

## Evaluación – Prueba de habilidades prácticas CCNA

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Dosquebradas, 2018

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## **Resumen del informe**

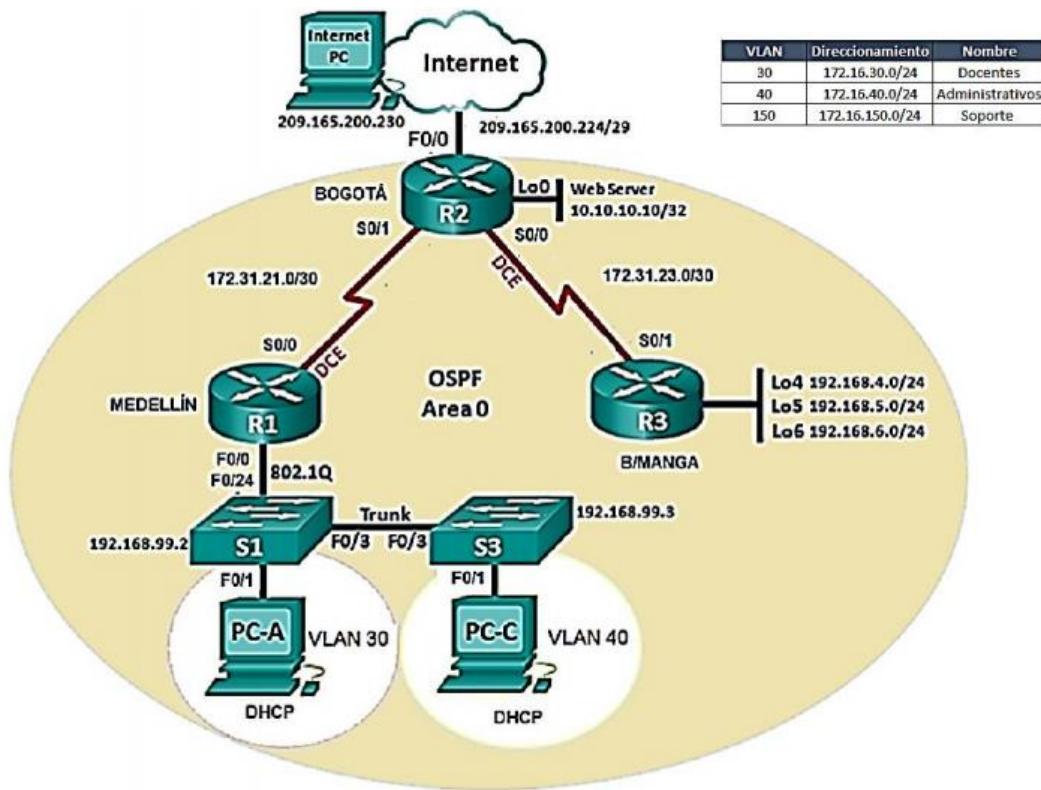
- Se desarrolla el direccionamiento IP de todos los dispositivos.
- Se establece conexión a través de protocolos seguros de comunicación entre los periféricos.
- OSPF V2 Su medida de métrica se denomina cost, y tiene en cuenta diversos parámetros tales como el ancho de banda y la congestión de los enlaces. OSPF construye además una base de datos enlace-estado (Link-State Database, LSDB) idéntica en todos los routers de la zona. (Fundación Wikimedia, Wikipedia, 2018).
- DHCP es un servidor que usa protocolo de red de tipo cliente/servidor en el que generalmente un servidor posee una lista de direcciones IP dinámicas y las va asignando a los clientes conforme éstas van quedando libres, sabiendo en todo momento quién ha estado en posesión de esa IP, cuánto tiempo la ha tenido y a quién se la ha asignado después. Así los clientes de una red IP pueden conseguir sus parámetros de configuración automáticamente. (Fundación Wikimedia, Wikipedia, 2018).

## Desarrollo de la prueba de habilidades

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:



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

1. El direccionamiento IP quedaría de la siguiente forma:

Dispositivo	Interfaz	Dirección IP	Máscara de Subred	Gateway Predeterminado
R1	G0/0.1	192.168.99.1	255.255.255.0	N/A
	S0/0/0	172.31.21.1	255.255.255.252	N/A
	G0/0	192.168.98.1	255.255.255.0	N/A
R2	S0/0/1	172.31.21.2	255.255.255.252	N/A
	S0/0/0	172.31.23.1	255.255.255.252	N/A
	Lo0	10.10.10.10	255.255.255.255	N/A
	G0/1	192.168.98.2	255.255.255.0	
R3	S/0/0/1	172.31.23.2	255.255.255.252	N/A
	Lo4	192.168.4.1	255.255.255.0	N/A
	Lo5	192.168.5.1	255.255.255.0	N/A
	Lo6	192.168.6.1	255.255.255.0	N/A
PC-A	NIC	DHCP	DHCP	DHCP
PC-C	NIC	DHCP	DHCP	DHCP
PC-Internet	NIC	209.165.200.230	255.255.255.248	209.165.200.255
WebServer				

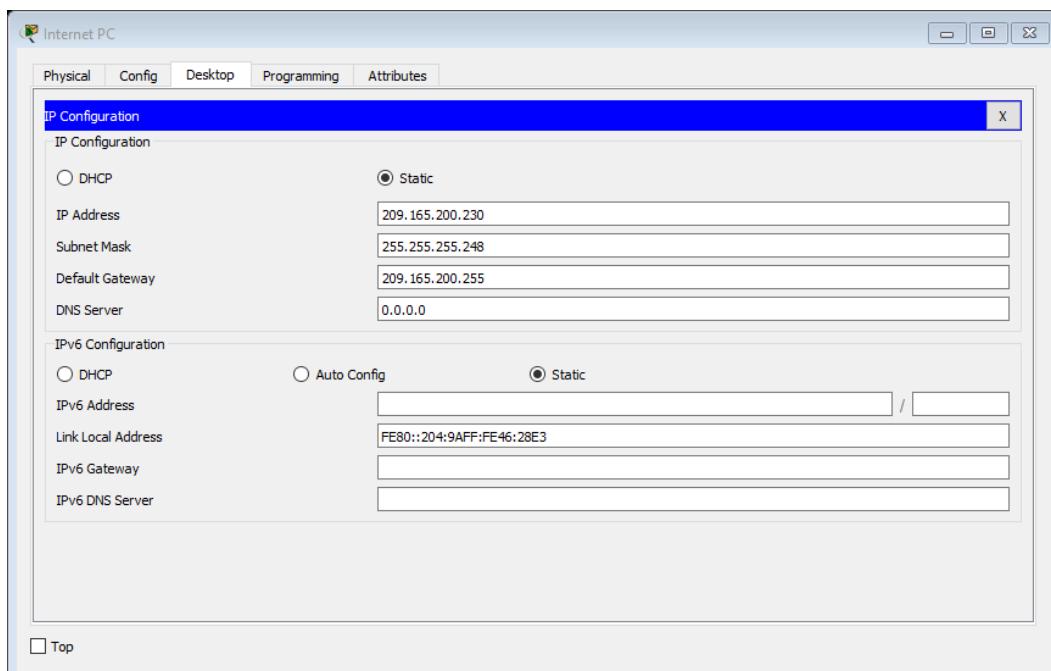


Imagen 1 - Configuración IP PC-Internet

The screenshot shows the Cisco Configuration Constructor (CC) interface for a device named 'Router0'. The 'CLI' tab is selected, displaying the IOS Command Line Interface. The configuration commands entered are:

```

Router>en
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup
Router(config)#hostname R1
R1(config)#enable secret class
R1(config)#line con 0
R1(config-line)#pass cisco
R1(config-line)#login
R1(config-line)#line vty 0 4
R1(config-line)#pass cisco
R1(config-line)#login
R1(config-line)#exit
R1(config)#service password-encry
R1(config)#service password-encryption
R1(config)#banner motd #Acceso no Autorizado#
R1(config)#int s0/0/0
R1(config-if)#ip address 172.31.21.1 255.255.255.252
R1(config-if)#clock rate 128000
R1(config-if)#no shut

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

```

At the bottom of the CLI window, there are 'Copy' and 'Paste' buttons, and a checkbox labeled 'Top'.

*Imagen 2 – Configuración básica Router 1*

The screenshot shows the Cisco Configuration Constructor (CC) interface for a device named 'R1'. The 'CLI' tab is selected, displaying the IOS Command Line Interface. The configuration commands entered are:

```

R1(config-if)#clock rate 128000
R1(config-if)#no shut

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R1(config-if)#
R1(config-if)#end
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#
%SYS-5-CONFIG_I: Configured from console by console

R1(config)#int g0/0/1
%Invalid interface type and number
R1(config)#int g0/1
R1(config-if)#ip address 192.168.99.1 255.255.255.0
R1(config-if)#no shut

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

R1(config-if)#int s0/0/0
R1(config-if)#ip address 172.31.21.1 255.255.255.252
R1(config-if)#no shut
R1(config-if)#

```

At the bottom of the CLI window, there are 'Copy' and 'Paste' buttons, and a checkbox labeled 'Top'.

*Imagen 3 – Configuración Puertos Router 1 Asignación IP*

The screenshot shows a software interface titled "Router1" with a tab bar at the top. The "CLI" tab is selected. Below it is a window titled "IOS Command Line Interface". The command-line session is as follows:

```

Router>en
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup
Router(config)#hostname R2
R2(config)#enable secret class
R2(config)#line console 0
R2(config-line)#pass cisco
R2(config-line)#login
R2(config-line)#exit
R2(config)#service password
R2(config)#service password-encryption
R2(config)#banner motd #Acceso no autorizado#
R2(config)#int s0/0/0
R2(config-if)#ip address 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)#ip address 172.31.23.1 255.255.255.252
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

```

At the bottom of the CLI window, there are "Copy" and "Paste" buttons, and a checkbox labeled "Top".

Imagen 4 – Configuración Router 2 y Asignación de IP a Puertos

This screenshot shows the same software interface as above, but the configuration commands are focused on a specific interface:

```

R2(config-if)#int g0/0
R2(config-if)#description conexion a ISP
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 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

```

At the bottom of the CLI window, there are "Copy" and "Paste" buttons, and a checkbox labeled "Top".

Imagen 5 – IP Asignación Puerto a ISP

```

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup
Router(config)#hostname R3
R3(config)#enable secret class
R3(config)#line con 0
R3(config-line)#pass cisco
R3(config-line)#login
R3(config-line)#line vty 0 4
R3(config-line)#pass cisco
R3(config-line)#login
R3(config-line)#exit
R3(config)#service password-encryption
R3(config)#banner motd #Acceso no autorizado#
R3(config)#interface s0/0/1
R3(config-if)#ip address 172.31.23.2 255.255.255.252
R3(config-if)#no shutdown

R3(config-if)#
*LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

```

Ctrl+F6 to exit CLI focus     

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Imagen 6 – Configuración Router 3, Asignación IP a Puertos

```

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 address 192.168.4.1 255.255.255.0
R3(config-if)#no shutdown
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 address 192.168.5.1 255.255.255.0
R3(config-if)#no shutdown
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 address 192.168.6.1 255.255.255.0
R3(config-if)#no shutdown
R3(config-if)#

```

Ctrl+F6 to exit CLI focus     

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Imagen 7 – Configuración IP LoopBack 4-5-6

The screenshot shows the Cisco Configuration Professional interface for a device named 'S1'. The 'CLI' tab is selected. The main window displays the IOS Command Line Interface (CLI) configuration commands:

```
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S1
S1(config)#no ip domain-lookup
S1(config)#enable secret class
S1(config)#line console 0
S1(config-line)#pass cisco
S1(config-line)#line vty 0 4
S1(config-line)#pass cisco
S1(config-line)#login
S1(config-line)#exit
S1(config)#service password-encryption
S1(config)#banner motd #Acceso no autorizado#
S1(config)#exit
S1#
*SYS-5-CONFIG_I: Configured from console by console
copy run
S1#copy running-config start
S1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
S1#
```

At the bottom of the CLI window, there are 'Copy' and 'Paste' buttons. Below the window, there is a checkbox labeled 'Top'.

Imagen 8 – Configuración Switch 1 Básica

The screenshot shows the Cisco Configuration Professional interface for a device named 'S3'. The 'CLI' tab is selected. The main window displays the IOS Command Line Interface (CLI) configuration commands:

```
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#
Switch(config)#hostname S3
S3(config)#no ip domain-lookup
S3(config)#enable secret class
S3(config)#line console 0
S3(config-line)#pass cisco
S3(config-line)#line vty 0 4
S3(config-line)#pass cisco
S3(config-line)#login
S3(config-line)#exit
S3(config)#service password-encryption
S3(config)#banner motd #Acceso no autorizado#
S3(config)#exit
S3#
*SYS-5-CONFIG_I: Configured from console by console

S3#copy ru
S3#copy running-config sta
S3#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
S3#
```

At the bottom of the CLI window, there are 'Copy' and 'Paste' buttons. Below the window, there is a checkbox labeled 'Top'.

Imagen 9 - Configuración Switch 3 Básica

Configurar el protocolo de enrutamiento OSPFv2 bajo los siguientes criterios:

**OSPFv2 area 0**

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

The screenshot shows the Cisco IOS CLI interface for Router R1. The window title is "R1". The tabs at the top are "Physical", "Config", "CLI" (which is selected), and "Attributes". The main area is titled "IOS Command Line Interface". The command history shows the configuration of OSPF on Router R1, including setting the router ID, defining five network interfaces, and enabling OSPF. The configuration is as follows:

```
R1>en
Password:
R1#configure terminal
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 0.0.0.3 area 0
R1(config-router)#network 192.168.40.0 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
```

Imagen 10 – Configuración OSPF Router 1

The screenshot shows the Cisco IOS CLI interface for Router R1. The window title is "R1". The tabs at the bottom are "Copy" and "Paste". The command history shows the configuration of a serial interface (S0/0/0) with a bandwidth of 128 Kbps and an OSPF cost of 7500. The configuration is as follows:

```
R1(config-router)#auto-cost reference-bandwidth 7500
% OSPF: Reference bandwidth is changed.
    Please ensure reference bandwidth is consistent across
all routers.
R1(config-router)#exit
R1(config)#int s0/0/0
R1(config-if)#bandwidth 128
R1(config-if)#ip ospf cost 7500
R1(config-if)#
```

Imagen 11 – Configuración BandWith Puertos

```
R2>en
Password: (redacted)
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config-router)#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
R2(config-router)#network 10.10.10.0 0.0.0.255 area 0
R2(config-router)#passive-interface g0/1
R2(config-router)#auto-cost reference
R2(config-router)#auto-cost reference-bandwidth 7500
% OSPF: Reference bandwidth is changed.
    Please ensure reference bandwidth is consistent across
all routers.
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)#exit
R2(config)#exit
R2#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
R2#
```

Ctrl+F6 to exit CLI focus           

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Imagen 12 – Configuración OSPF Router 2, BandWith.

```
R3>en
Password:
R3#conf 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)#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)#auto-cost
R3(config-router)#auto-cost referen
R3(config-router)#auto-cost reference-bandwidth 7500
* OSPF: Reference bandwidth is changed.
    Please ensure reference bandwidth is consistent across
all routers.
R3(config-router)#exit
R3(config)#int s0/0/1
R3(config-if)#band
R3(config-if)#bandwidth 128
R3(config-if)#exit
R3(config)#exit
R3#
*SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
R3#
```

Ctrl+F6 to exit CLI focus     

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Imagen 13 – Configuración OSPF Router 3, BandWith.

### 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

```

R2#sh ip route ospf
R2#sh ip route ospf
R2#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile,
B - BGP
      D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter
area
      N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external
type 2
      E1 - OSPF external type 1, E2 - OSPF external type 2, E -
EGP
      i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia -
IS-IS inter area
      * - candidate default, U - per-user static route, o - ODR
      P - periodic downloaded static route

Gateway of last resort is not set

      172.31.0.0/16 is variably subnetted, 4 subnets, 2 masks
C        172.31.21.0/30 is directly connected, Serial0/0/0
L        172.31.21.2/32 is directly connected, Serial0/0/0
C        172.31.23.0/30 is directly connected, Serial0/0/1
L        172.31.23.1/32 is directly connected, Serial0/0/1

R2#

```

Ctrl+F6 to exit CLI focus     

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Imagen 14 – Show IP Route OSPF Router 2

```

Internet address is 172.31.23.1/30, Area 0
  Process ID 1, Router ID 2.2.2.2, Network Type POINT-TO-POINT,
Cost: 7500
  Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40,
Retransmit 5
    Hello due in 00:00:08
    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
    Suppress hello for 0 neighbor(s)
Serial0/0/0 is up, line protocol is up
  Internet address is 172.31.21.2/30, Area 0
  Process ID 1, Router ID 2.2.2.2, Network Type POINT-TO-POINT,
Cost: 781
  Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40,
Retransmit 5
    Hello due in 00:00:00
--More--

```

Ctrl+F6 to exit CLI focus     

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Imagen 15 – Resultados lista resumida de interfaces por OSPF

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

```
!
router ospf 1
router-id 2.2.2.2
log-adjacency-changes
passive-interface GigabitEthernet0/1
auto-cost reference-bandwidth 7500
network 172.31.21.0 0.0.0.3 area 0
network 172.31.23.0 0.0.0.3 area 0
network 10.10.10.0 0.0.0.255 area 0
```

Imagen 16 - OSPF Process ID, Router ID, Address summarizations, Routing Networks, and passive interfaces

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

```
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 200
S1(config-if)#
*LINK-5-CHANGED: Interface Vlan200, changed state to up
ip address 192.168.99.2 255.255.255.0
S1(config-if)#no shutdown
S1(config-if)#exit
S1(config)#ip default-gateway 192.168.99.1
S1(config)#int f0/3
S1(config-if)#switchport mode trunk

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

*LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3,
changed state to up

*LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan200, changed
state to up

S1(config-if)#
Ctrl+F6 to exit CLI focus
```

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Imagen 17 - VLANs, Inter-VLAN Routing

```
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)#

```

Imagen 18 - Puertos troncales

Comandos - VLANs, Puertos troncales, puertos de acceso, encapsulamiento, Inter-VLAN Routing y Seguridad Switch 1

```
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 fa0/2, fa0/4-23, g0/1-2
S1(config-if-range)#switch mode access
S1(config-if-range)#int fa0/1
S1(config-if)#switch mode access
S1(config-if)#switch access vlan
% Incomplete command.
S1(config-if)#switch access vlan 30
S1(config-if)#int range fa0/2, fa0/4-23, g0/1-2
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: administratively down	Interface	FastEthernet0/10,	changed	state	to
%LINK-5-CHANGED: administratively down	Interface	FastEthernet0/11,	changed	state	to
%LINK-5-CHANGED: administratively down	Interface	FastEthernet0/12,	changed	state	to
%LINK-5-CHANGED: administratively down	Interface	FastEthernet0/13,	changed	state	to
%LINK-5-CHANGED: administratively down	Interface	FastEthernet0/14,	changed	state	to
%LINK-5-CHANGED: administratively down	Interface	FastEthernet0/15,	changed	state	to
%LINK-5-CHANGED: administratively down	Interface	FastEthernet0/16,	changed	state	to
%LINK-5-CHANGED: administratively down	Interface	FastEthernet0/17,	changed	state	to
%LINK-5-CHANGED: administratively down	Interface	FastEthernet0/18,	changed	state	to
%LINK-5-CHANGED: administratively down	Interface	FastEthernet0/19,	changed	state	to
%LINK-5-CHANGED: administratively down	Interface	FastEthernet0/20,	changed	state	to
%LINK-5-CHANGED: administratively down	Interface	FastEthernet0/21,	changed	state	to
%LINK-5-CHANGED: administratively down	Interface	FastEthernet0/22,	changed	state	to
%LINK-5-CHANGED: administratively down	Interface	FastEthernet0/23,	changed	state	to
%LINK-5-CHANGED: administratively down	Interface	GigabitEthernet0/1,	changed	state	to

```
%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to administratively down
```

### Comandos - VLANs, Inter-VLAN Routing Switch 3

```
S3>en
Password:
S3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#vlan 30
S3(config-vlan)#name Admnistracion
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)#int vlan 200
S3(config-if)#
%LINK-5-CHANGED: Interface Vlan200, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan200, changed state to up

S3(config-if)#ip address 192.168.99.3 255.255.255.0
S3(config-if)#no shutdown
S3(config-if)#exit
S3(config)#ip default-gateway 192.168.99.1
S3(config)#exit
S3#
%SYS-5-CONFIG_I: Configured from console by console

S3#wr
Building configuration...
[OK]
```

### Comandos - Crear y configurar vlan en R1 ( (CISCO, 2018))

```
R1>en
Password:
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#int g0/1.30
R1(config-subif)#

```

```
%LINK-5-CHANGED: Interface GigabitEthernet0/1.30, changed state to up

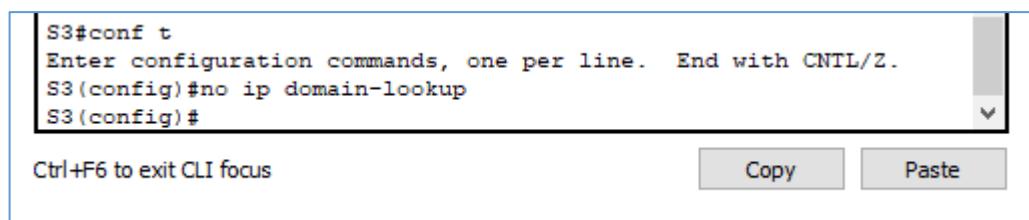
R1(config-subif)#encap
R1(config-subif)#encapsulation do
R1(config-subif)#encapsulation dot1Q 30
R1(config-subif)#ip address 192.168.30.1 255.255.255.0
R1(config-subif)#int g0/1.40
R1(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1.40, changed state to up

R1(config-subif)#ip address 192.168.40.1 255.255.255.0
R1>en
Password:
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#int g0/1.30
R1(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1.30, changed state to up

R1(config-subif)#encap
R1(config-subif)#encapsulation do
R1(config-subif)#encapsulation dot1Q 30
R1(config-subif)#ip address 192.168.30.1 255.255.255.0
R1(config-subif)#int g0/1.40
R1(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1.40, changed state to up

R1(config-subif)#ip address 192.168.40.1 255.255.255.0
```

En el Switch 3 deshabilitar DNS lookup



```
S3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
S3(config)#no ip domain-lookup
S3(config)#

Ctrl+F6 to exit CLI focus
```

*Imagen 19 – Deshabilitar DNS LOOKUP*

Asignar direcciones IP a los Switchs acorde a los lineamientos.

```
 Password:  
 S1#configure  
 Configuring from terminal, memory, or network [terminal]?  
 Enter configuration commands, one per line. End with CNTL/Z.  
 S1(config)#interface Vlan99  
 S1(config-if)#ip address 192.168.99.2  
 % Incomplete command.  
 S1(config-if)#ip address 192.168.99.2 255.255.255.0  
 S1(config-if)#+
```

Imagen 20 – Asignación IP Switchs

```
S3(config)#interface vlan99  
 S3(config-if)#ip address 192.168.99.3 255.255.255.0  
 S3(config-if)#exit  
 S3(config)#ip default-gateway 192.168.99.1  
 ^  
 % Invalid input detected at '^' marker.  
 S3(config)#ip default-gateway 192.168.99.1
```

Imagen 21 – Asignación IP Switchs

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

```
S1(config-if)#int range fa0/2, fa0/4-23, g0/1-2  
 S1(config-if-range)#shutdown  
 S1(config-if-range)#+
```

Ctrl+F6 to exit CLI focus

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Imagen 22 – Desactivar Interfaces

Comandos – Desactivar Interfaces

```
S3(config)#int range fa0/2, fa0/4-24, g0/1-2  
 S3(config-if-range)#shutdown
```

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

%LINK-5-CHANGED: Interface FastEthernet0/24, changed state to administratively down

%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to administratively down

%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to administratively down

Implement DHCP and NAT for IPv4

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

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

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

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

```
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 admin
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#defa
R1(dhcp-config)#default-router 192.168.30.1
R1(dhcp-config)#net
R1(dhcp-config)#network 192.168.30.0 255.255.255.0
R1(dhcp-config)#ip dhcp pool merc
R1(dhcp-config)#ip dhcp pool merca
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#default-router 192.168.40.1
R1(dhcp-config)#network 192.168.40.0 255.255.255.0
R1(dhcp-config)#

```

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*Imagen 23 – Excluded-Address, DHCP POOL, IP DHCP*

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

```
R2#configure
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#us
R2(config)#user web
R2(config)#user webuser privi
R2(config)#user webuser privilege 15 secret internetcisco
R2(config)#ip http server
^
% Invalid input detected at '^' marker.

R2(config)#

```

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*Imagen 24 - Los comandos: ip http server y ip http authentication local no funcionan en este entorno, implementación de servidor en topología.*

```
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 out
R2(config-if)#ip nat out
R2(config-if)#ip nat outside
R2(config-if)#int g0/1
R2(config-if)#ip nat inside
R2(config-if)#shut
R2(config-if)#

```

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Imagen 25 – Configuración IP NAT

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#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#acce
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)#ip nat pool INTERNET 209.165.200.225 209.165.200.228
netmask 255.255.255.248
R2(config)#ip nat inside source list 1 pool INTERNET
R2(config)#

```

Ctrl+F6 to exit CLI focus

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Imagen 26 – Listas de Accesos Tipo Estándar

```
R2(config)#ip access-list standard ADM
R2(config-std-nacl)#permit host 172.31.21.1
R2(config-std-nacl)#exit
R2(config)#line vty 0 4
R2(config-line)#access-class ADM in
R2(config-line)#

```

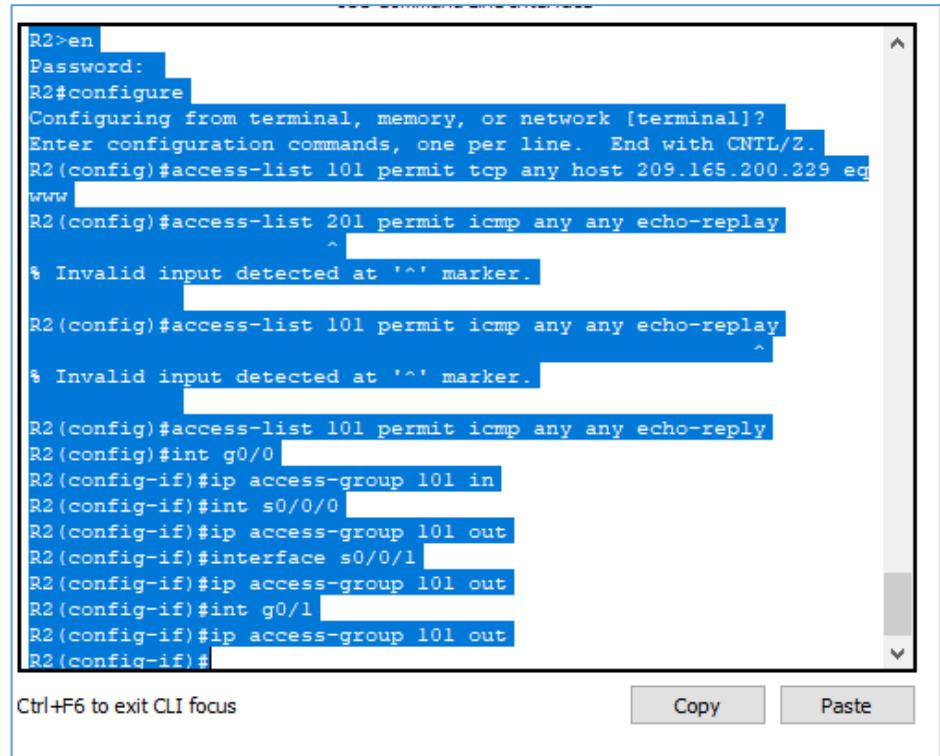
Ctrl+F6 to exit CLI focus

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Imagen 27 – Listas de Accesos Estándar ADM

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.



```
R2>en
Password:
R2#configure
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#access-list 101 permit tcp any host 209.165.200.229 eq www
R2(config)#access-list 201 permit icmp any any echo-replay
% Invalid input detected at '^' marker.

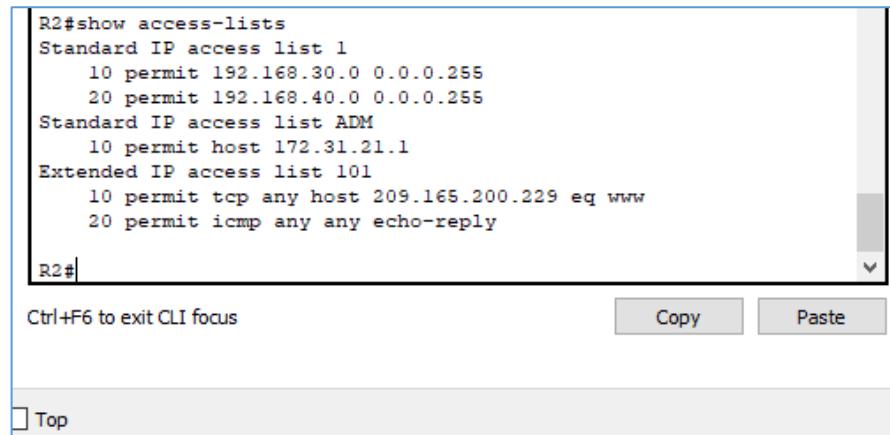
R2(config)#access-list 101 permit icmp any any echo-replay
% Invalid input detected at '^' marker.

R2(config)#access-list 101 permit icmp any any echo-reply
R2(config)#int g0/0
R2(config-if)#ip access-group 101 in
R2(config-if)#int s0/0/0
R2(config-if)#ip access-group 101 out
R2(config-if)#interface s0/0/1
R2(config-if)#ip access-group 101 out
R2(config-if)#int g0/1
R2(config-if)#ip access-group 101 out
R2(config-if)#
Ctrl+F6 to exit CLI focus
```

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Imagen 28 - Listas de acceso de tipo extendido

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



```
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
Standard IP access list ADM
  10 permit host 172.31.21.1
Extended IP access list 101
  10 permit tcp any host 209.165.200.229 eq www
  20 permit icmp any any echo-reply
R2#
Ctrl+F6 to exit CLI focus
```

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Imagen 29 - Verificación

## **Conclusión**

En la topología construida logramos identificar varios procesos prácticos de lo anteriormente estudiado, se comprende los procesos básicos y esenciales para controlar el flujo de tráfico a través de la red, se identifica la necesidad de configurar entornos reales con parámetros precisos para evitar un fallo o interrupción en cualquier puente de comunicación y caída del servicio.

Se comprende el uso necesario del protocolo OSPF V2, permitiendo un mejor desarrollo de la comunicación.

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