip address 192.168.21.1 255.255.255.0
Router(config-subif)#exit
Router(config)#int f0/0
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/0.100, changed state to
up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/0.100, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/0.200, changed state to
up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/0.200, changed state to up
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


R1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router>enable
Router#conf
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int f0/0.100
Router(config-subif)#encapsulation dot1q 100
Router(config-subif)#ip address 192.168.20.1 255.255.255.0
Router(config-subif)#exit
Router(config)#int f0/0.200
Router(config-subif)#encapsulation dot1q 200
Router(config-subif)#ip address 192.168.21.1 255.255.255.0
Router(config-subif)#exit
Router(config)#int f0/0
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/0.100, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/0.200, changed state to up
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

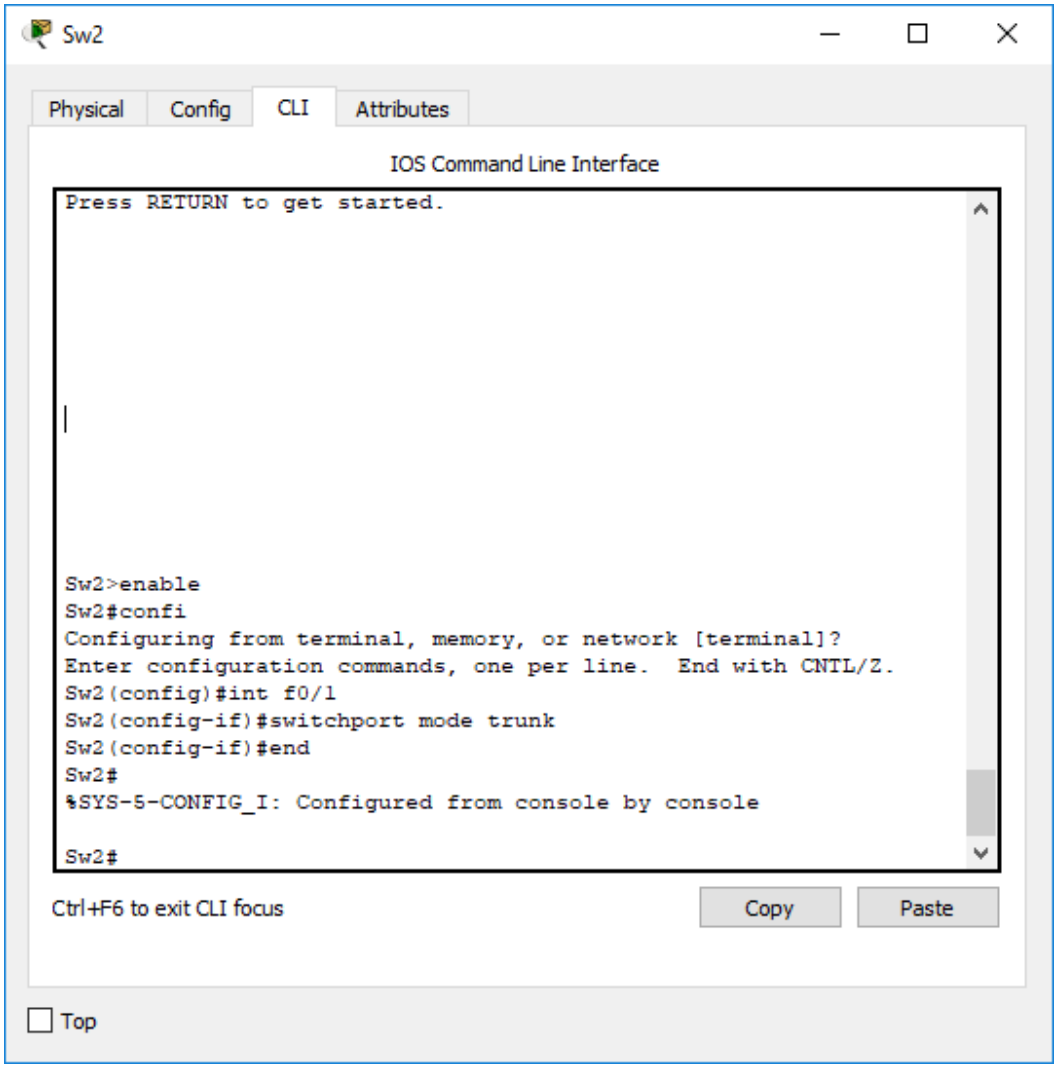

R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router>enable
Router#conf
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int s0/0/0
Router(config-if)#ip address 10.0.0.2 255.255.255.252
Router(config-if)#exit
Router(config)#int s0/0/1
Router(config-if)#ip address 10.0.0.9 255.255.255.252
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
exit
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router>enable
Router#conf
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int f0/0
Router(config-if)#int f0/0 100
^
% Invalid input detected at '^' marker.
Router(config-if)#int f0/0.100
Router(config-subif)#encapsulation dot1q 100
Router(config-subif)#ip address 192.168.20.1 255.255.255.0
Router(config-subif)#exit
Router(config)#int f0/0.200
Router(config-subif)#encapsulation dot1q 200
Router(config-subif)#ip address 192.168.21.1 255.255.255.0
Router(config-subif)#exit
Router(config)#int f0/0
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

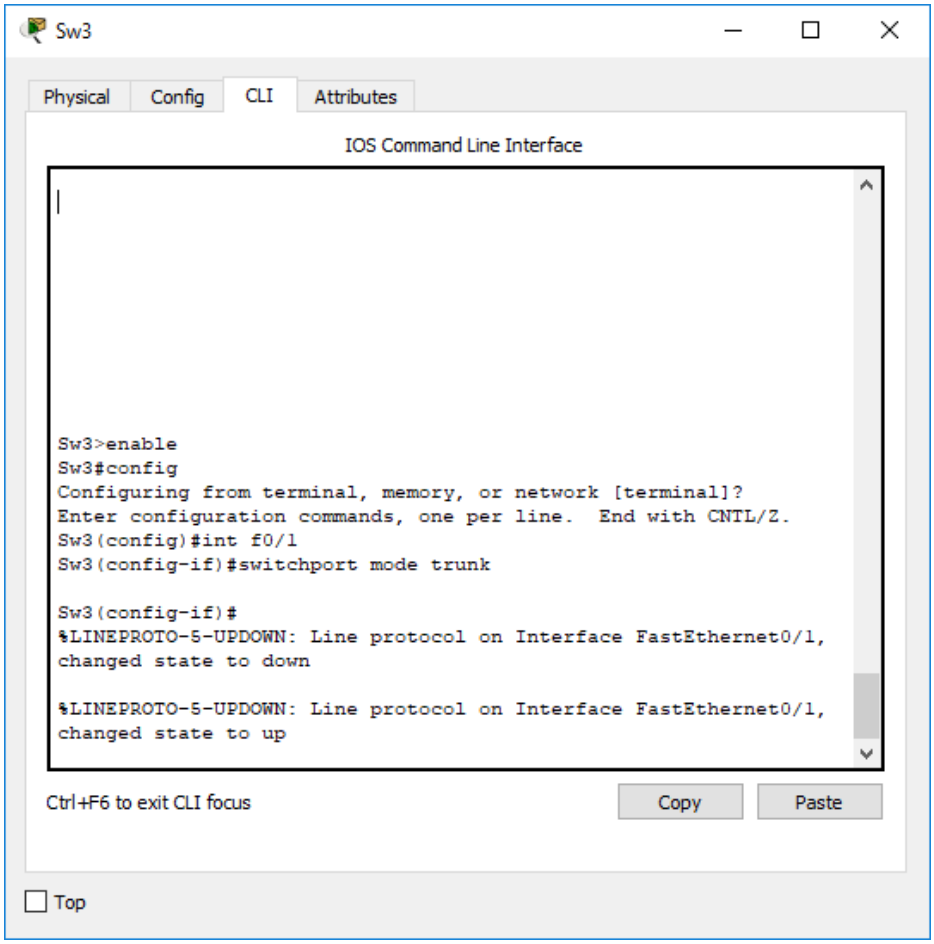

R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router(config-if)#no shut
Router(config-if)#int s0/0/0
Router(config-if)#ip address 10.0.0.6 255.255.255.252
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0,
changed state to up
Router(config-if)#int s0/
^
% Invalid input detected at '^' marker.
Router(config-if)#
Router(config-if)#int s0/0/0
Router(config-if)#ip address 10.0.0.10 255.255.255.252
Router(config-if)#no shut
Router(config-if)#exit
Router(config)#
Router(config)#int s0/0/1
Router(config-if)#exit
Router(config)#
Router(config)#exit
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

Se realiza la creación de los enlaces troncales en los SW

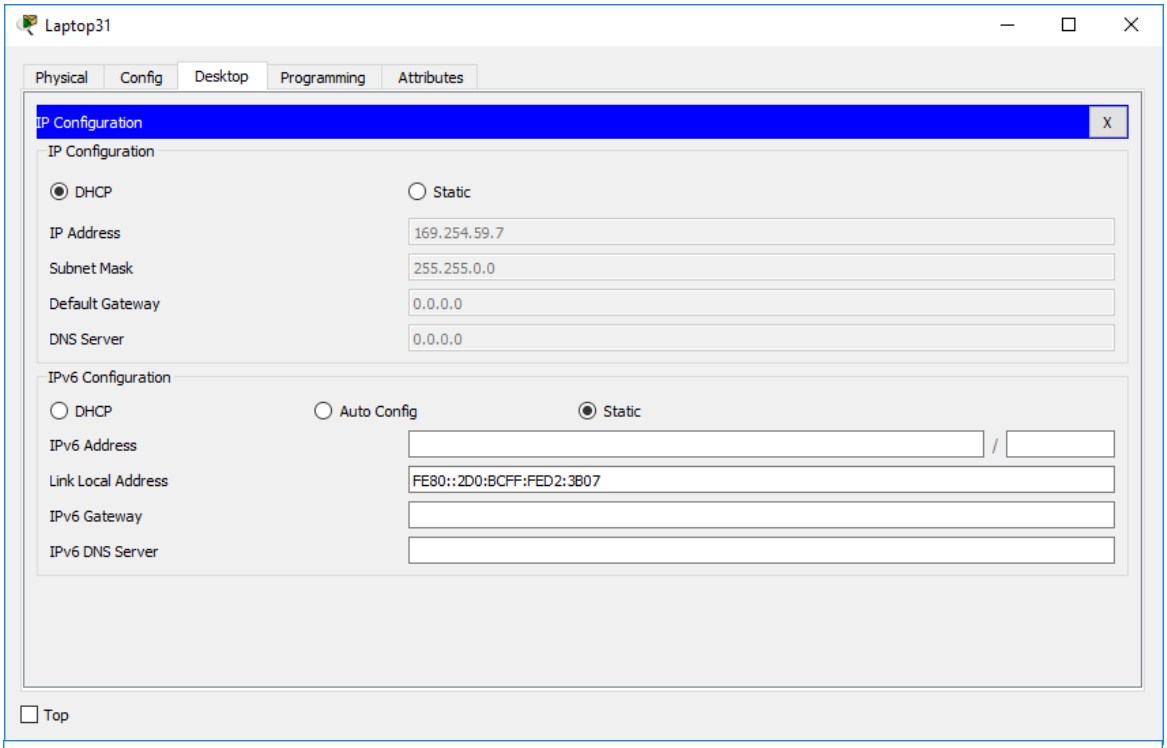
```
Sw2>enable
Sw2#confi
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Sw2(config)#int f0/1
Sw2(config-if)#switchport mode trunk
Sw2(config-if)#end
Sw2#
%SYS-5-CONFIG_I: Configured from console by console
```

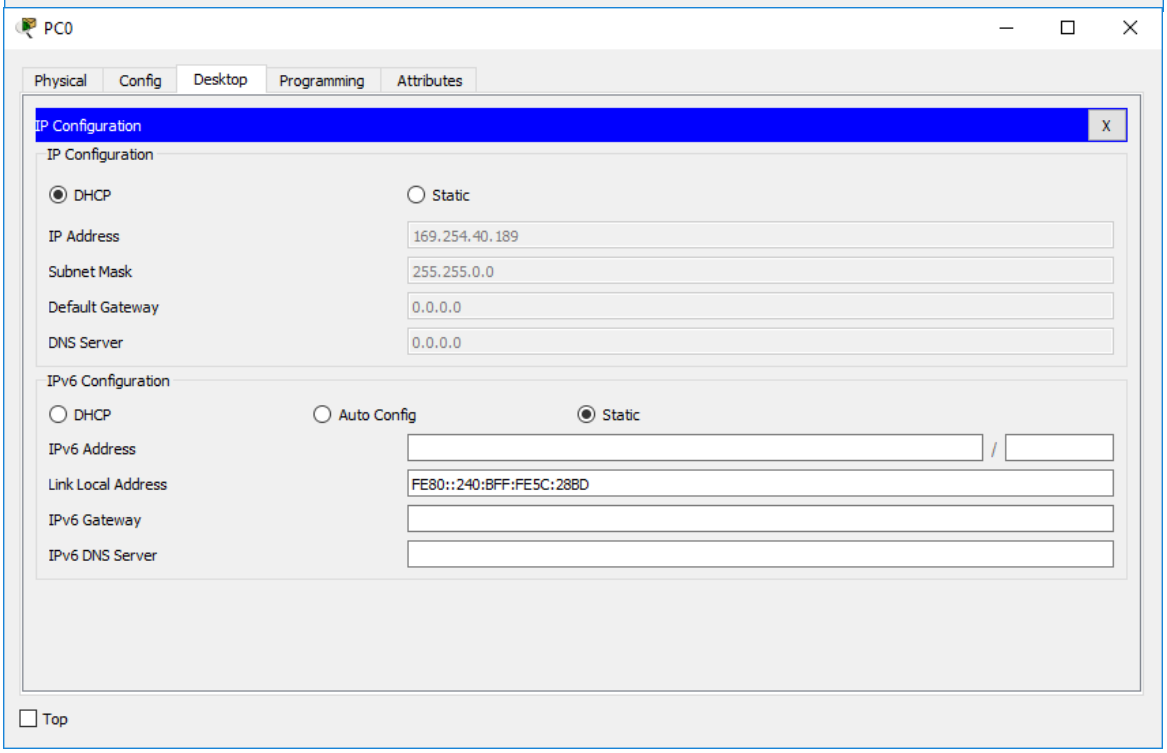


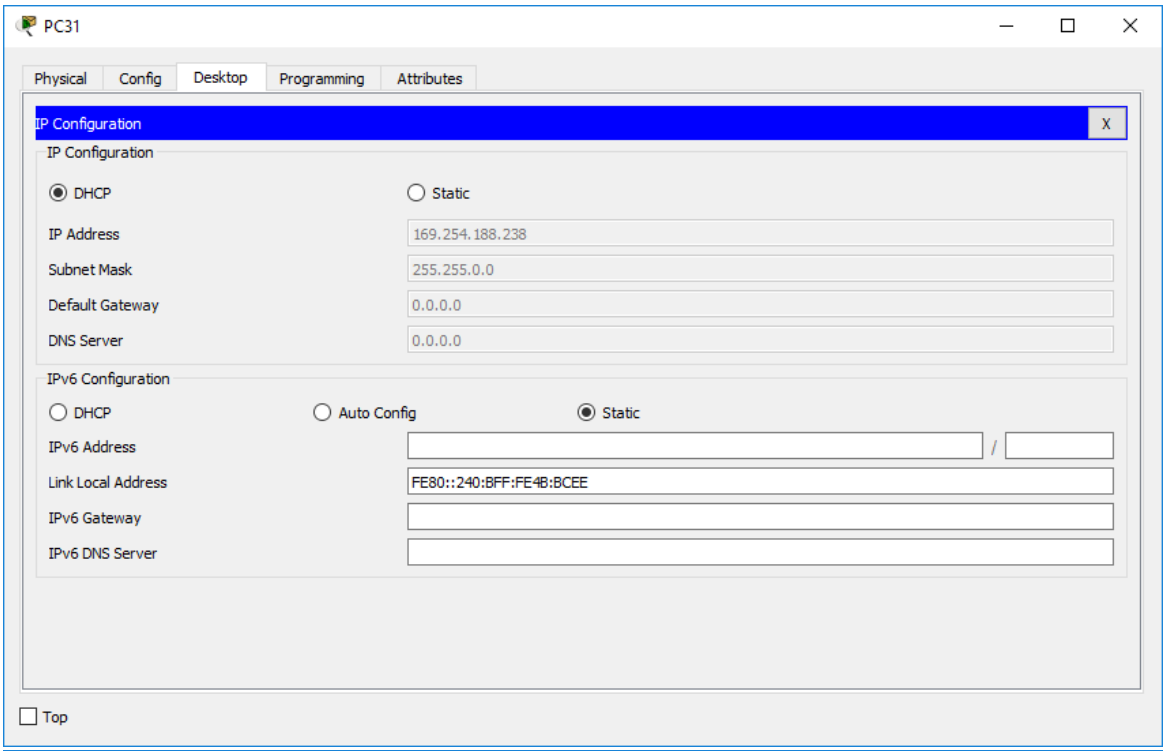
```
Sw3>enable
Sw3#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
Sw3(config)#int f0/1
Sw3(config-if)#switchport mode trunk

Sw3(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed
state to down

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

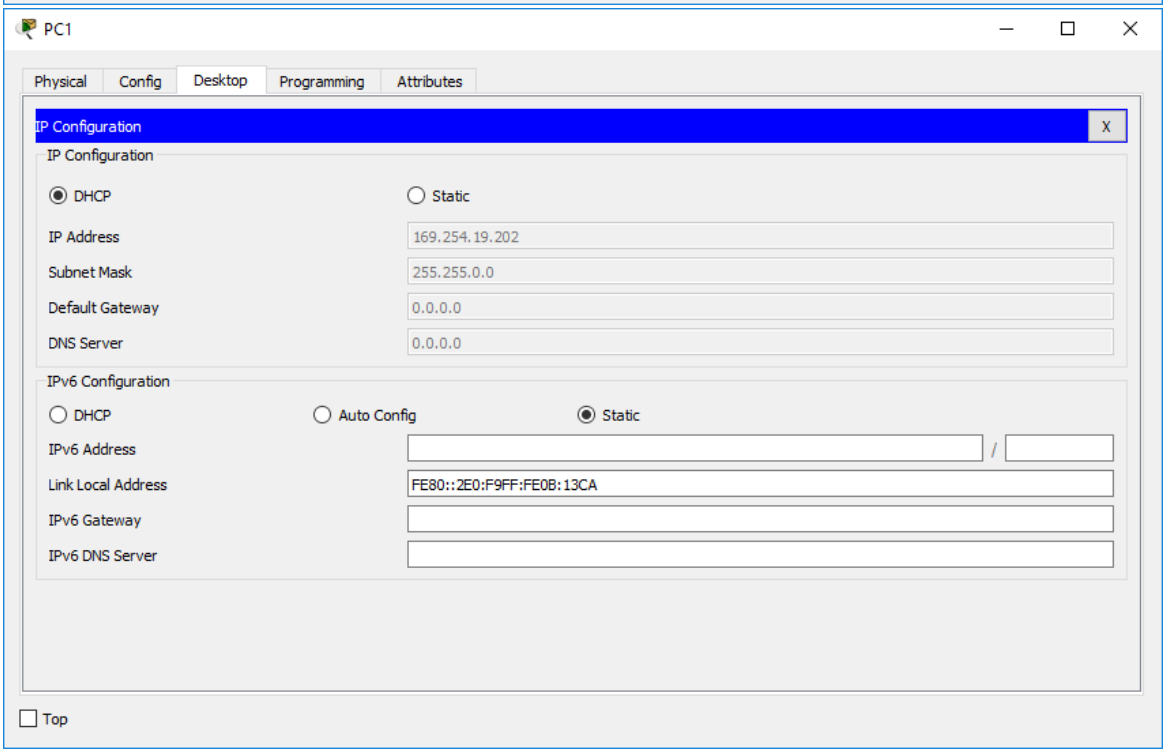


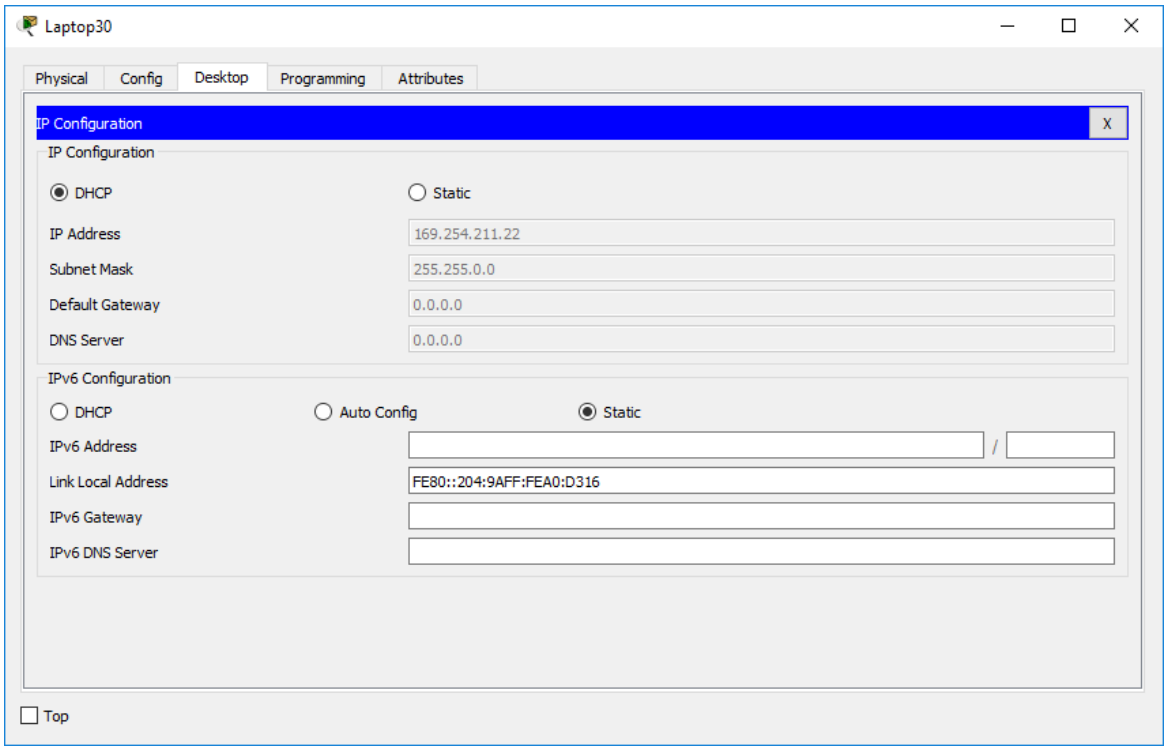
- **Laptop20, Laptop21, PC20, PC21, Laptop30, Laptop31, PC30 y PC31** deben obtener información IPv4 del servidor DHCP.

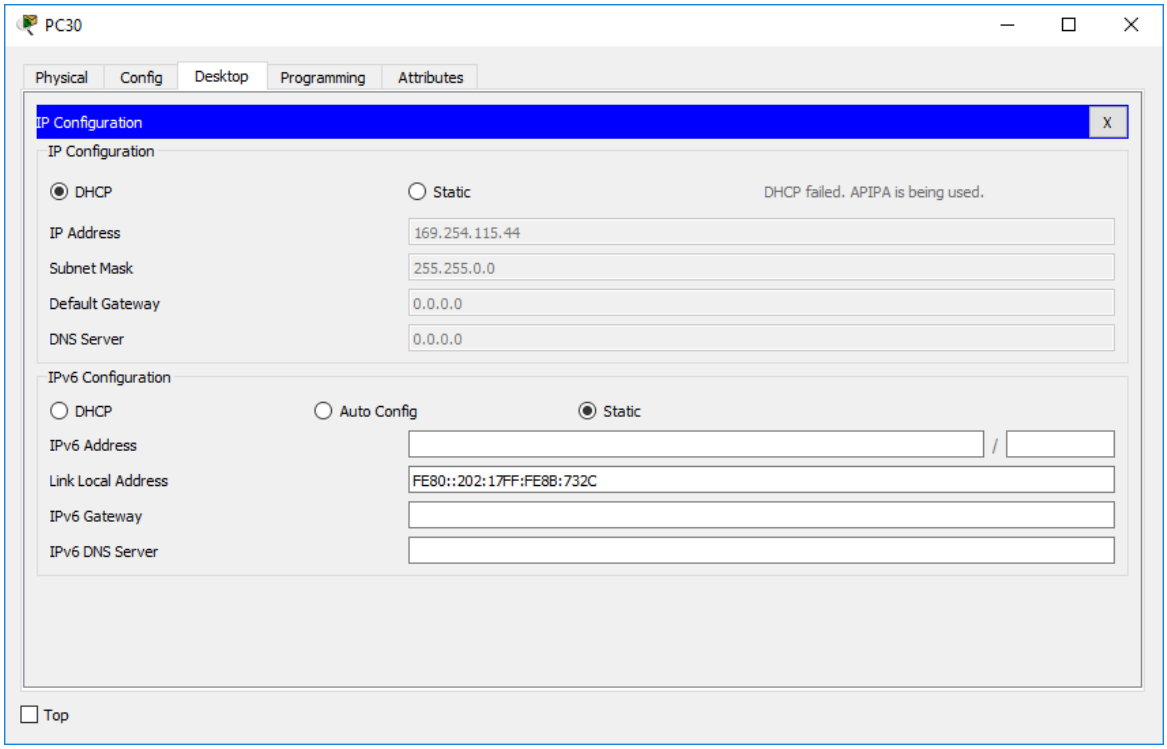





PC31
Physical
Config
Desktop
Programming
Attributes
IP Configuration
IP Configuration
DHCP
Static
IP Address
169.254.188.238
Subnet Mask
255.255.0.0
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::240:BFF:FE4B:BCEE
IPv6 Gateway
IPv6 DNS Server
Top

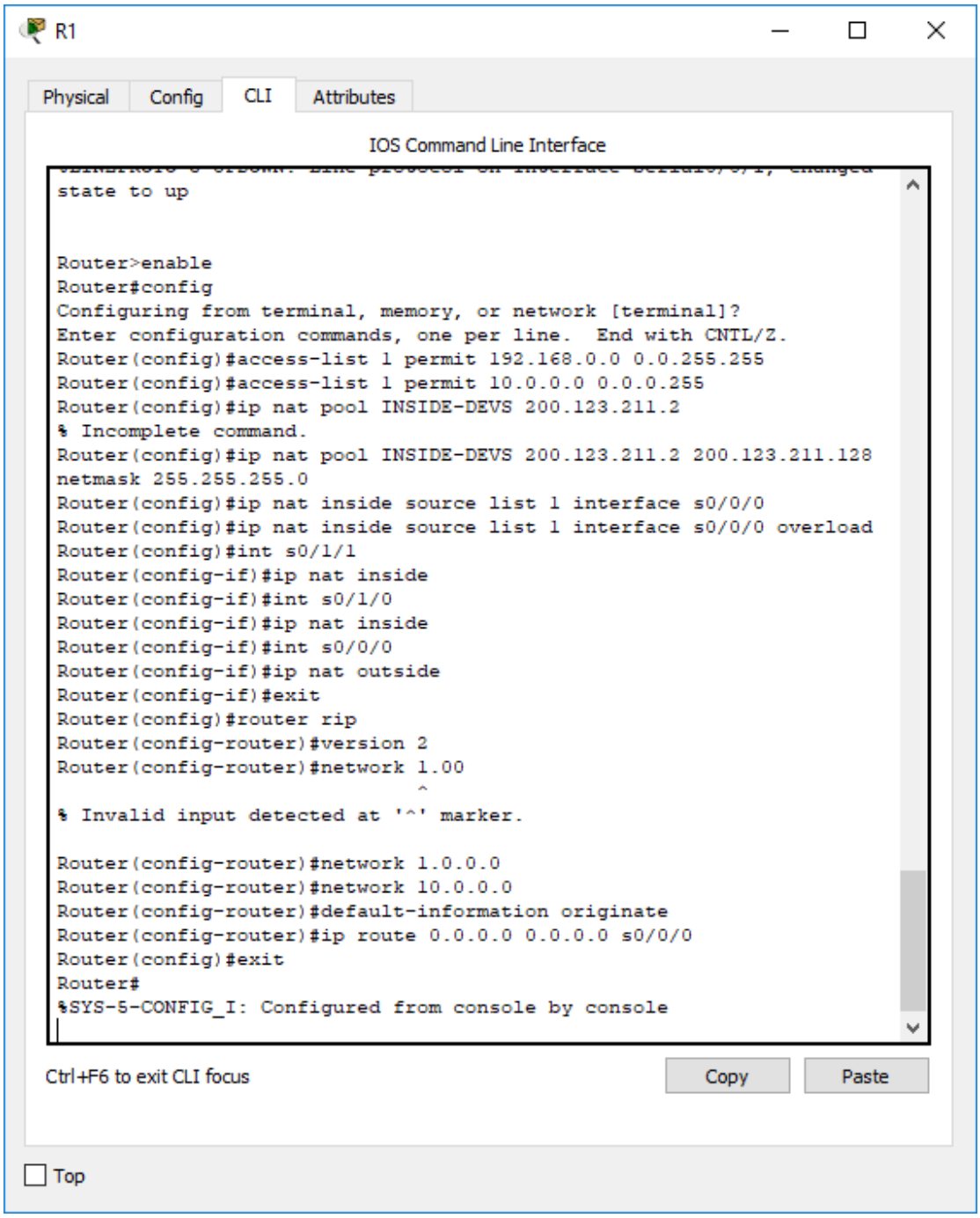

PC1
Physical
Config
Desktop
Programming
Attributes
IP Configuration
IP Configuration
DHCP
Static
IP Address
169.254.19.202
Subnet Mask
255.255.0.0
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::2E0:F9FF:FE0B:13CA
IPv6 Gateway
IPv6 DNS Server
Top





- **R1** debe realizar una NAT con sobrecarga sobre una dirección IPv4 pública.

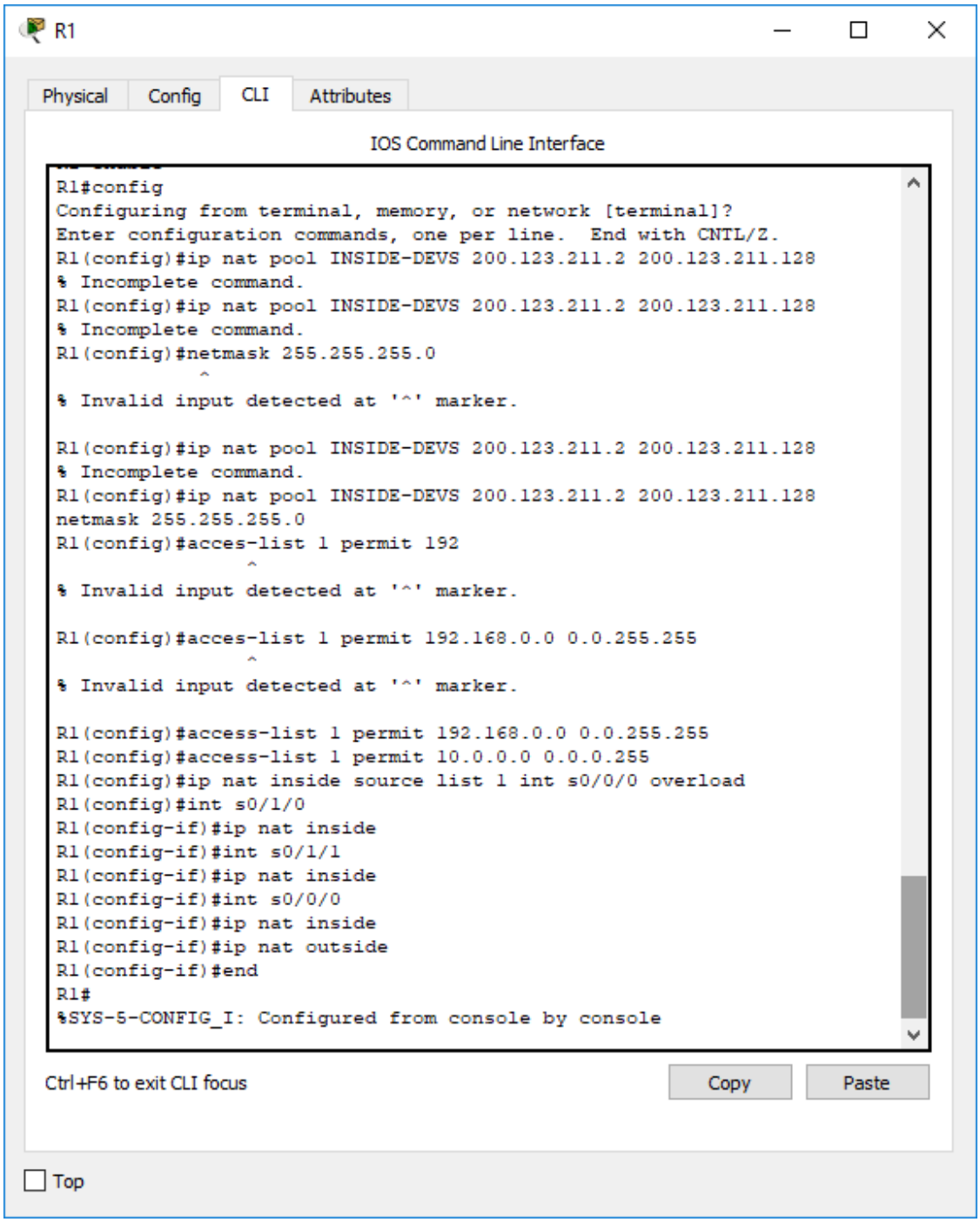
Asegúrese de que todos los terminales pueden comunicarse con Internet pública (haga ping a la dirección ISP) y la lista de acceso estándar se **llama INSIDE-DEVS**.



Se procede a configura la NAT en el R1 con sobrecarga en una dirección IPV4 publica.

R1>enable
R1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.

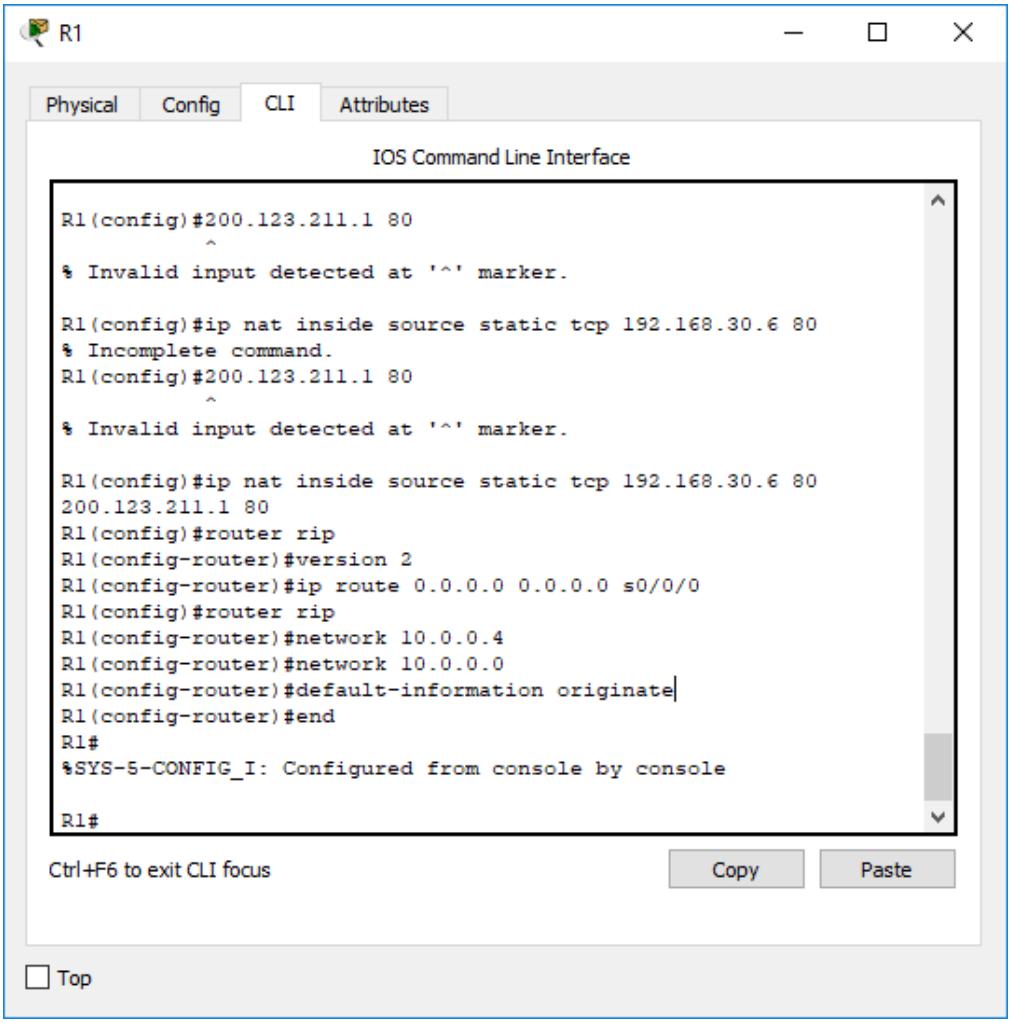
```
R1(config)#ip nat pool INSIDE-DEVS 200.123.211.2 200.123.211.128
% Incomplete command.
R1(config)#ip nat pool INSIDE-DEVS 200.123.211.2 200.123.211.128
% Incomplete command.
R1(config)#netmask 255.255.255.0
^
% Invalid input detected at '^' marker.
R1(config)#ip nat pool INSIDE-DEVS 200.123.211.2 200.123.211.128
% Incomplete command.
R1(config)#ip nat pool INSIDE-DEVS 200.123.211.2 200.123.211.128 netmask
255.255.255.0
R1(config)#acces-list 1 permit 192
^
% Invalid input detected at '^' marker.
R1(config)#acces-list 1 permit 192.168.0.0 0.0.255.255
^
% Invalid input detected at '^' marker.
R1(config)#access-list 1 permit 192.168.0.0 0.0.255.255
R1(config)#access-list 1 permit 10.0.0.0 0.0.0.255
R1(config)#ip nat inside source list 1 int s0/0/0 overload
R1(config)#int s0/1/0
R1(config-if)#ip nat inside
R1(config-if)#int s0/1/1
R1(config-if)#ip nat inside
R1(config-if)#int s0/0/0
R1(config-if)#ip nat inside
R1(config-if)#ip nat outside
R1(config-if)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console
```



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

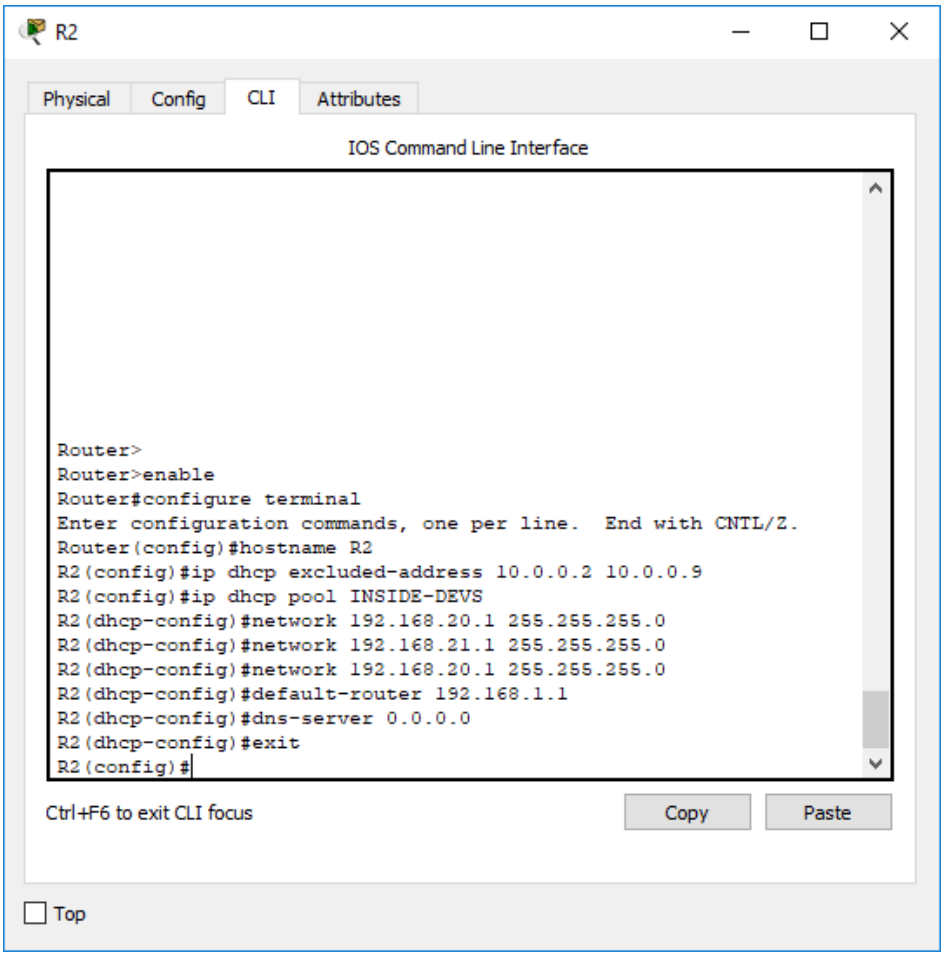
Invalid input detected at '^' marker.

```
R1(config)#ip nat inside source static tcp 192.168.30.6 80
% Incomplete command.
R1(config)#200.123.211.1 80
^
% Invalid input detected at '^' marker.
R1(config)#ip nat inside source static tcp 192.168.30.6 80 200.123.211.1 80
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#ip route 0.0.0.0 0.0.0.0 s0/0/0
R1(config)#router rip
R1(config-router)#network 10.0.0.4
R1(config-router)#network 10.0.0.0
R1(config-router)#default-information originate
R1(config-router)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console
```

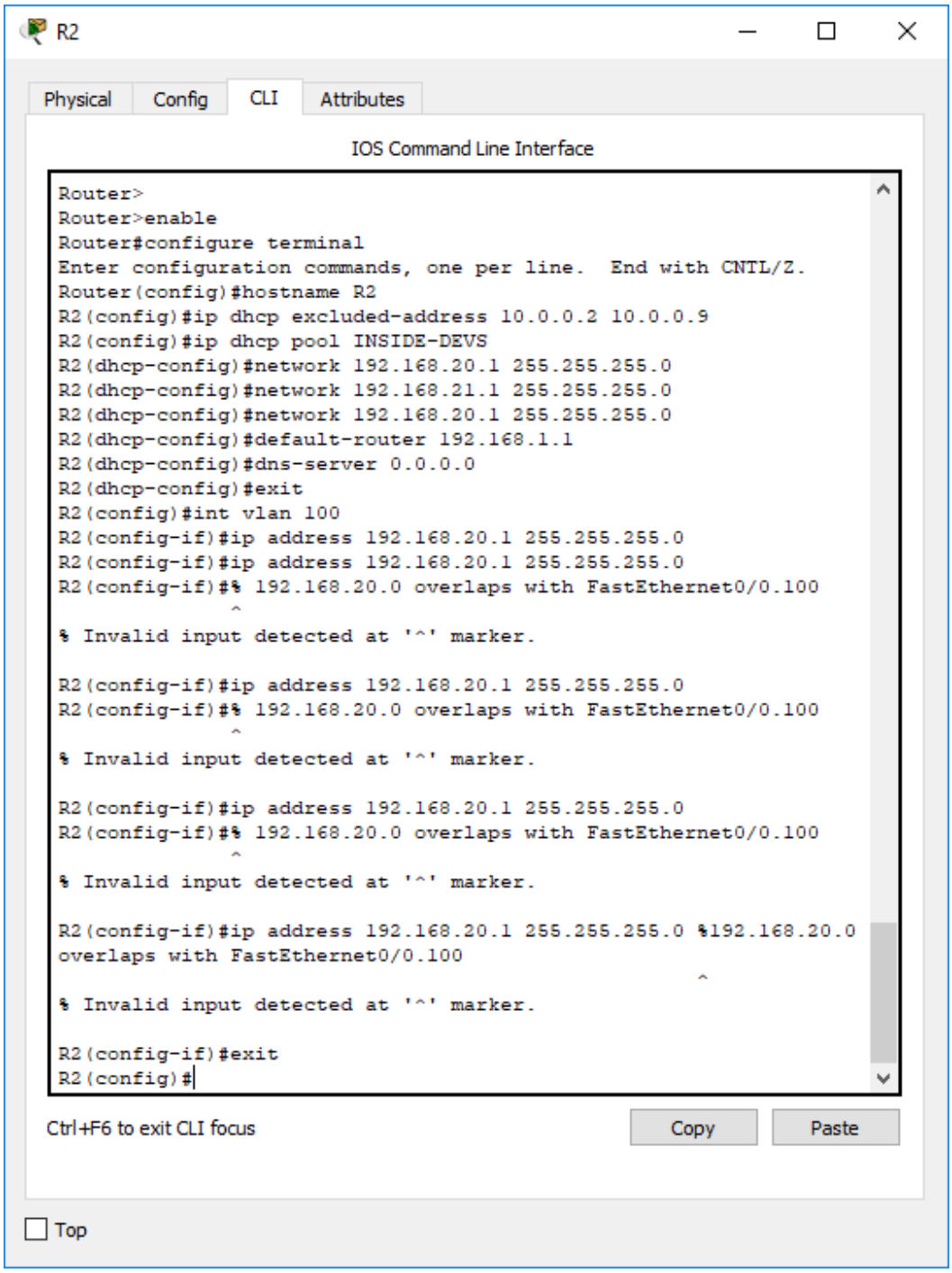


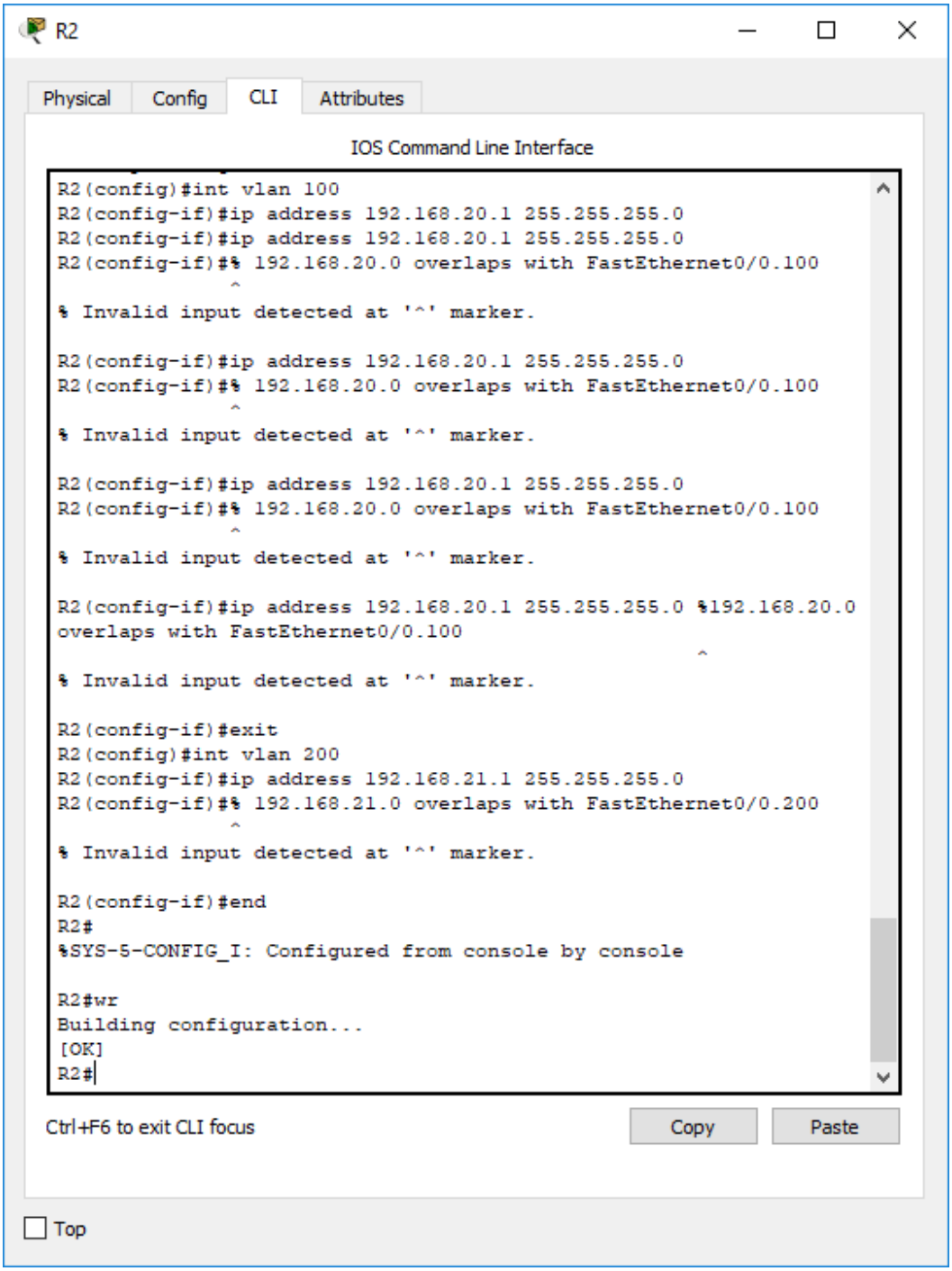
- **R2** es un servidor de DHCP para los dispositivos conectados al puerto FastEthernet0/0.

```
R2>enable
R2#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip dhcp excluded-address 10.0.0.2 10.0.0.9
R2(config)#ip dhcp pool INSIDE-DEVS
R2(dhcp-config)#network 192.168.20.1 255.255.255.0
R2(dhcp-config)#network 192.168.21.1 255.255.255.0
R2(dhcp-config)#defaul-router 192.168.1.1
^
% Invalid input detected at '^' marker.
R2(dhcp-config)#default-router 192.168.1.1
R2(dhcp-config)#dns-server 0.0.0.0
R2(dhcp-config)#exit
```



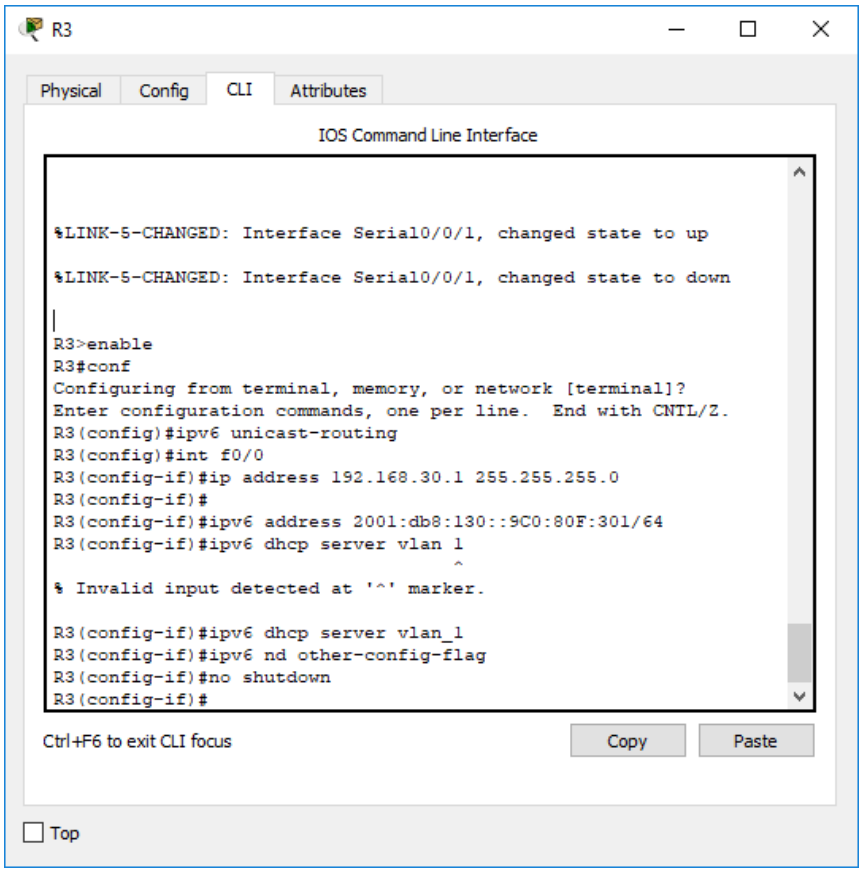
- **R2** debe, además de enrutamiento a otras partes de la red, ruta entre las VLAN 100 y 200.




R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
R2(config)#int vlan 100
R2(config-if)#ip address 192.168.20.1 255.255.255.0
R2(config-if)#ip address 192.168.20.1 255.255.255.0
R2(config-if)#% 192.168.20.0 overlaps with FastEthernet0/0.100
^
% Invalid input detected at '^' marker.
R2(config-if)#ip address 192.168.20.1 255.255.255.0
R2(config-if)#% 192.168.20.0 overlaps with FastEthernet0/0.100
^
% Invalid input detected at '^' marker.
R2(config-if)#ip address 192.168.20.1 255.255.255.0
R2(config-if)#% 192.168.20.0 overlaps with FastEthernet0/0.100
^
% Invalid input detected at '^' marker.
R2(config-if)#ip address 192.168.20.1 255.255.255.0 %192.168.20.0
overlaps with FastEthernet0/0.100
^
% Invalid input detected at '^' marker.
R2(config-if)#exit
R2(config)#int vlan 200
R2(config-if)#ip address 192.168.21.1 255.255.255.0
R2(config-if)#% 192.168.21.0 overlaps with FastEthernet0/0.200
^
% Invalid input detected at '^' marker.
R2(config-if)#end
R2#
%SYS-5-CONFIG_I: Configured from console by console
R2#wr
Building configuration...
[OK]
R2#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

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

```
R3>enable
R3#conf
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#ipv6 unicast-routing
R3(config)#int f0/0
R3(config-if)#ip address 192.168.30.1 255.255.255.0
R3(config-if)#
R3(config-if)#ipv6 address 2001:db8:130::9C0:80F:301/64
R3(config-if)#ipv6 dhcp server vlan 1
^
% Invalid input detected at '^' marker.
R3(config-if)#ipv6 dhcp server vlan_1
R3(config-if)#ipv6 nd other-config-flag
R3(config-if)#no shutdown
R3(config-if)#
```

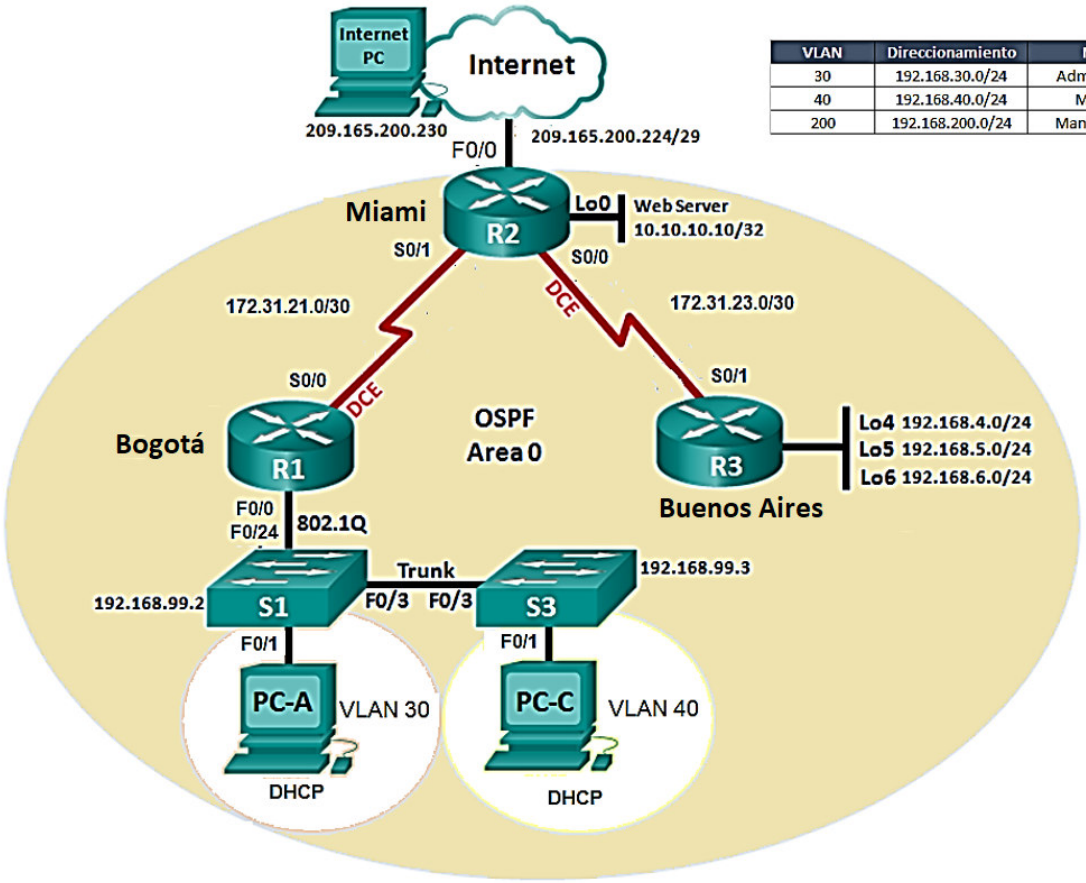


- La NIC instalado en direcciones IPv4 e IPv6 de Laptop30, de Laptop31, de PC30 y obligación de configurados PC31 simultáneas (dual-stack). Las direcciones se deben configurar mediante DHCP y DHCPv6.

- La interfaz FastEthernet 0/0 del R3 también deben tener direcciones IPv4 e IPv6 configuradas (dual- stack).
- R1, R2 y R3 intercambian información de routing mediante RIP versión 2.
- R1, R2 y R3 deben saber sobre las rutas de cada uno y la ruta predeterminada desde R1.
- Verifique la conectividad. Todos los terminales deben poder hacer ping entre sí y a la dirección IP del ISP. Los terminales bajo **el R3** deberían poder hacer IPv6-ping entre ellos y el servidor.

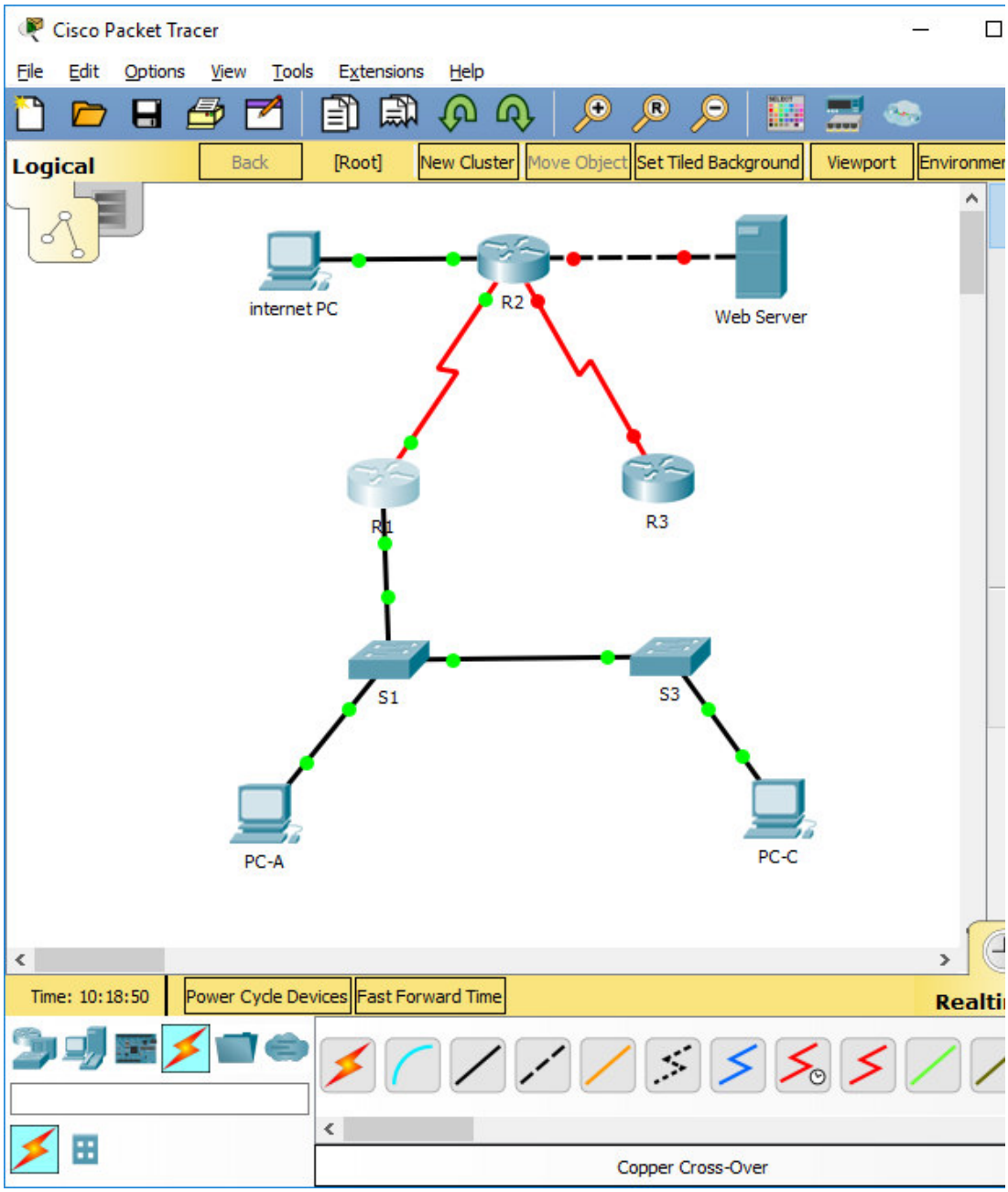
Escenario 2

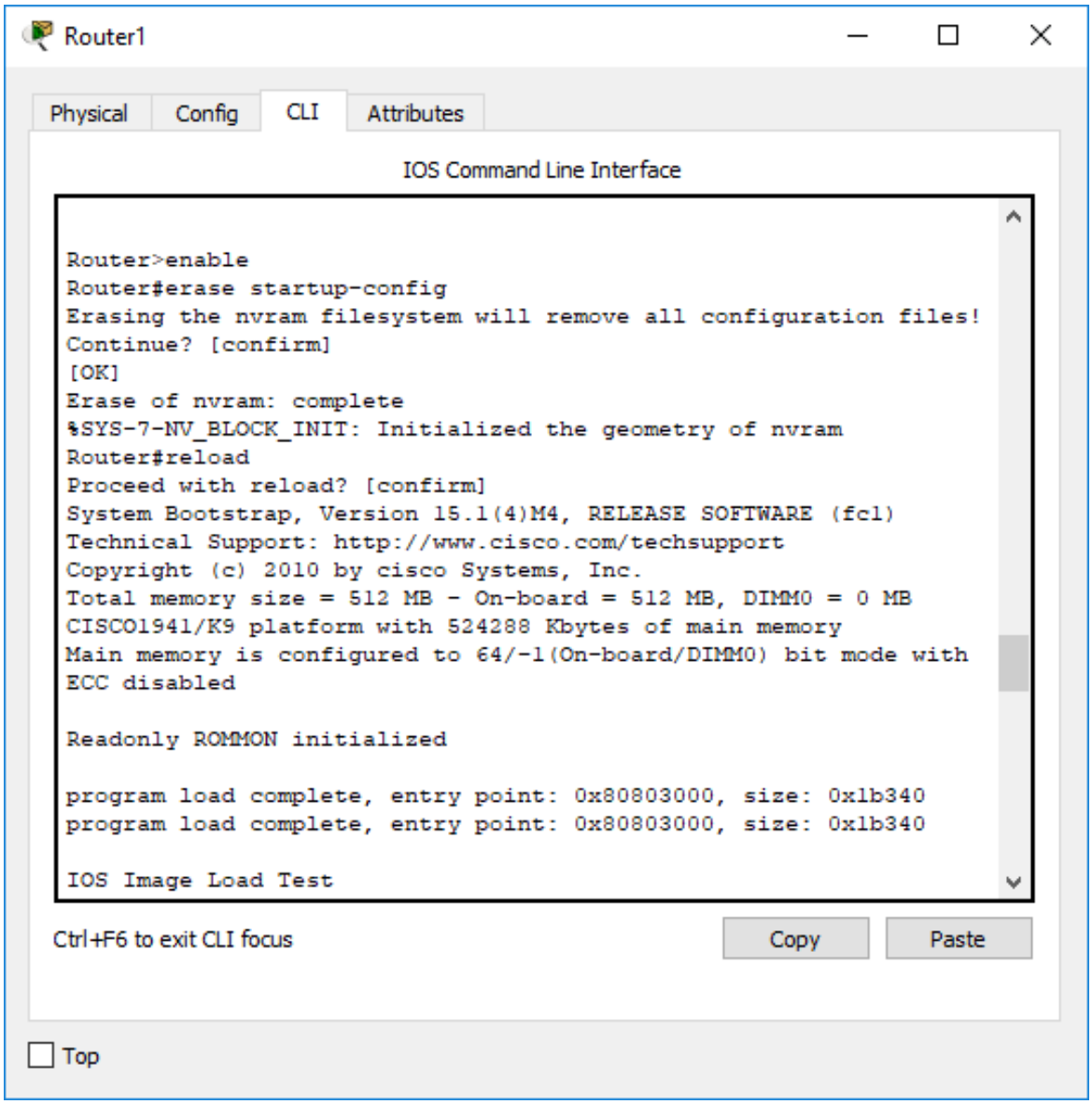
Escenario: Una empresa de Tecnología posee tres sucursales distribuidas en las ciudades de Miami, Bogotá y Buenos Aires, en donde el estudiante será el administrador de la red, el cual deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con los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

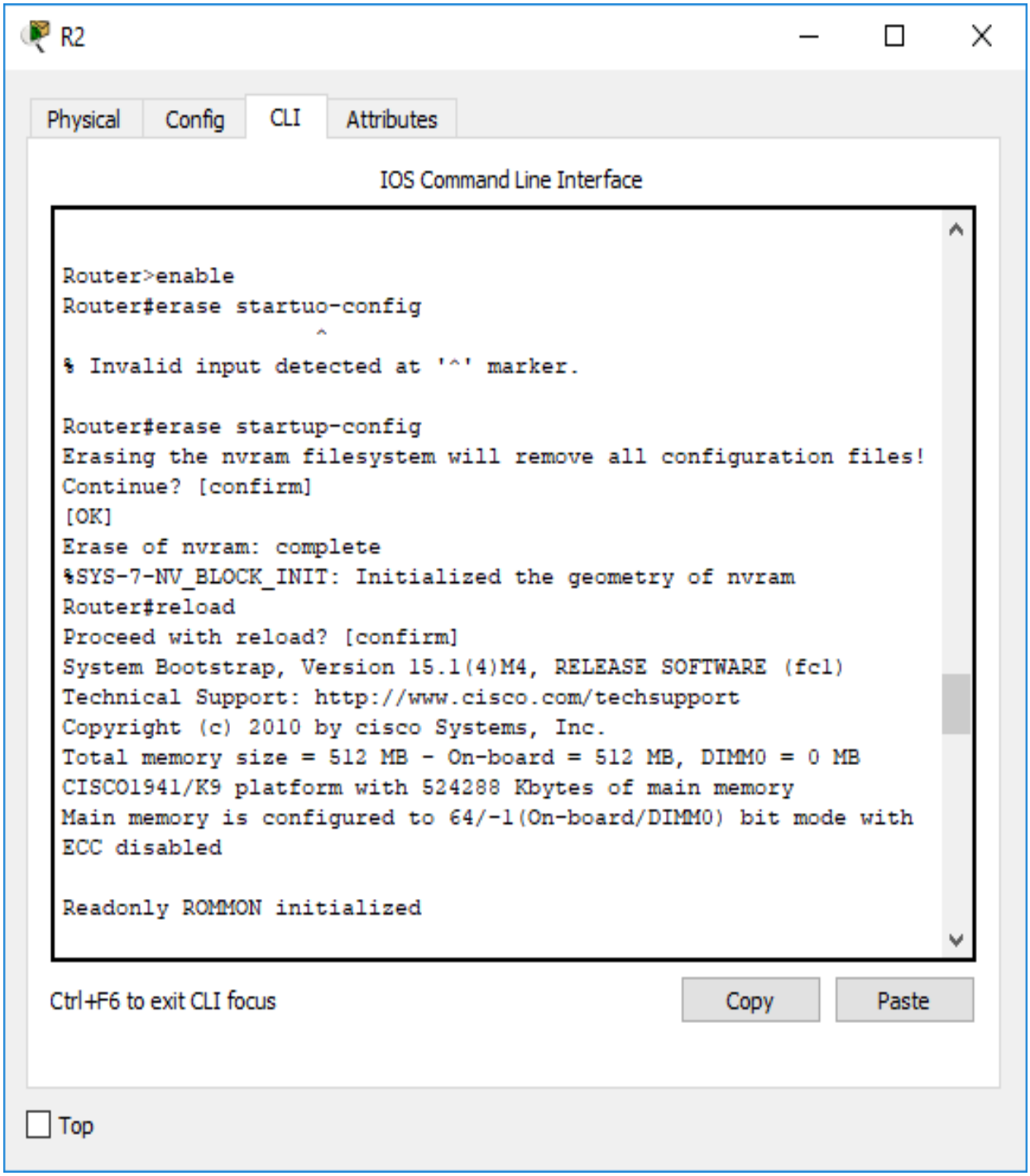


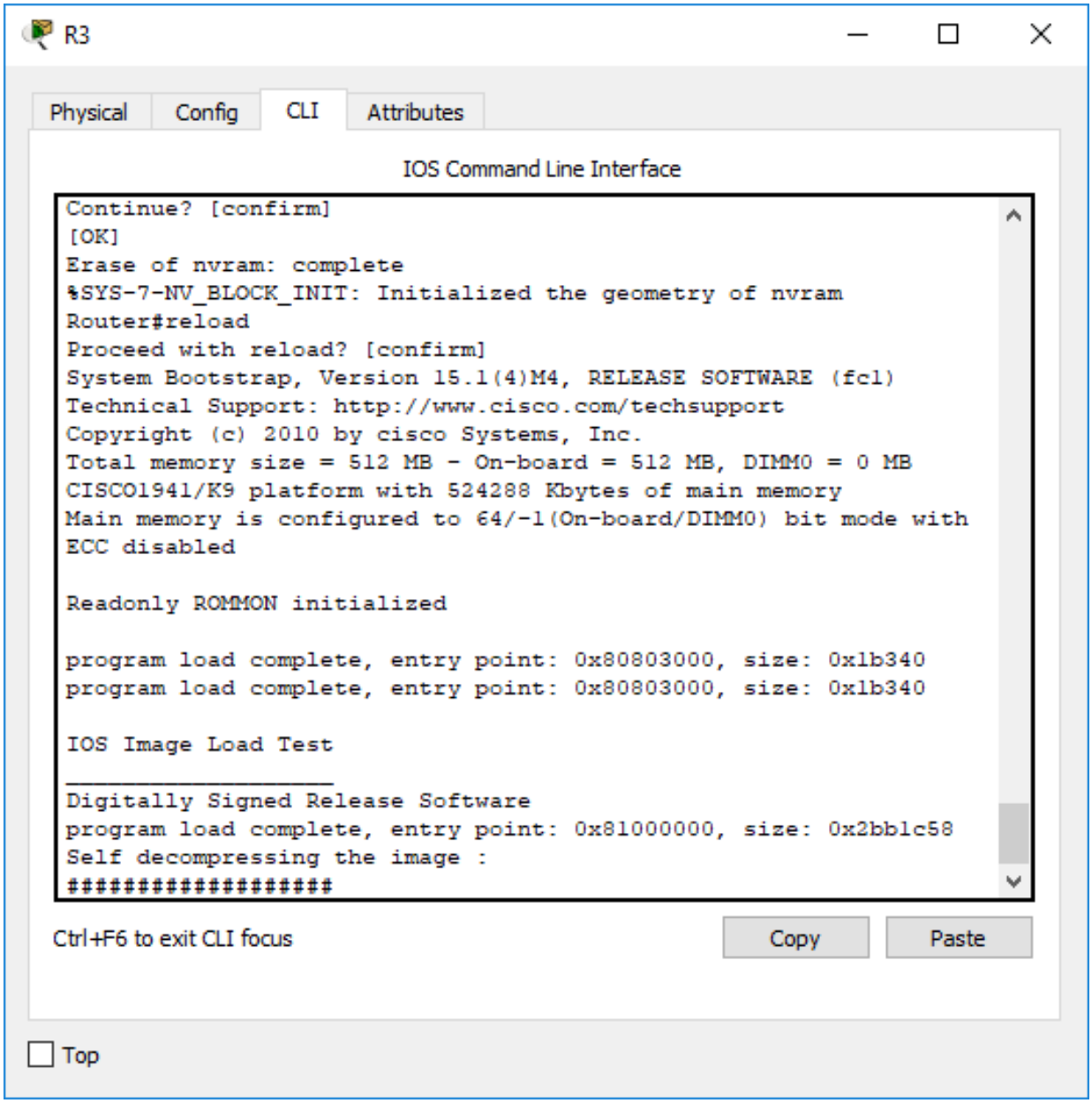
VLAN	Direccionamiento	Nombre
30	192.168.30.0/24	Administración
40	192.168.40.0/24	Mercadeo
200	192.168.200.0/24	Mantenimiento

1. Configurar el direccionamiento IP acorde con la topología de red para cada uno de los dispositivos que forman parte del escenario.
Procedemos a configurar los dispositivos router, swiches, y PC iniciando con el reset de los routers.




Router1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router>enable
Router#erase startup-config
Erasing the nvram filesystem will remove all configuration files!
Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
Router#reload
Proceed with reload? [confirm]
System Bootstrap, Version 15.1(4)M4, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2010 by cisco Systems, Inc.
Total memory size = 512 MB - On-board = 512 MB, DIMM0 = 0 MB
CISCO1941/K9 platform with 524288 Kbytes of main memory
Main memory is configured to 64/-1(On-board/DIMM0) bit mode with
ECC disabled
Readonly ROMMON initialized
program load complete, entry point: 0x80803000, size: 0x1b340
program load complete, entry point: 0x80803000, size: 0x1b340
IOS Image Load Test
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router>enable
Router#erase startuo-config
^
% Invalid input detected at '^' marker.
Router#erase startup-config
Erasing the nvram filesystem will remove all configuration files!
Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
Router#reload
Proceed with reload? [confirm]
System Bootstrap, Version 15.1(4)M4, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2010 by cisco Systems, Inc.
Total memory size = 512 MB - On-board = 512 MB, DIMM0 = 0 MB
CISCO1941/K9 platform with 524288 Kbytes of main memory
Main memory is configured to 64/-1(On-board/DIMM0) bit mode with
ECC disabled
Readonly ROMMON initialized
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
Continue? [confirm]
[OK]
Erase of nvram: complete
%SYS-7-NV_BLOCK_INIT: Initialized the geometry of nvram
Router#reload
Proceed with reload? [confirm]
System Bootstrap, Version 15.1(4)M4, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2010 by cisco Systems, Inc.
Total memory size = 512 MB - On-board = 512 MB, DIMM0 = 0 MB
CISCO1941/K9 platform with 524288 Kbytes of main memory
Main memory is configured to 64/-1(On-board/DIMM0) bit mode with
ECC disabled
Readonly ROMMON initialized
program load complete, entry point: 0x80803000, size: 0x1b340
program load complete, entry point: 0x80803000, size: 0x1b340
IOS Image Load Test
Digitally Signed Release Software
program load complete, entry point: 0x81000000, size: 0x2bb1c58
Self decompressing the image :
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

Iniciamos la configuración R1 según parámetros indicados y sus ip´s.

Router>enable

Router#conf t

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

Router(config)#hostname R1

R1(config)#int s0/0/0

R1(config-if)#ip address 172.31.21.1 255.255.255.252

R1(config-if)#no shutdown

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

R1(config-if)#conf t

%Invalid hex value

R1(config)#int g0/0

R1(config-if)#ip address 192.168.99.1 255.255.255.0

R1(config-if)#no shutdown

R1(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

R1(config-if)#exit

R1(config)#

Router>enable

Router#enable

Router#conf t

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

Router(config)#hosname R2

% Invalid input detected at '^' marker.

Router(config)#int 0/0/1

% Invalid input detected at '^' marker.

Router(config)#int s0/0/1

Router(config-if)#ip address 172.31.21.2 255.255.255.252

Router(config-if)#no shutdown

Router(config-if)#

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

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

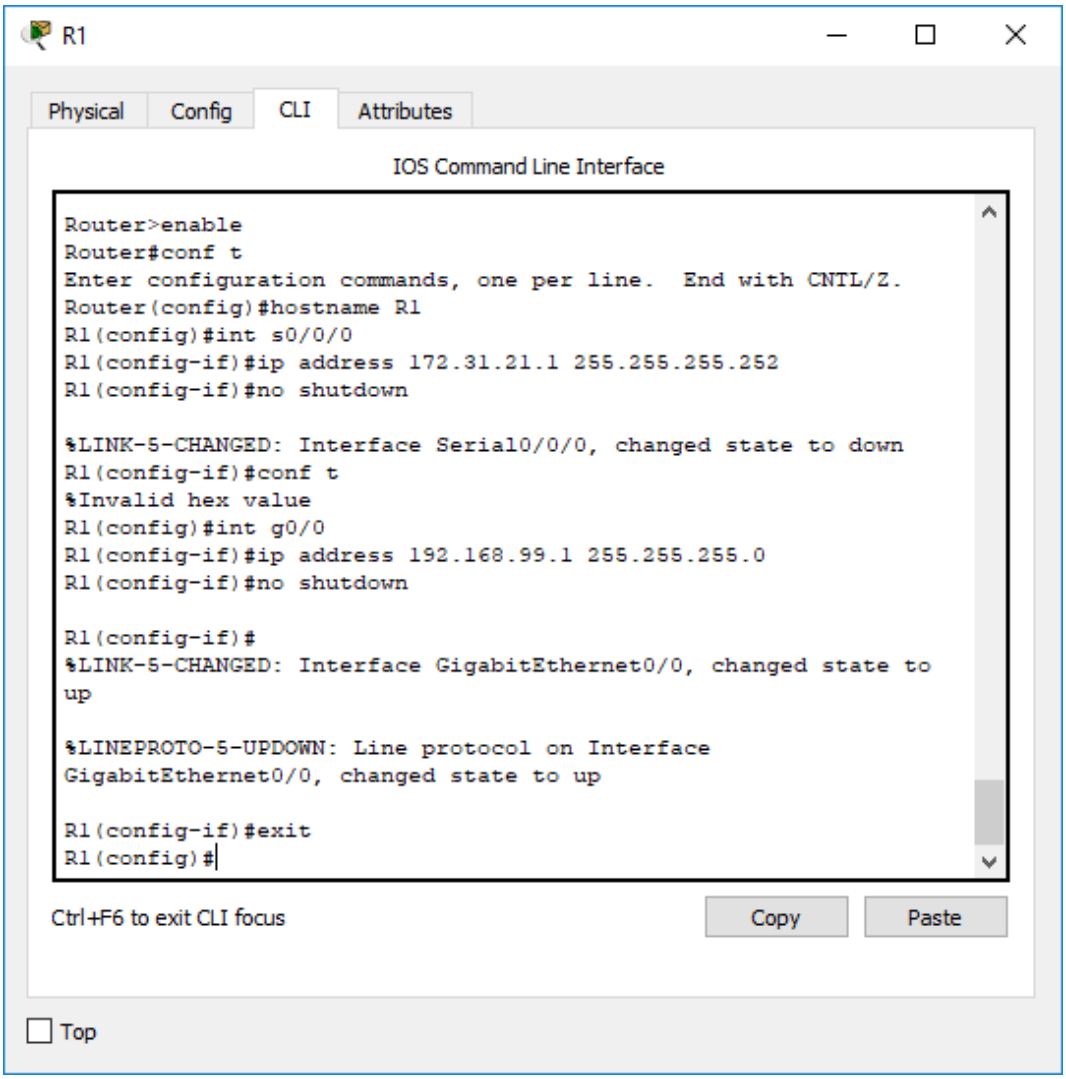
Router#

Iniciamos la configuración de parámetros según lo indicado en la guía en el R1.

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

Router#enable

Router#conf t



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

Continuamos con la configuración del Router 2

Router(config)#hostname R2

R2(config)#int s0/0/1

R2(config-if)#ip address 172.31.21.2 255.255.255.252

R2(config-if)#no shutdown

R2(config-if)#int g0/0

R2(config-if)#ip address 209.165.200.255 255.255.255.248

Bad mask /29 for address 209.165.200.255

R2(config-if)#no shutdown

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#

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

R2#conf t

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

R2(config)#interface loopback 0

R2(config-if)#

%LINK-5-CHANGED: Interface Loopback0, changed state to up

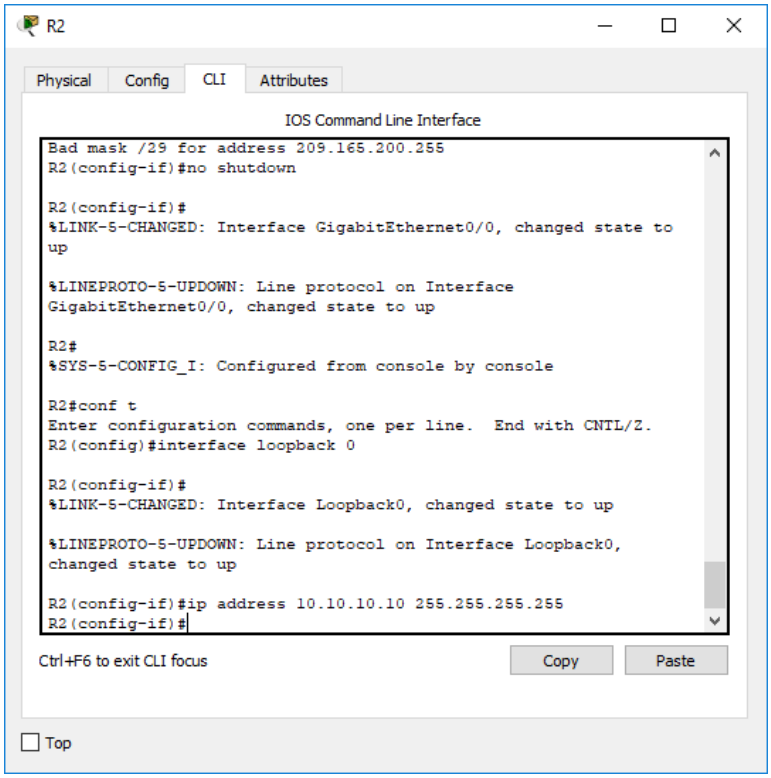
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up

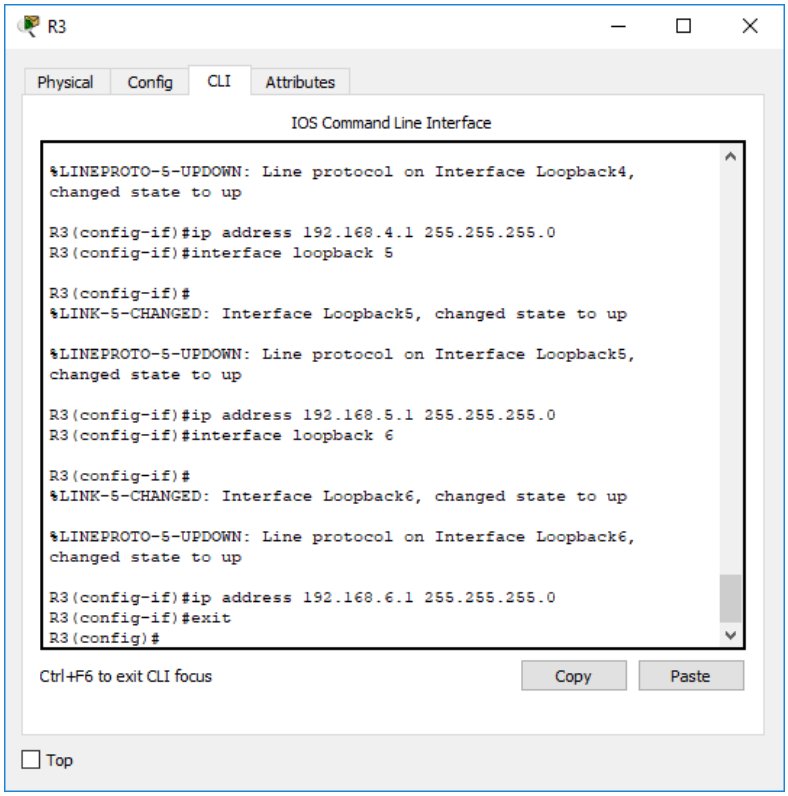
R2(config-if)#ip address 10.10.10.10 255.255.255.255

R2(config-if)#

R2#

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


R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
Bad mask /29 for address 209.165.200.255
R2(config-if)#no shutdown
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#
%SYS-5-CONFIG_I: Configured from console by console
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#interface loopback 0
R2(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up
R2(config-if)#ip address 10.10.10.10 255.255.255.255
R2(config-if)#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback4, changed state to up
R3(config-if)#ip address 192.168.4.1 255.255.255.0
R3(config-if)#interface loopback 5
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 address 192.168.5.1 255.255.255.0
R3(config-if)#interface loopback 6
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 address 192.168.6.1 255.255.255.0
R3(config-if)#exit
R3(config)#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

Seguimos con la configuración de ip´s del Router 3

Router>enable

Router#conf t

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

Router(config)#hostname R3

R3(config)#int s0/0/1

R3(config-if)#ip address 172.31.23.1 255.255.255.252

R3(config-if)#no shutdown

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

R3(config-if)#

R3(config-if)#interface loopback 4

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 address 192.168.4.1 255.255.255.0

R3(config-if)#interface loopback 5

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 address 192.168.5.1 255.255.255.0

R3(config-if)#interface loopback 6

R3(config-if)#

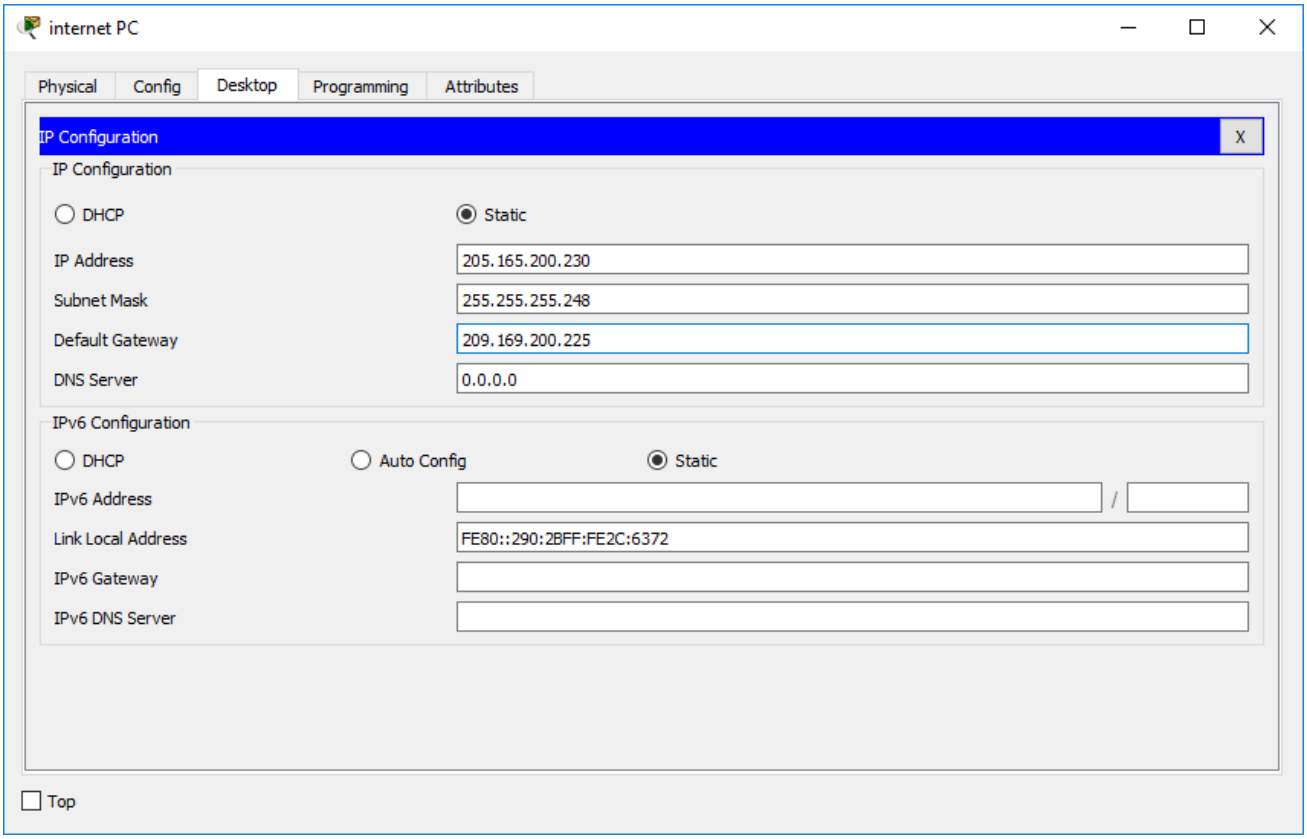
%LINK-5-CHANGED: Interface Loopback6, changed state to up

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

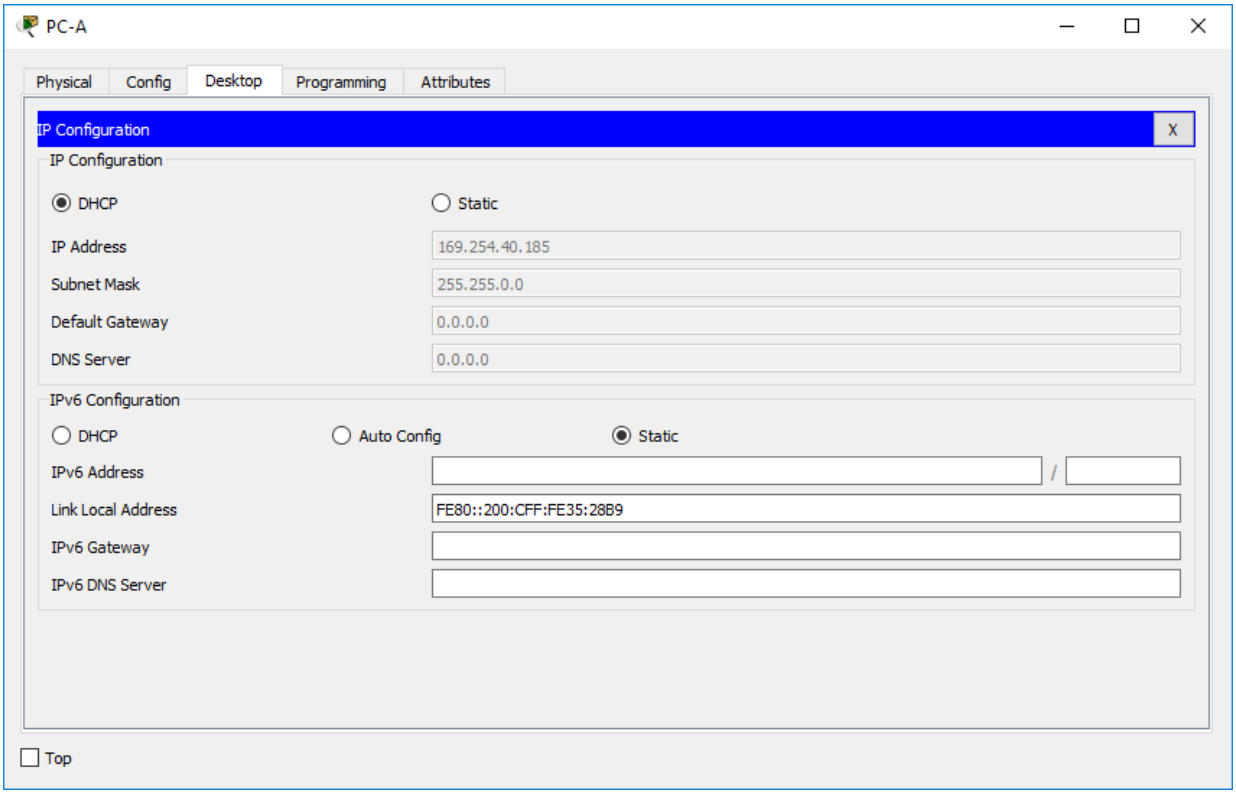
R3(config-if)#ip address 192.168.6.1 255.255.255.0

R3(config-if)#exit

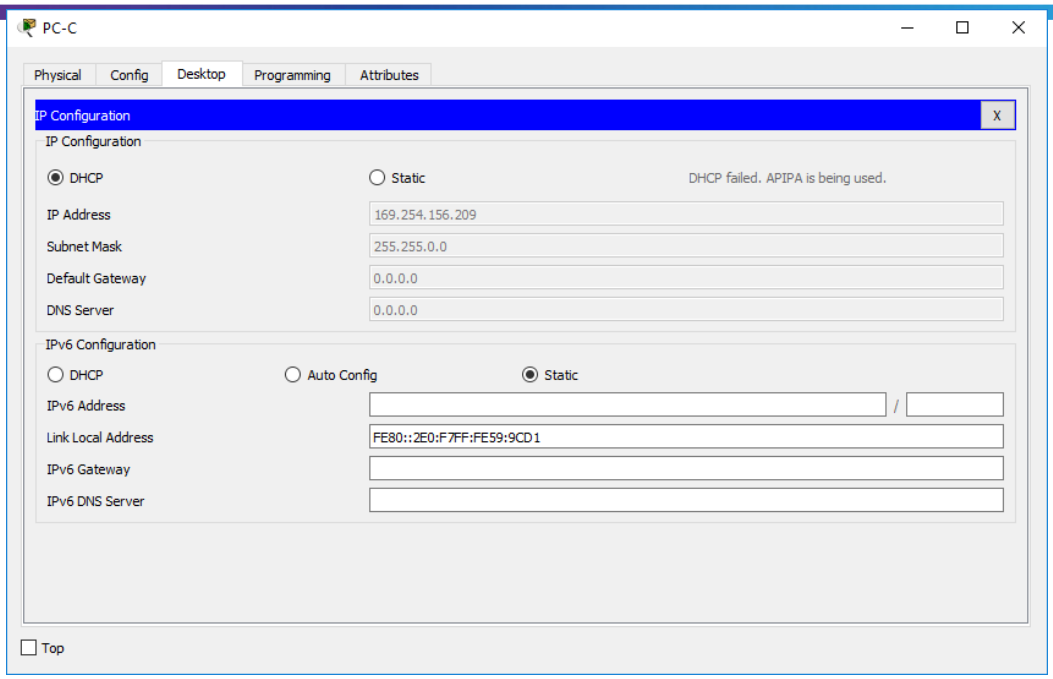
R3(config)#



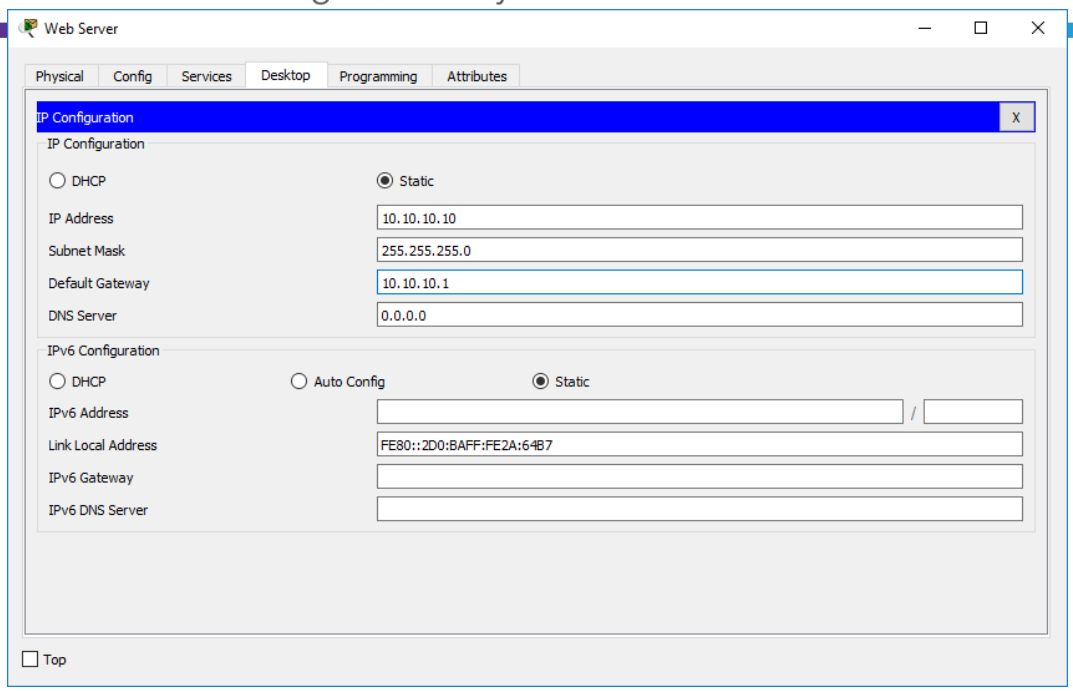
Configuramos el Pc A



Continuamos con la configuración del Pc C



Configuración de web server



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

OSPFv2 area 0

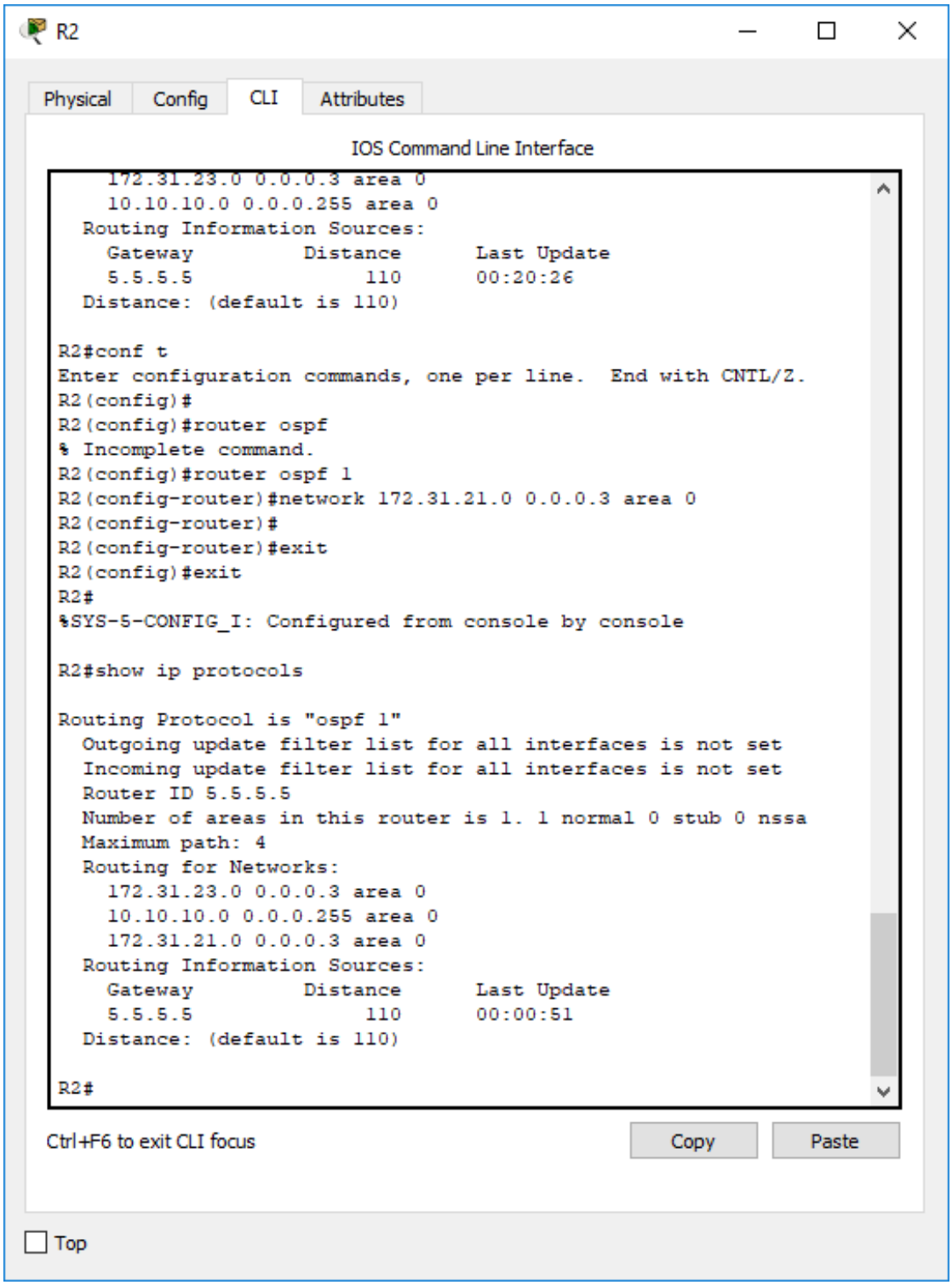
Configuration Item or Task	Specification
Router ID R1	1.1.1.1
Router ID R2	5.5.5.5
Router ID R3	8.8.8.8
Configurar todas las interfaces LAN como pasivas	
Establecer el ancho de banda para enlaces seriales en	256 Kb/s
Ajustar el costo en la métrica de S0/0 a	9500

Verificar información de OSPF

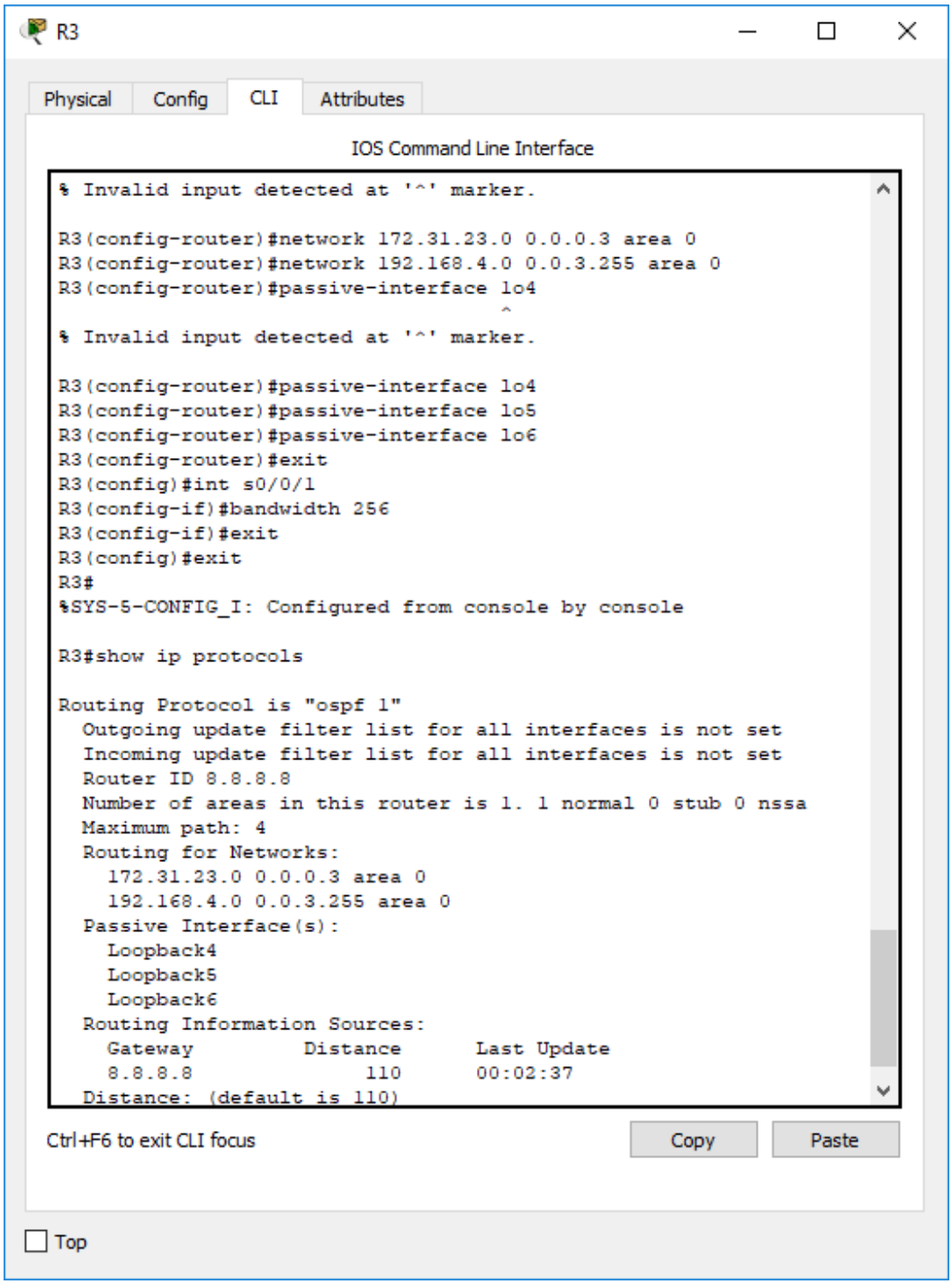
- Visualizar tablas de enrutamiento y routers conectados por OSPFv2
- Visualizar lista resumida de interfaces por OSPF en donde se ilustre el costo de cada interface
- Visualizar el OSPF Process ID, Router ID, Address summarizations, Routing Networks, and passive interfaces configuradas en cada router.


R1
Physical
Config
CLI
Attributes
IOS Command Line Interface
R1>enable
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 0.0.0.3 area 0
192.168.40.0 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
Routing Information Sources:
Gateway Distance Last Update
1.1.1.1 110 00:12:24
Distance: (default is 110)
R1#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

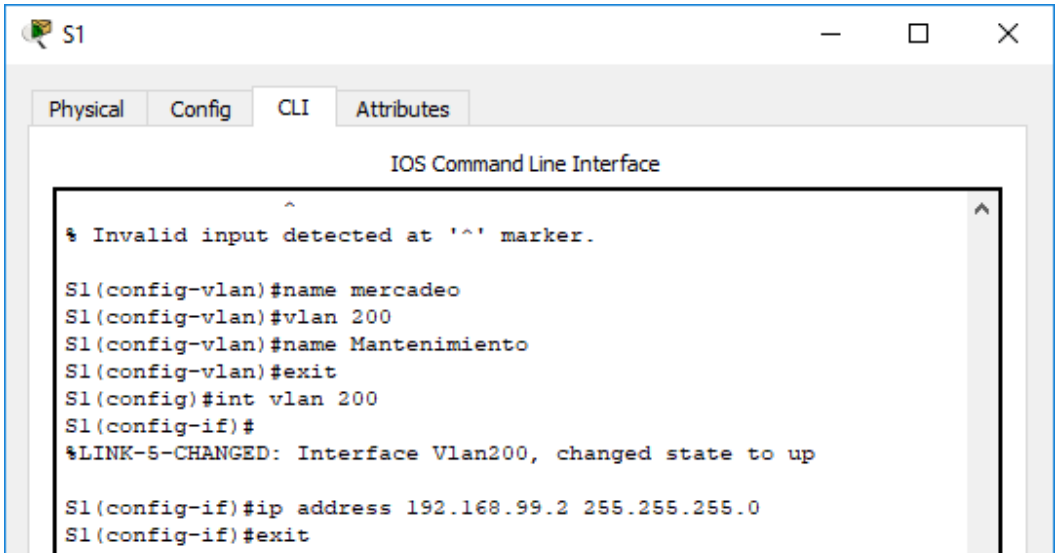
- Visualizar lista resumida de interfaces por OSPF en donde se ilustre el costo de cada interface

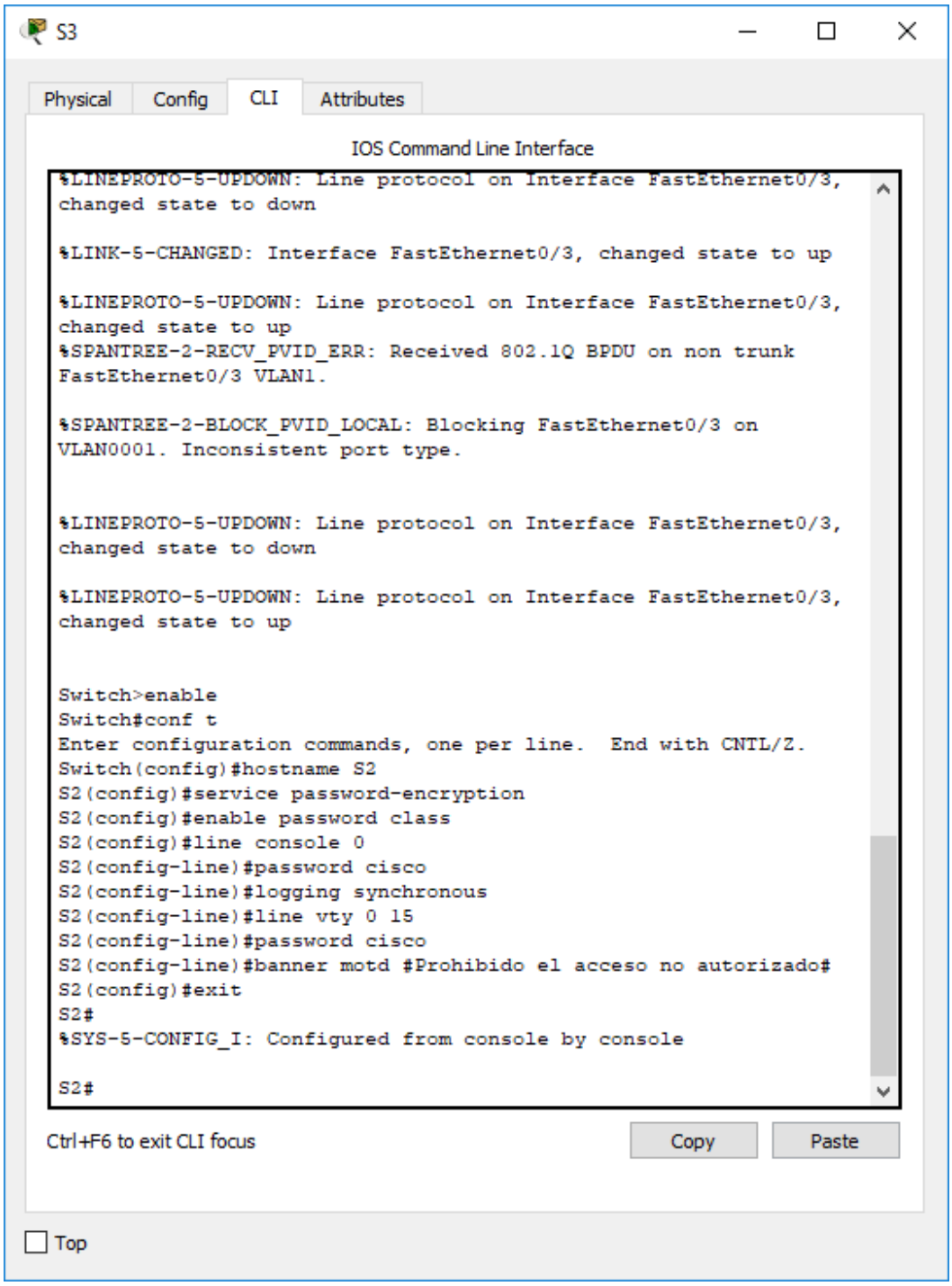

R2
Physical
Config
CLI
Attributes
IOS Command Line Interface
172.31.23.0 0.0.0.3 area 0
10.10.10.0 0.0.0.255 area 0
Routing Information Sources:
Gateway Distance Last Update
5.5.5.5 110 00:20:26
Distance: (default is 110)
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#
R2(config)#router ospf
% Incomplete command.
R2(config)#router ospf 1
R2(config-router)#network 172.31.21.0 0.0.0.3 area 0
R2(config-router)#
R2(config-router)#exit
R2(config)#exit
R2#
%SYS-5-CONFIG_I: Configured from console by console
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 5.5.5.5
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
Maximum path: 4
Routing for Networks:
172.31.23.0 0.0.0.3 area 0
10.10.10.0 0.0.0.255 area 0
172.31.21.0 0.0.0.3 area 0
Routing Information Sources:
Gateway Distance Last Update
5.5.5.5 110 00:00:51
Distance: (default is 110)
R2#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

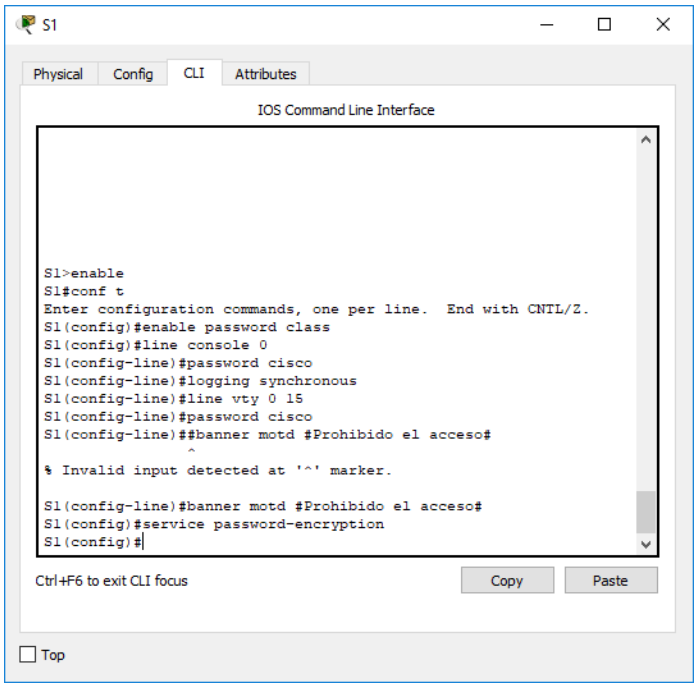
Configuramos ip´s de los routers según requerimientos



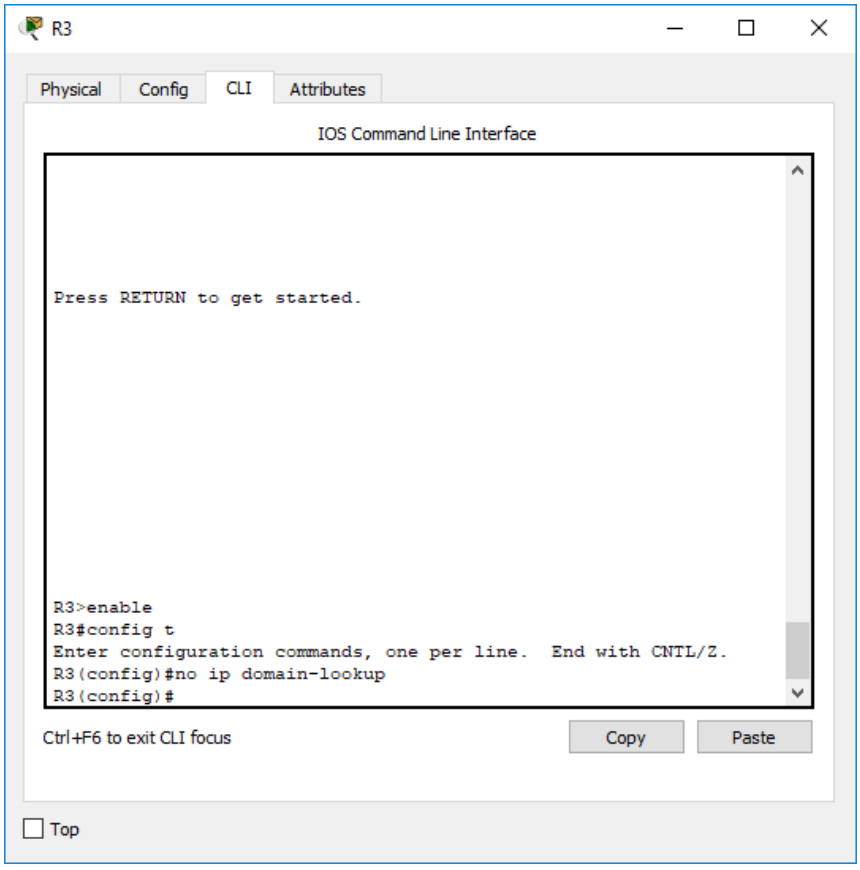
3. Configurar VLANs, Puertos troncales, puertos de acceso, encapsulamiento, Inter-VLAN Routing y Seguridad en los Switches acorde a la topología de red establecida.


S1
Physical
Config
CLI
Attributes
IOS Command Line Interface
% Invalid input detected at '^' marker.
S1(config-vlan)#name mercadeo
S1(config-vlan)#vlan 200
S1(config-vlan)#name Mantenimiento
S1(config-vlan)#exit
S1(config)#int vlan 200
S1(config-if)#
%LINK-5-CHANGED: Interface Vlan200, changed state to up
S1(config-if)#ip address 192.168.99.2 255.255.255.0
S1(config-if)#exit

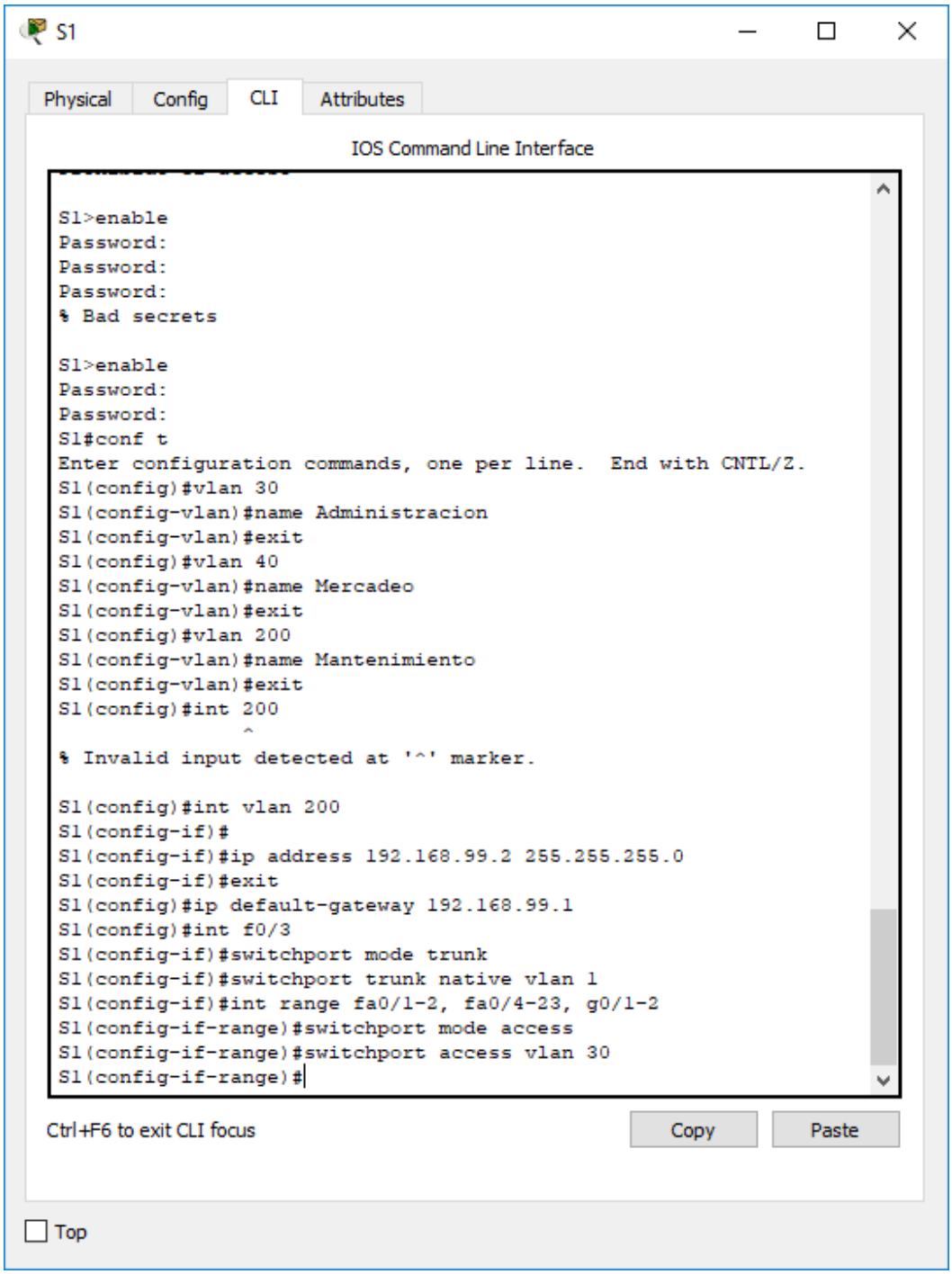

S3
Physical
Config
CLI
Attributes
IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to down
%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
%SPANTREE-2-RECV_PVID_ERR: Received 802.1Q BPDU on non trunk FastEthernet0/3 VLAN1.
%SPANTREE-2-BLOCK_PVID_LOCAL: Blocking FastEthernet0/3 on VLAN0001. Inconsistent port type.
%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
Switch>enable
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S2
S2(config)#service password-encryption
S2(config)#enable password class
S2(config)#line console 0
S2(config-line)#password cisco
S2(config-line)#logging synchronous
S2(config-line)#line vty 0 15
S2(config-line)#password cisco
S2(config-line)#banner motd #Prohibido el acceso no autorizado#
S2(config)#exit
S2#
%SYS-5-CONFIG_I: Configured from console by console
S2#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

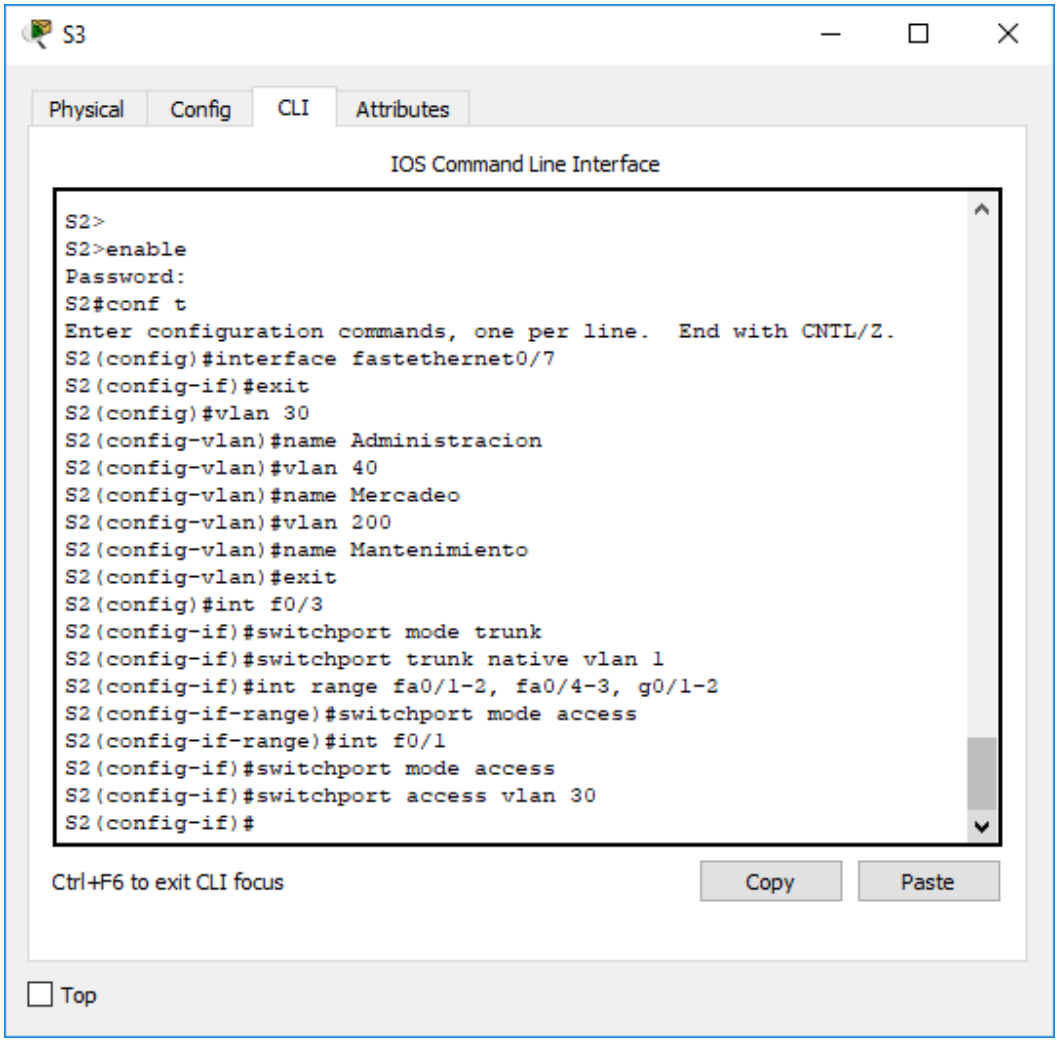


4. En el Switch 3 deshabilitar DNS lookup


R3
Physical
Config
CLI
Attributes
IOS Command Line Interface
Press RETURN to get started.
R3>enable
R3#config t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#no ip domain-lookup
R3(config)#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

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.

S1>enable

Password:

Password:

Password:

% Bad secrets

```
S1>enable
Password:
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)#exit
S1(config)#vlan 40
S1(config-vlan)#name Mercadeo
S1(config-vlan)#exit
S1(config)#vlan 200
S1(config-vlan)#name Mantenimiento
S1(config-vlan)#exit
S1(config)#int 200
             ^
% Invalid input detected at '^' marker.

S1(config)#int vlan 200
S1(config-if)#
S1(config-if)#ip address 192.168.99.2 255.255.255.0
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)#switchport trunk native vlan 1
S1(config-if)#int range fa0/1-2, fa0/4-23, g0/1-2
S1(config-if-range)#switchport mode access
S1(config-if-range)#switchport access vlan 30
S1(config-if-range)#exit
```

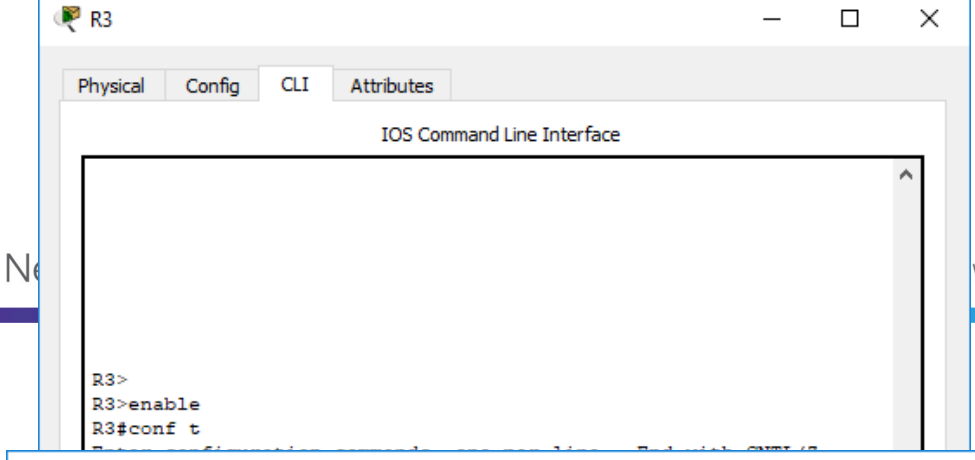
```
S1(config)#exit
S1#
```

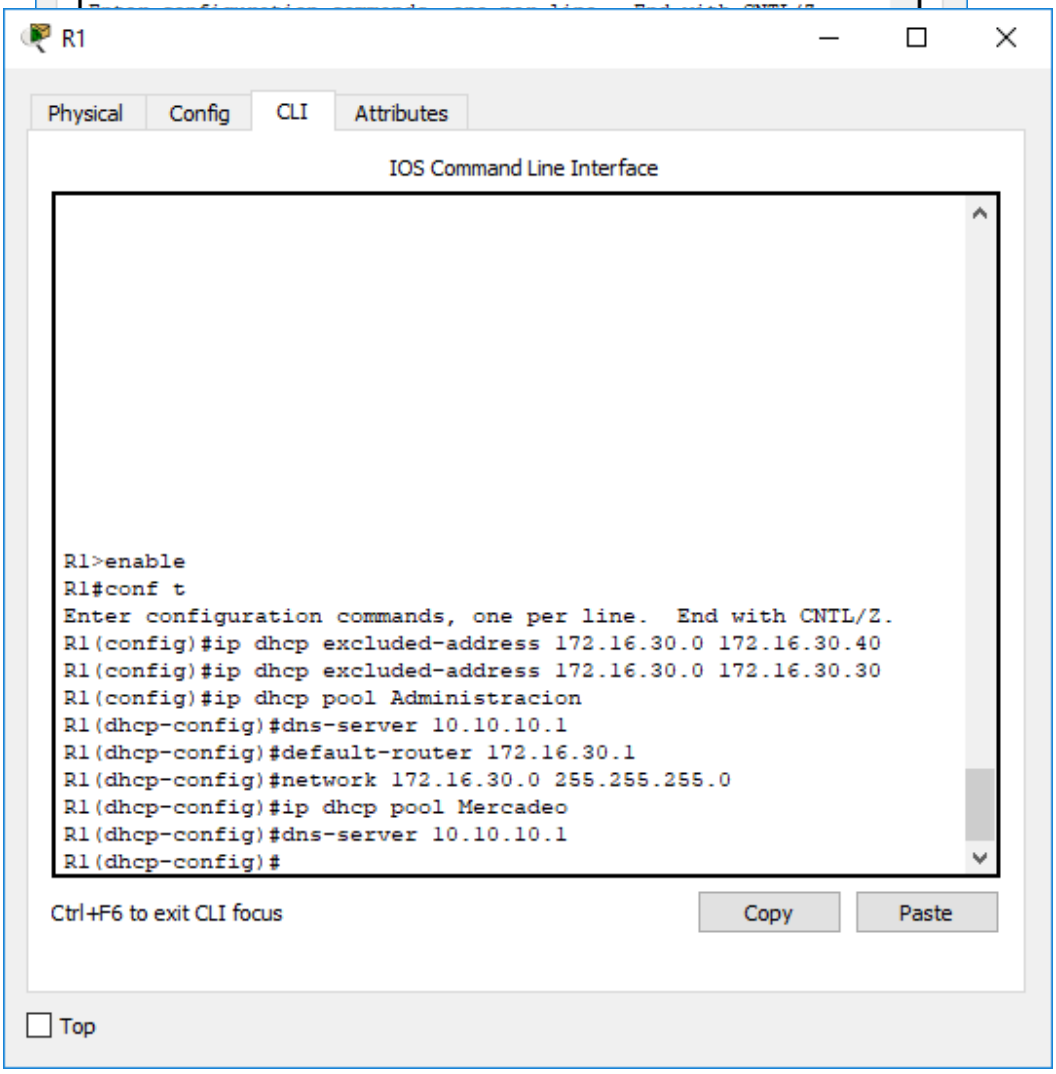
7. Implement DHCP and NAT for IPv4

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

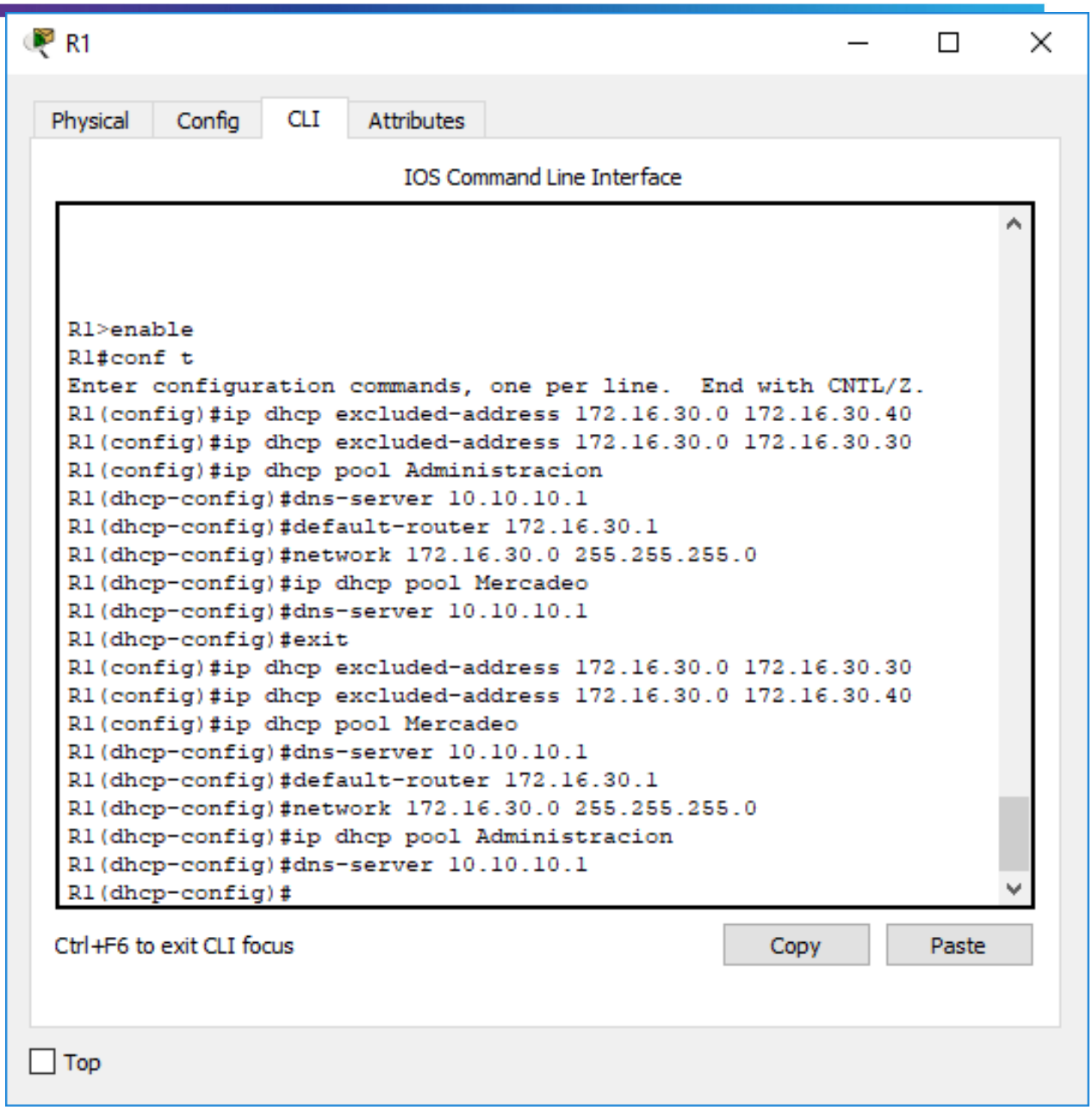
Configurar DHCP pool para VLAN 30	Name: ADMINISTRACION DNS-Server: 10.10.10.11 Domain-Name: ccna-unad.com Establecer default gateway.
Configurar DHCP pool para VLAN 40	Name: MERCADEO DNS-Server: 10.10.10.11 Domain-Name: ccna-unad.com Establecer default gateway.

9.

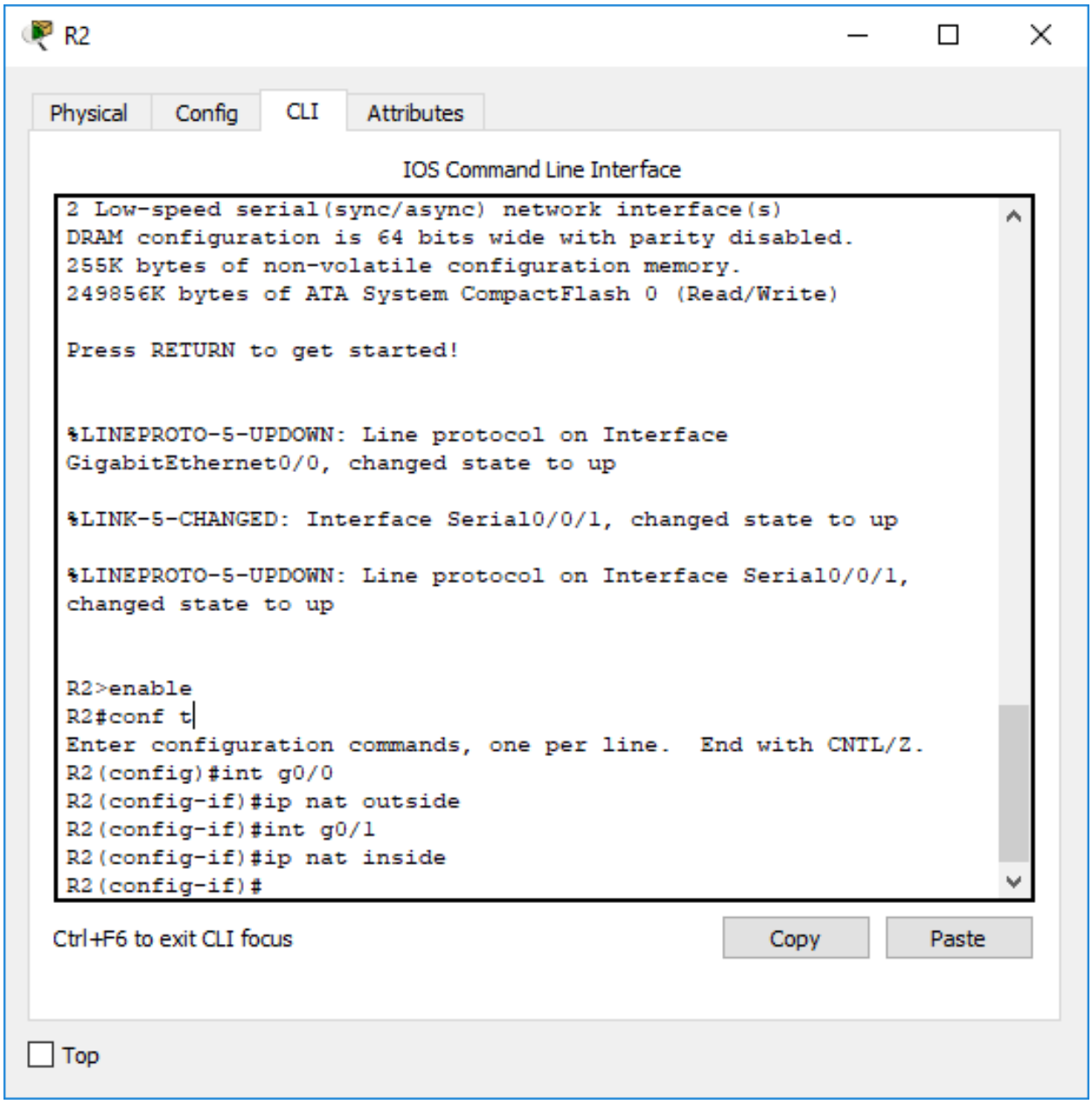




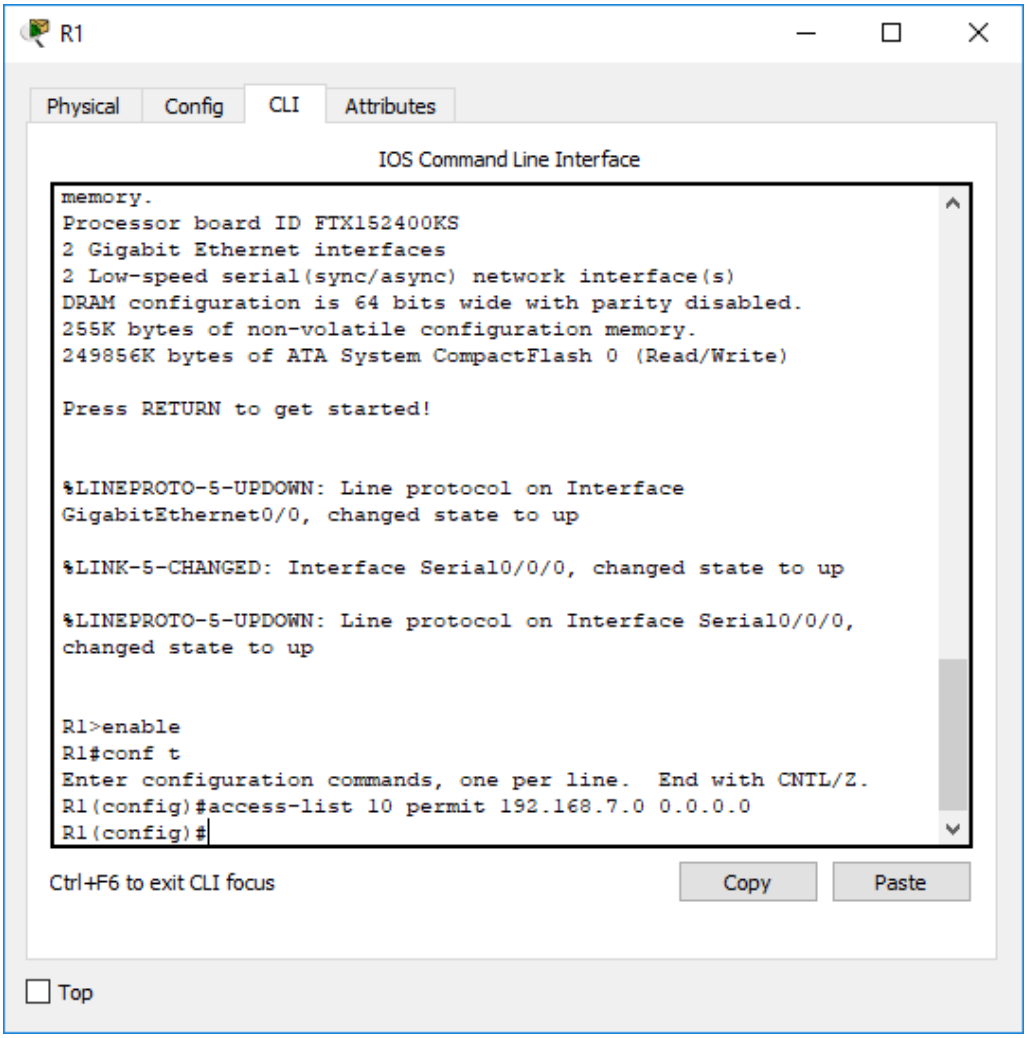
10. Reservar las primeras 30 direcciones IP de las VLAN 30 y 40 para configuraciones estáticas.


R1
Physical
Config
CLI
Attributes
IOS Command Line Interface
R1>enable
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp excluded-address 172.16.30.0 172.16.30.40
R1(config)#ip dhcp excluded-address 172.16.30.0 172.16.30.30
R1(config)#ip dhcp pool Administracion
R1(dhcp-config)#dns-server 10.10.10.1
R1(dhcp-config)#default-router 172.16.30.1
R1(dhcp-config)#network 172.16.30.0 255.255.255.0
R1(dhcp-config)#ip dhcp pool Mercadeo
R1(dhcp-config)#dns-server 10.10.10.1
R1(dhcp-config)#exit
R1(config)#ip dhcp excluded-address 172.16.30.0 172.16.30.30
R1(config)#ip dhcp excluded-address 172.16.30.0 172.16.30.40
R1(config)#ip dhcp pool Mercadeo
R1(dhcp-config)#dns-server 10.10.10.1
R1(dhcp-config)#default-router 172.16.30.1
R1(dhcp-config)#network 172.16.30.0 255.255.255.0
R1(dhcp-config)#ip dhcp pool Administracion
R1(dhcp-config)#dns-server 10.10.10.1
R1(dhcp-config)#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

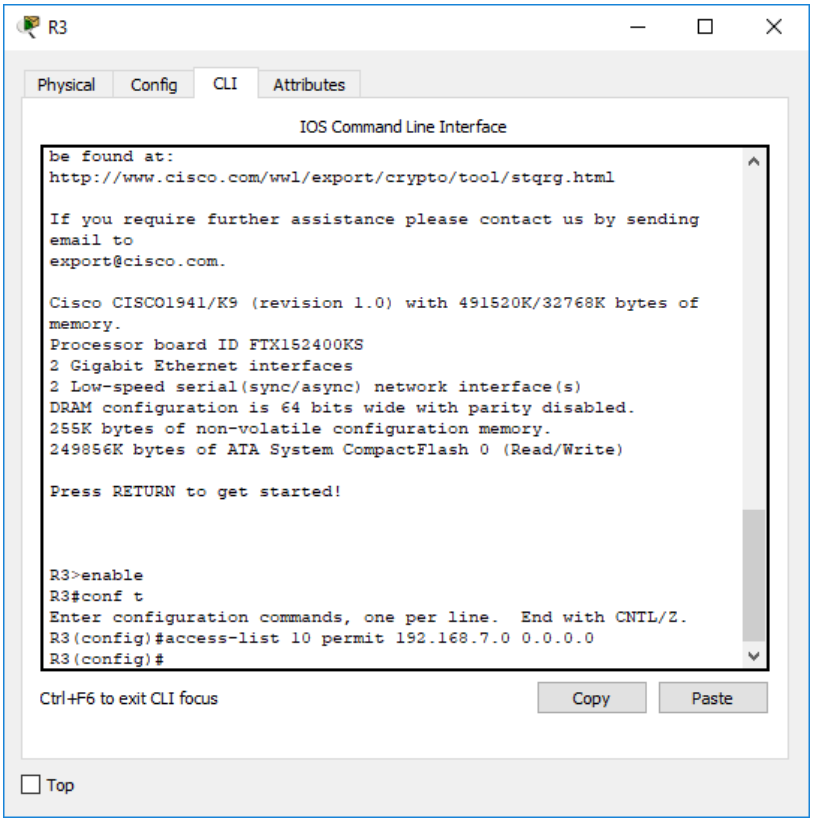
11. Configurar NAT en R2 para permitir que los host puedan salir a internet.



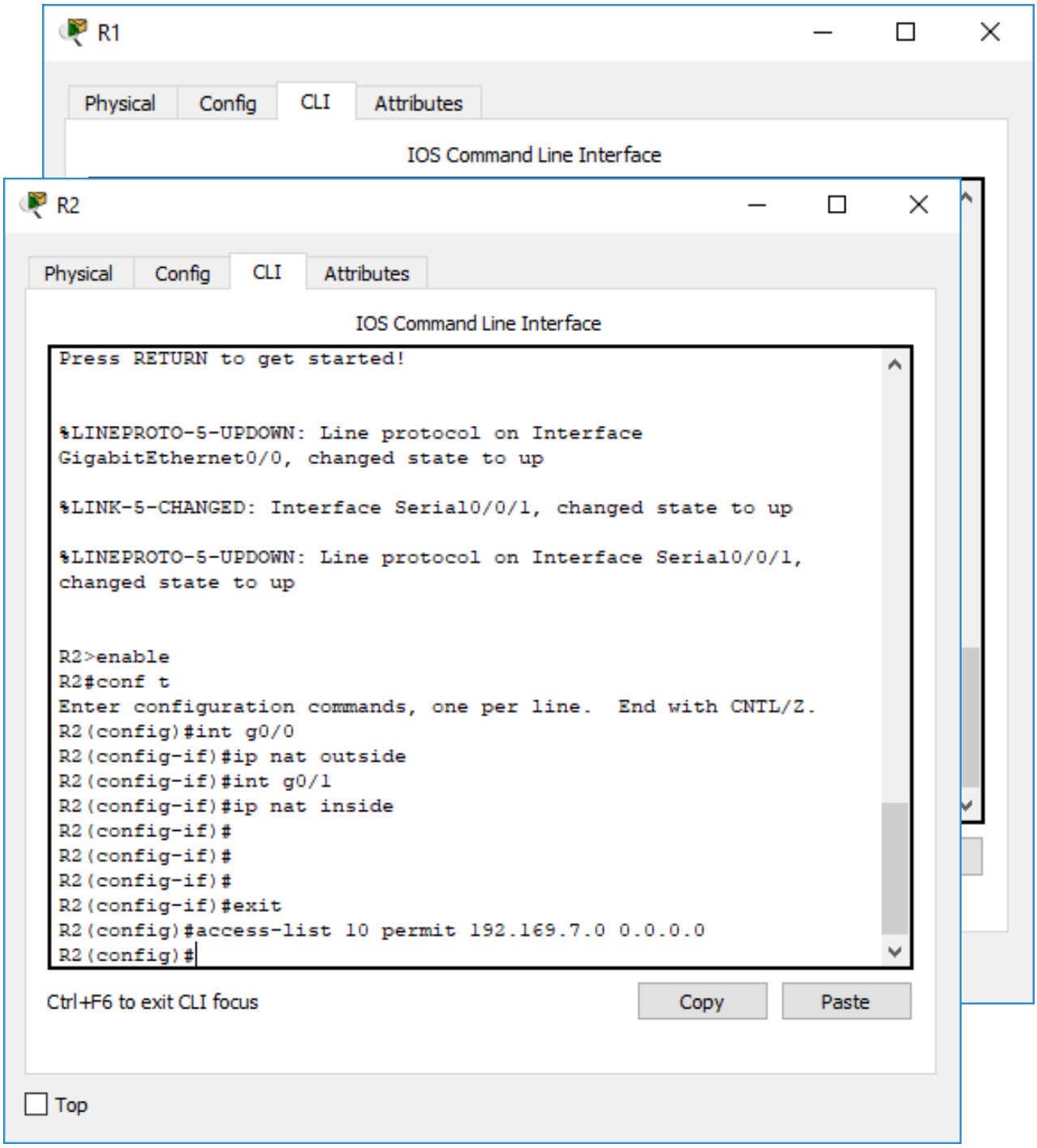
12. Configurar al menos dos listas de acceso de tipo estándar a su criterio en para restringir o permitir tráfico desde R1 o R3 hacia R2.

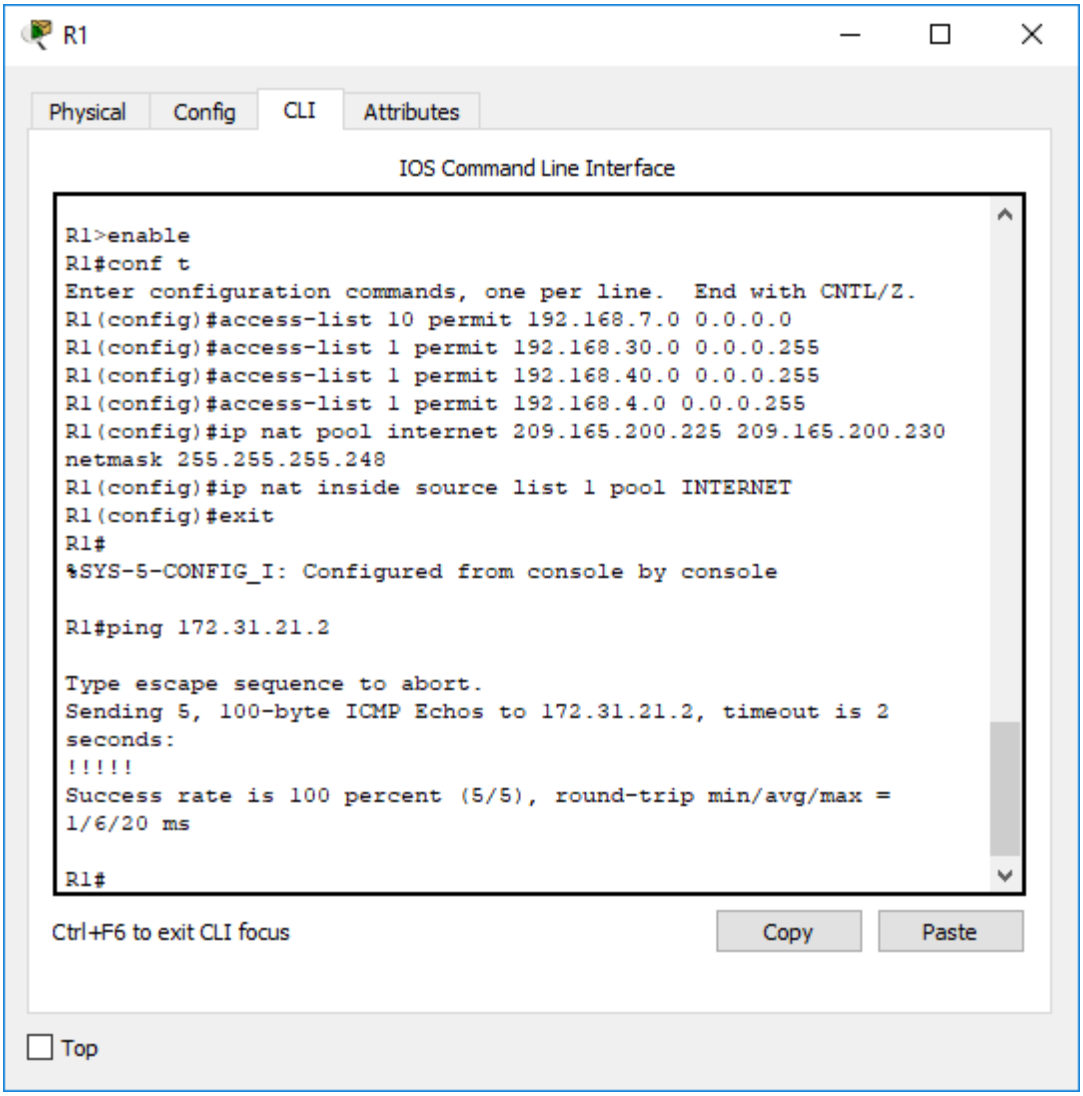


13. Configurar al menos dos listas de acceso de tipo extendido o nombradas a su criterio en para restringir o permitir tráfico desde R1 o R3 hacia R2.



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




R1
Physical
Config
CLI
Attributes
IOS Command Line Interface
R1>enable
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#access-list 10 permit 192.168.7.0 0.0.0.0
R1(config)#access-list 1 permit 192.168.30.0 0.0.0.255
R1(config)#access-list 1 permit 192.168.40.0 0.0.0.255
R1(config)#access-list 1 permit 192.168.4.0 0.0.0.255
R1(config)#ip nat pool internet 209.165.200.225 209.165.200.230
netmask 255.255.255.248
R1(config)#ip nat inside source list 1 pool INTERNET
R1(config)#exit
R1#
%SYS-5-CONFIG_I: Configured from console by console
R1#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 =
1/6/20 ms
R1#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top