

DISEÑO E IMPLEMENTACION DE UNA SOLUCION LAN/WAN

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OBJETIVOS

General

- Demostrar los conocimientos adquiridos durante el desarrollo del Diplomado de profundización CISCO (CNNA1 – CNNA2) mediante una prueba de habilidades practicas en el software PACKET TRACER

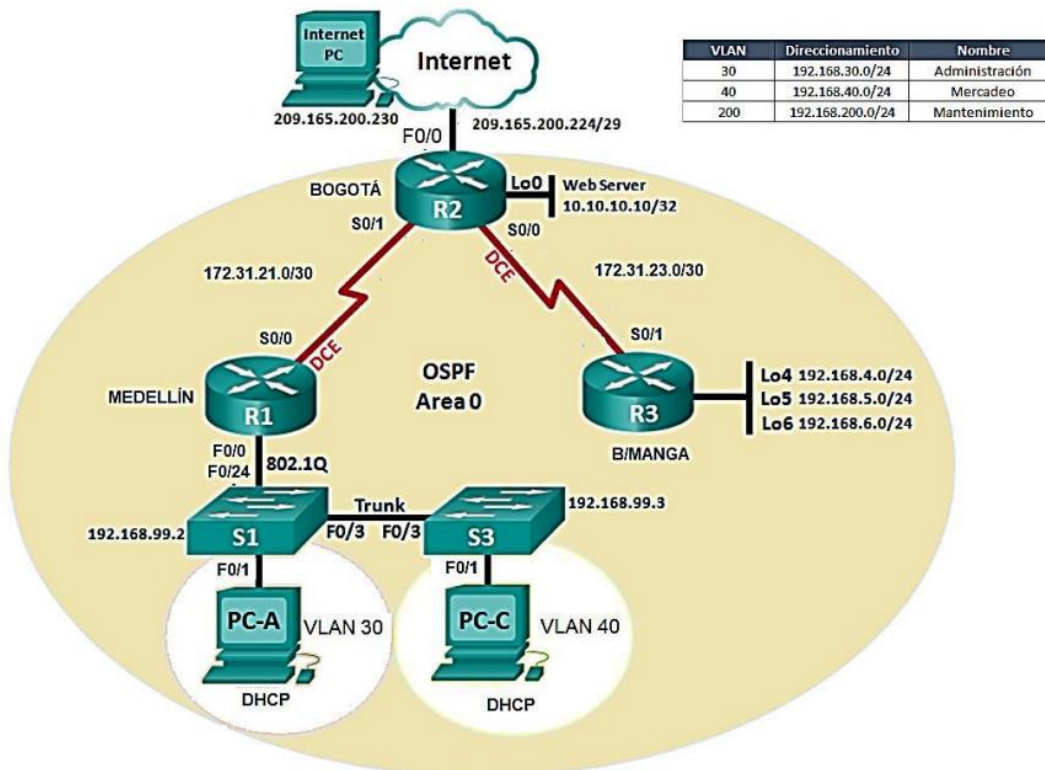
Específicos

- Configurar el direccionamiento IP acorde con la topología de red para cada uno de los dispositivos que forman parte del escenario
- Configurar el protocolo de enrutamiento OSPFv2
- Configurar VLANs, Puertos troncales, puertos de acceso, encapsulamiento, Inter-VLAN Routing y Seguridad en los Switches acorde a la topología de red establecida
- Asignar direcciones IP a los Switches acorde a los lineamientos
- Implement DHCP and NAT for IPv4

Escenario

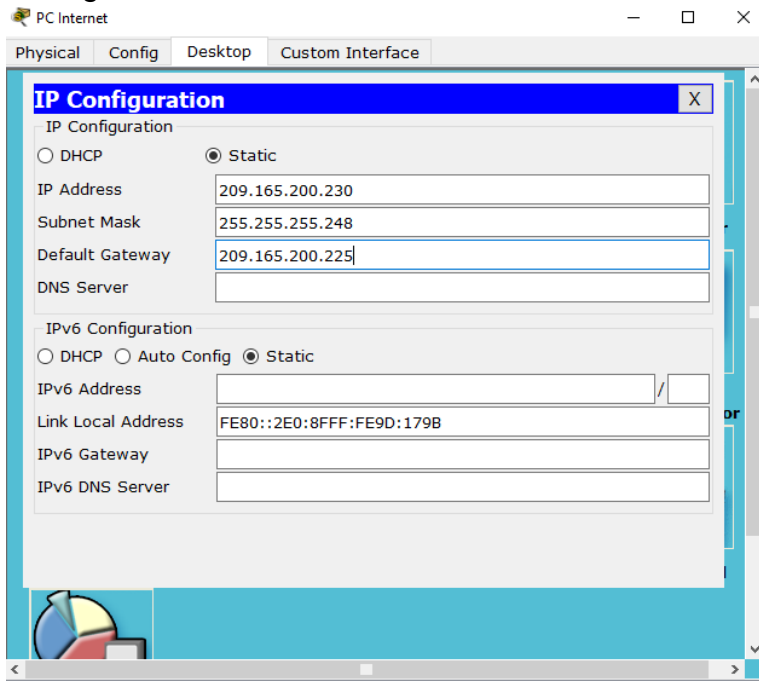
Una empresa de Tecnología posee tres sucursales distribuidas en las ciudades de Bogotá, Medellín y Bucaramanga, en donde el estudiante será el administrador de la red, el cual deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con los lineamientos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

Topología:



Configuraciones de los equipos

Configuración PC Internet



PC Internet

Physical Config Desktop Custom Interface

IP Configuration

DHCP Static

IP Address: 209.165.200.230

Subnet Mask: 255.255.255.248

Default Gateway: 209.165.200.225

DNS Server:

IPv6 Configuration

DHCP Auto Config Static

IPv6 Address:

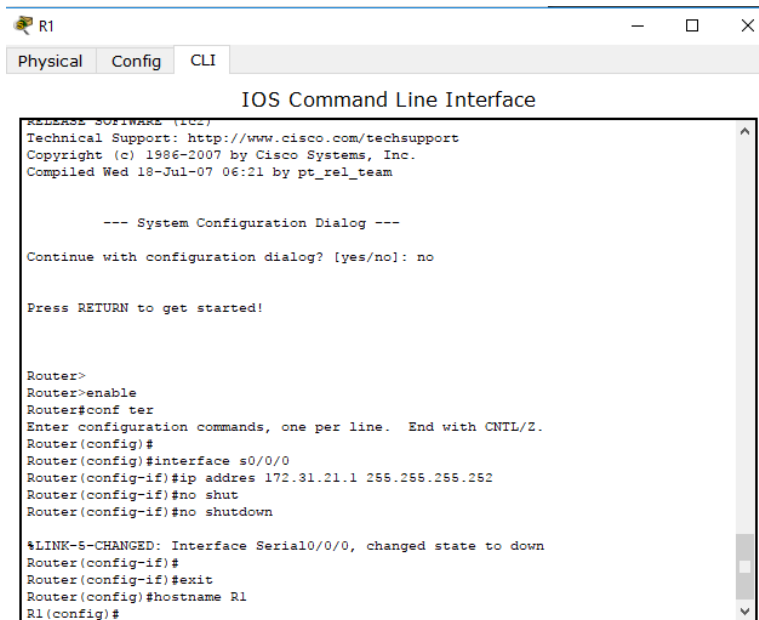
Link Local Address: FE80::2E0:8FFF:FE9D:179B

IPv6 Gateway:

IPv6 DNS Server:

Configuración en R1

IP a las interfaces



R1

Physical Config CLI

IOS Command Line Interface

```
RELEASE SOFTWARE (102)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2007 by Cisco Systems, Inc.
Compiled Wed 18-Jul-07 06:21 by pt_rel_team

--- System Configuration Dialog ---

Continue with configuration dialog? [yes/no]: no

Press RETURN to get started!

Router>
Router>enable
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#interface s0/0/0
Router(config-if)#ip address 172.31.21.1 255.255.255.252
Router(config-if)#no shut
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
Router(config-if)#
Router(config-if)#exit
Router(config)#hostname R1
R1(config)#
```

Encapsulamiento

```
R1
Physical Config CLI
IOS Command Line Interface

R1>
R1>enable
R1#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface fa0/0
R1(config-if)#exit
R1(config)#interface fa0/0.33
R1(config-subif)#desc
R1(config-subif)#description Administracion LAN
R1(config-subif)#encap
R1(config-subif)#encapsulation dot1q 30
R1(config-subif)#ip add 192.268.30.1 255.255.255.0
^
% Invalid input detected at '^' marker.

R1(config-subif)#ip address 192.268.30.1 255.255.255.0
^
% Invalid input detected at '^' marker.

R1(config-subif)#encapsulation dot1q
% Incomplete command.
R1(config-subif)#encapsulation dot1q 30
R1(config-subif)#ip address 192.168.30.1 255.255.255.0
R1(config-subif)#
```

```
R1(config)#interface fa0/0.30
R1(config-subif)#desc
R1(config-subif)#description Administracion LAN
R1(config-subif)#encapsulation dot1q 30
R1(config-subif)#ip address 192.168.30.1 255.255.255.0
R1(config-subif)#interface fa0/0.40
R1(config-subif)#description Mercadeo LAN
R1(config-subif)#encapsulation dot1q 40
R1(config-subif)#ip address 192.168.4.1 255.255.255.0
R1(config-subif)#interface fa0/0.200
R1(config-subif)#description Mantenimiento LAN
R1(config-subif)#encapsulation dot1q 200
R1(config-subif)#ip address 192.168.200.1 255.255.255.0
R1(config-subif)#interface fa0/0.40
R1(config-subif)#description Mercadeo LAN
R1(config-subif)#encapsulation dot1q 40
R1(config-subif)#ip address 192.168.40.1 255.255.255.0
R1(config-subif)#interface fa0/0
R1(config-if)#no shut
R1(config-if)#no shutdown

R1(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 FastEthernet0/0.30, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.30, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/0.33, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.33, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/0.40, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.40, 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
```

Enrutamiento

```
R1
Physical Config CLI
IOS Command Line Interface

R1>enable
R1#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#route ospf 1
R1(config-router)#route-id 1.1.1.1
% Invalid input detected at '^' marker.

R1(config-router)#router-id 1.1.1.1
R1(config-router)#network
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
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)#pass
R1(config-router)#passive-interface fa0/0.30
R1(config-router)#passive-interface fa0/0.40
R1(config-router)#passive-interface fa0/0.200
R1(config-router)#auto-cost reference-bandwidth 1000
% Invalid input detected at '^' marker.

R1(config-router)#interface s0/0/0
R1(config-if)#band
R1(config-if)#bandwidth 128
R1(config-if)#ip ospf co
R1(config-if)#ip ospf cost 7500
R1(config-if)#
```

Habilitar el DHCP and NAT para IPv4

```
R1
Physical Config CLI
IOS Command Line Interface

Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp ex
R1(config)#ip dhcp ex
% Incomplete command.
R1(config)#ip dhcp excluded-a
R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.20
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.20
R1(config)#ip dhcp pool Administration
R1(dhcp-config)#dns-ser
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#domain-na
R1(dhcp-config)#domain-name ccna-unad.com
% Invalid input detected at '^' marker.

R1(dhcp-config)#'
% Invalid input detected at '^' marker.

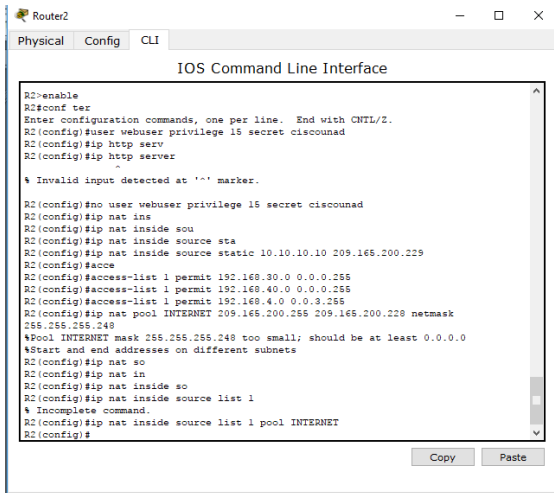
R1(dhcp-config)?
default-router Default routers
dns-server Set name server
exit Exit from DHCP pool configuration mode
network Network number and mask
no Negate a command or set its defaults
option Raw DHCP options
R1(dhcp-config)#defaut
R1(dhcp-config)#default-r
R1(dhcp-config)#default-router 192.168.30.1
R1(dhcp-config)#
```

```
R1
Physical Config CLI
IOS Command Line Interface

R1(dhcp-config)#defaut
R1(dhcp-config)#default-r
R1(dhcp-config)#default-router 192.168.30.1
R1(dhcp-config)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

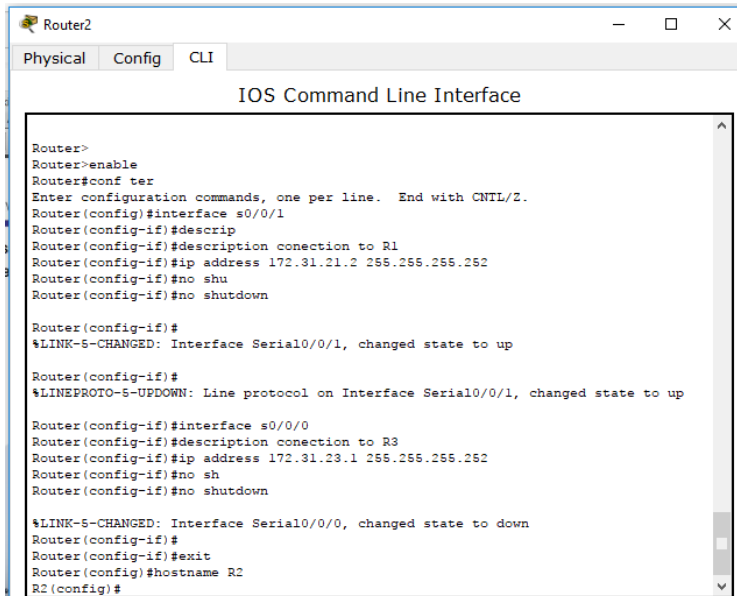
R1#ip dhcp ex
R1#ip dhcp excluded-address 192.168.40.1 192.168.40.30
% Invalid input detected at '^' marker.

R1#
R1#
R1#
R1#conf term
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ip dhcp exclu
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.30
R1(config)#ip dhcp pool MERCADERO
R1(dhcp-config)#NET
R1(dhcp-config)#network 192.168.40.0 255.255.255.0
R1(dhcp-config)#defaut
R1(dhcp-config)#default-router 192.168.40.1
R1(dhcp-config)#dns-se
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console
```



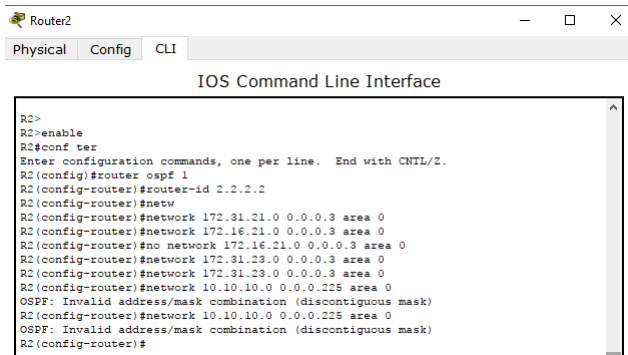
```
Router2
Physical Config CLI
IOS Command Line Interface
R2>enable
R2#conf t
R2(config)#user webuser privilege 15 secret ciscounad
R2(config)#ip http serv
R2(config)#ip http server
% Invalid input detected at '^' marker.
R2(config)#no user webuser privilege 15 secret ciscounad
R2(config)#ip nat ins
R2(config)#ip nat inside sou
R2(config)#ip nat inside source sta
R2(config)#ip nat inside source static 10.10.10.10 209.165.200.229
R2(config)#acc
R2(config)#access-list 1 permit 192.168.30.0 0.0.0.255
R2(config)#access-list 1 permit 192.168.40.0 0.0.0.255
R2(config)#access-list 1 permit 192.168.4.0 0.0.3.255
R2(config)#ip nat pool INTERNET 209.165.200.255 209.165.200.229 netmask
255.255.255.248
*Pool INTERNET mask 255.255.255.248 too small; should be at least 0.0.0.0
*Start and end addresses on different subnets
R2(config)#ip nat in
R2(config)#ip nat inside so
R2(config)#ip nat inside source list 1
% Incomplete command
R2(config)#ip nat inside source list 1 pool INTERNET
R2(config)#
```

Configuración en R2 IP de interfaces



```
Router2
Physical Config CLI
IOS Command Line Interface
Router>
Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface s0/0/1
Router(config-if)#descrip
Router(config-if)#description conection to R1
Router(config-if)#ip address 172.31.21.2 255.255.255.252
Router(config-if)#no shu
Router(config-if)#no shutdown
.
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
.
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up
.
Router(config-if)#interface s0/0/0
Router(config-if)#description conection to R3
Router(config-if)#ip address 172.31.23.1 255.255.255.252
Router(config-if)#no sh
Router(config-if)#no shutdown
.
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
Router(config-if)#
Router(config-if)#exit
Router(config)#hostname R2
R2(config)#
```

Enrutamiento



```
Router2
Physical Config CLI
IOS Command Line Interface
R2>
R2>enable
R2#conf 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)#netw
R2(config-router)#network 172.31.21.0 0.0.0.3 area 0
R2(config-router)#network 172.16.21.0 0.0.0.3 area 0
R2(config-router)#no network 172.16.21.0 0.0.0.3 area 0
R2(config-router)#network 172.31.23.0 0.0.0.3 area 0
R2(config-router)#network 10.10.10.0 0.0.0.225 area 0
OSPF: Invalid address/mask combination (discontiguous mask)
R2(config-router)#network 10.10.10.0 0.0.0.225 area 0
OSPF: Invalid address/mask combination (discontiguous mask)
R2(config-router)#
```

```

R2>enable
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2 (config)#router ospf 1
R2 (config-router)#pass
R2 (config-router)#passive-interface fa0/0
R2 (config-router)#auto
R2 (config-router)#auto-cost ref
R2 (config-router)#auto-cost reference-bandwidth 1000
% OSPF: Reference bandwidth is changed.
Please ensure reference bandwidth is consistent across all routers.
R2 (config-router)#
Enter configuration commands, one per line. End with CNTL/Z.
R2 (config)#router ospf 1
R2 (config-router)#interface s0/0/1
R2 (config-if)#ip
R2 (config-if)#ip ospf c
R2 (config-if)#ip ospf cost 7500
R2 (config-if)#

```

Router2

Physical Config CLI

IOS Command Line Interface

| Neighbor ID | Pri | State | Dead Time | Address | Interface | |
|-------------|-----|-------|-----------|----------|-------------|-------------|
| 3.3.3.3 | 0 | FULL/ | - | 00:00:33 | 172.31.23.2 | Serial0/0/0 |
| 1.1.1.1 | 0 | FULL/ | - | 00:00:37 | 172.31.21.1 | Serial0/0/1 |

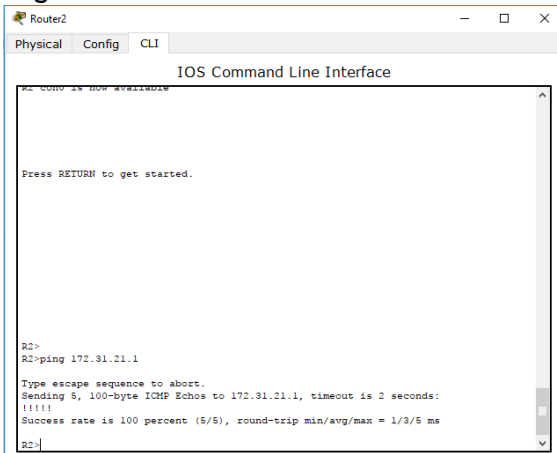
```

R2#show ip interface
FastEthernet0/0 is up, line protocol is down (disabled)
Internet address is 209.165.200.225/29
Broadcast address is 255.255.255.255
Address determined by setup command
MTU is 1500 bytes
Helper address is not set
Directed broadcast forwarding is disabled
Outgoing access list is not set
Inbound access list is not set
Proxy ARP is enabled
Security level is default
Split horizon is enabled
ICMP redirects are always sent
ICMP unreachable are always sent
ICMP mask replies are never sent
IP fast switching is disabled
IP fast switching on the same interface is disabled
IP Flow switching is disabled
IP Fast switching turbo vector
IP multicast fast switching is disabled
IP multicast distributed fast switching is disabled
Router Discovery is disabled
IP output packet accounting is disabled
IP access violation accounting is disabled
TCP/IP header compression is disabled
RIP/IP header compression is disabled
Probe proxy name replies are disabled
Policy routing is disabled
Network address translation is disabled
BGP Policy Mapping is disabled
Input features: MCI Check
WCCP Redirect outbound is disabled
WCCP Redirect inbound is disabled
WCCP Redirect exclude is disabled
FastEthernet0/1 is up, line protocol is up (connected)
--More--

```

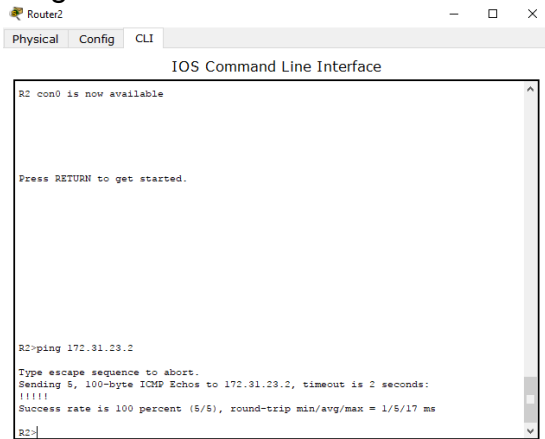
Copy Paste

Ping R2 a R1



```
Router2
Physical Config CLI
IOS Command Line Interface
R2 con0 is now available
Press RETURN to get started.
R2>
R2>ping 172.31.21.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.21.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/5 ms
R2>
```

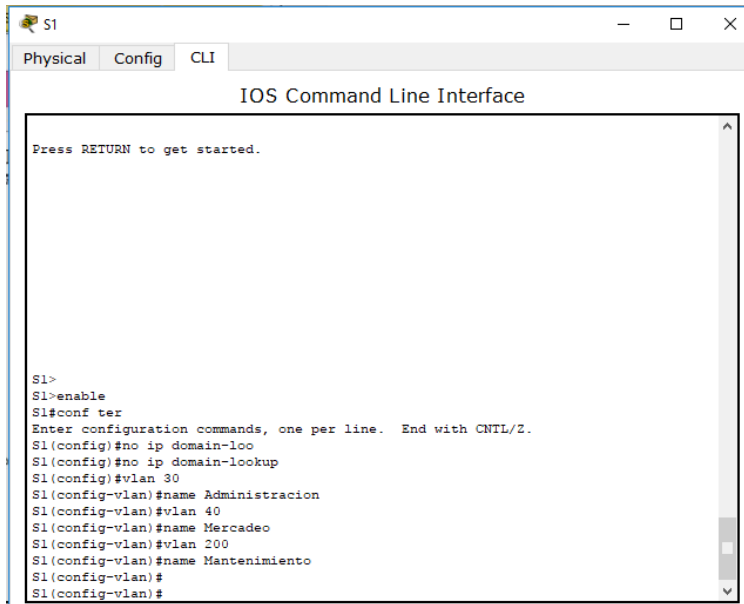
Ping R2 a R3



```
Router2
Physical Config CLI
IOS Command Line Interface
R2 con0 is now available
Press RETURN to get started.
R2>
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 = 1/5/17 ms
R2>
```

Configuración S1

Creación de las Vlan

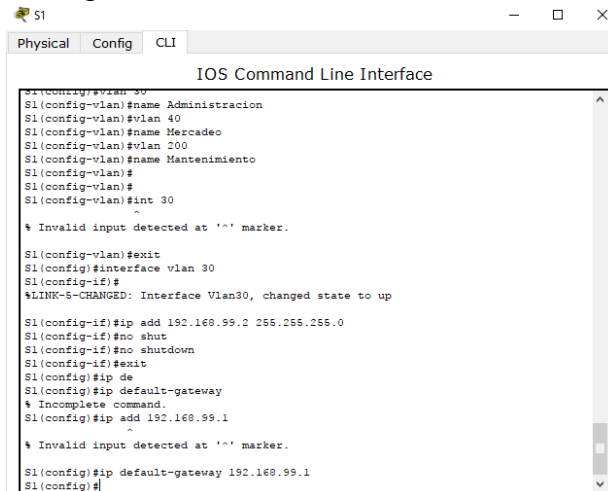


```
S1
Physical Config CLI
IOS Command Line Interface

Press RETURN to get started.

S1>
S1>enable
S1#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
S1(config)#no ip domain-loo
S1(config)#no ip domain-lookup
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)#
S1(config-vlan)#
```

Configuración Vlan 30



```
S1
Physical Config CLI
IOS Command Line Interface

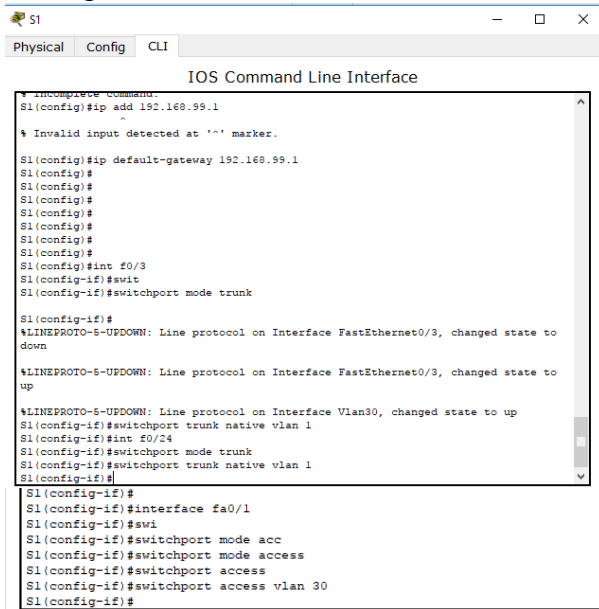
S1(config-vlan)#vlan 30
S1(config-vlan)#name Administracion
S1(config-vlan)#vlan 40
S1(config-vlan)#name Mercadeo
S1(config-vlan)#vlan 200
S1(config-vlan)#name Mantenimiento
S1(config-vlan)#
S1(config-vlan)#
S1(config-vlan)#int 30
^
% Invalid input detected at '^' marker.

S1(config-vlan)#exit
S1(config)#interface vlan 30
S1(config-if)#
%LINK-5-CHANGED: Interface Vlan30, changed state to up

S1(config-if)#ip add 192.168.99.2 255.255.255.0
S1(config-if)#no shut
S1(config-if)#no shutdown
S1(config-if)#exit
S1(config)#ip de
S1(config)#ip default-gateway
% Incomplete command.
S1(config)#ip add 192.168.99.1
^
% Invalid input detected at '^' marker.

S1(config)#ip default-gateway 192.168.99.1
S1(config)#
```

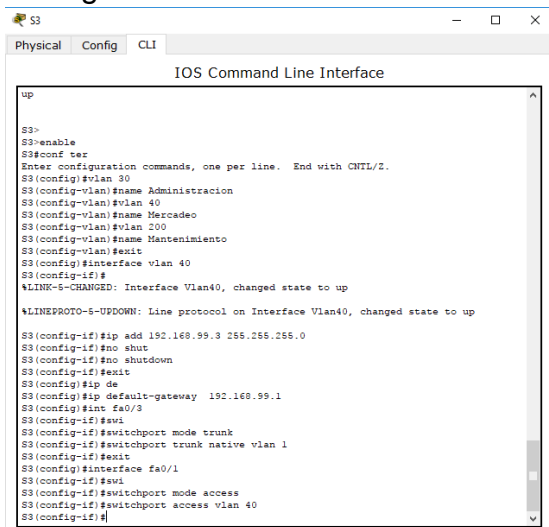
Configuración Trunk



```
S1
Physical Config CLI
IOS Command Line Interface
S1#
S1#configure terminal
S1(config)#ip add 192.168.99.1
S1(config)#
S1(config)#ip default-gateway 192.168.99.1
S1(config)#
S1(config)#
S1(config)#
S1(config)#
S1(config)#
S1(config)#int f0/3
S1(config-if)#swit
S1(config-if)#switchport mode trunk

S1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to
down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to
up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan30, 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)#
S1(config-if)#
S1(config-if)#interface fa0/1
S1(config-if)#swi
S1(config-if)#switchport mode acc
S1(config-if)#switchport mode access
S1(config-if)#switchport access
S1(config-if)#switchport access vlan 30
S1(config-if)#
```

Configuración S3



```
S3
Physical Config CLI
IOS Command Line Interface
S3#
S3#enable
S3#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#vlan 30
S3(config-vlan)#name Administracion
S3(config-vlan)#vlan 40
S3(config-vlan)#name Mercadeo
S3(config-vlan)#vlan 200
S3(config-vlan)#name Mantenimiento
S3(config-vlan)#exit
S3(config)#interface vlan 40
S3(config-if)#
%LINK-5-CHANGED: Interface Vlan40, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan40, changed state to up
S3(config-if)#ip add 192.168.99.3 255.255.255.0
S3(config-if)#no shut
S3(config-if)#no shutdown
S3(config-if)#exit
S3(config)#ip de
S3(config)#ip default-gateway 192.168.99.1
S3(config)#int fa0/3
S3(config-if)#swi
S3(config-if)#switchport mode trunk
S3(config-if)#switchport trunk native vlan 1
S3(config-if)#exit
S3(config)#interface fa0/1
S3(config-if)#swi
S3(config-if)#switchport mode access
S3(config-if)#switchport access vlan 40
S3(config-if)#
```

PC-A

Physical Config Desktop Custom Interface

IP Configuration

IP Configuration

DHCP Static DHCP failed. APIPA is being used.

IP Address: 169.254.68.215

Subnet Mask: 255.255.0.0

Default Gateway: 0.0.0.0

DNS Server:

IPv6 Configuration

DHCP Auto Config Static

IPv6 Address:

Link Local Address: FE80::250:FFF:FE5B:44D7

IPv6 Gateway:

IPv6 DNS Server:

PC-C

Physical Config Desktop Custom Interface

IP Configuration

IP Configuration

DHCP Static DHCP request successful.

IP Address: 192.168.40.31

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.40.1

DNS Server: 10.10.10.11

IPv6 Configuration

DHCP Auto Config Static

IPv6 Address:

Link Local Address: FE80::2D0:97FF:FEA5:4819

IPv6 Gateway:

IPv6 DNS Server:

Router2

Physical Config CLI

IOS Command Line Interface

```
R2>enable
R2#configure terminal
R2(config)#show acc
R2(config)#show access list
R2(config)#show access-list
R2(config)#exit
R2#
*SYS-5-CONFIG_I: Configured from console by console

R2#show acc
R2#show access-lists
Standard IP access list 1
 10 permit 192.168.30.0 0.0.0.255
 20 permit 192.168.40.0 0.0.0.255
 30 permit 192.168.4.0 0.0.0.255
R2#
```

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CONCLUSIONES

- Demostración de habilidades adquiridas para la implementación de redes a través del software Packet Tracer
- Solución a un escenario planteado de realidad simulada de una red
- Configuración adecuada de los elementos requeridos en la tipología propuesta

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