

**Diplomado de Profundización CISCO CCNA
Evolución - Prueba de Habilidades Practicas CISCO CCNA**

Presentado por

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**Grupo
203092_13**

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2018

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Resumen

La evaluación “Prueba de habilidades prácticas”, hace parte de las actividades evaluativas del Diplomado de Profundización CCNA, en este trabajo se realizó una serie de configuraciones a diferentes dispositivos que componen una red como router, switches, pc, vlans, puertos de acceso, puertos troncales, NAT estáticas para IPv4, enrutamiento OSPFv2, Configuración RIPv2, establecer el ancho de banda, implementación de DHCP para los PC, con el fin de establecer comunicación entre los equipos, las vlans, permitiendo de esta forma la comunicación entre las sucursales de la empresa de Tecnología como lo solicita la descripción del escenario propuesto esta simulación se realizó en el software packet tracer, además se busca demostrar el grado de desarrollo de competencias y habilidades que fueron adquiridas a lo largo del diplomado y a través de la cual se coloca a prueba los niveles de comprensión y solución de problemas relacionados con diversos aspectos de Networking.

Introducción

Durante el desarrollo de esta actividad se realizara un ejercicio practico donde una empresa que tiene tres sucursales desea interconectarse entre si para lo cual se deben aplicar las habilidades adquiridas a lo largo del diplomado de profundización CCNA , donde se busca establecer tanto la topologia como la configuración de cada uno de los dispositivos que componen la red con el fin de establecer comunicación entre los dispositivos y la creación de vlan ,esta actividad se realiza en el simulador **Packet Tracer**.

Objetivos

especifico

- identificar el grado de desarrollo de competencias y habilidades que fueron adquiridas a lo largo del diplomado

Generales

- Dar solución al caso planteado según lo solicitado en la guía de actividades
- Aplicar los conocimientos adquiridos a lo largo del diplomado de profundización CISCO
- identificar el grado de desarrollo de competencias adquiridas

Descripción general de la prueba de habilidades

La evaluación denominada “Prueba de habilidades prácticas”, forma parte de las actividades evaluativas del Diplomado de Profundización CCNA, la cual busca identificar el grado de desarrollo de competencias y habilidades que fueron adquiridas a lo largo del diplomado y a través de la cual se pondrá a prueba los niveles de comprensión y solución de problemas relacionados con diversos aspectos de Networking.

Para esta actividad, el estudiante dispone de cerca de dos semanas para realizar las tareas asignadas en cada uno de los escenarios propuestos, acompañado de los respectivos procesos de documentación de la solución, correspondientes al registro de la configuración de cada uno de los dispositivos, la descripción detallada del paso a paso de cada una de las etapas realizadas durante su desarrollo, el registro de los procesos de verificación de conectividad mediante el uso de comandos ping, traceroute, show ip route, entre otros.

La prueba de habilidades podrá ser desarrollada en el **Laboratorio SmartLab** o mediante el uso de **herramientas de Simulación (Puede ser Packet Tracer o GNS3)**. El estudiante es libre de escoger bajo qué mediación tecnológica resolverá cada escenario. No obstante, es importante mencionar que **aquellos estudiantes que hagan uso del laboratorio SmartLab se les considerará un estímulo adicional a la hora de evaluar el informe, teniendo en cuenta que su trabajo fue realizado sobre equipos reales y con ello será la oportunidad poner a prueba las habilidades y competencias adquiridas durante el diplomado**. Adicionalmente, es importante considerar, que esta actividad puede ser realizada en varias sesiones sobre este entorno, teniendo en cuenta que disponen de casi 15 días para su desarrollo.

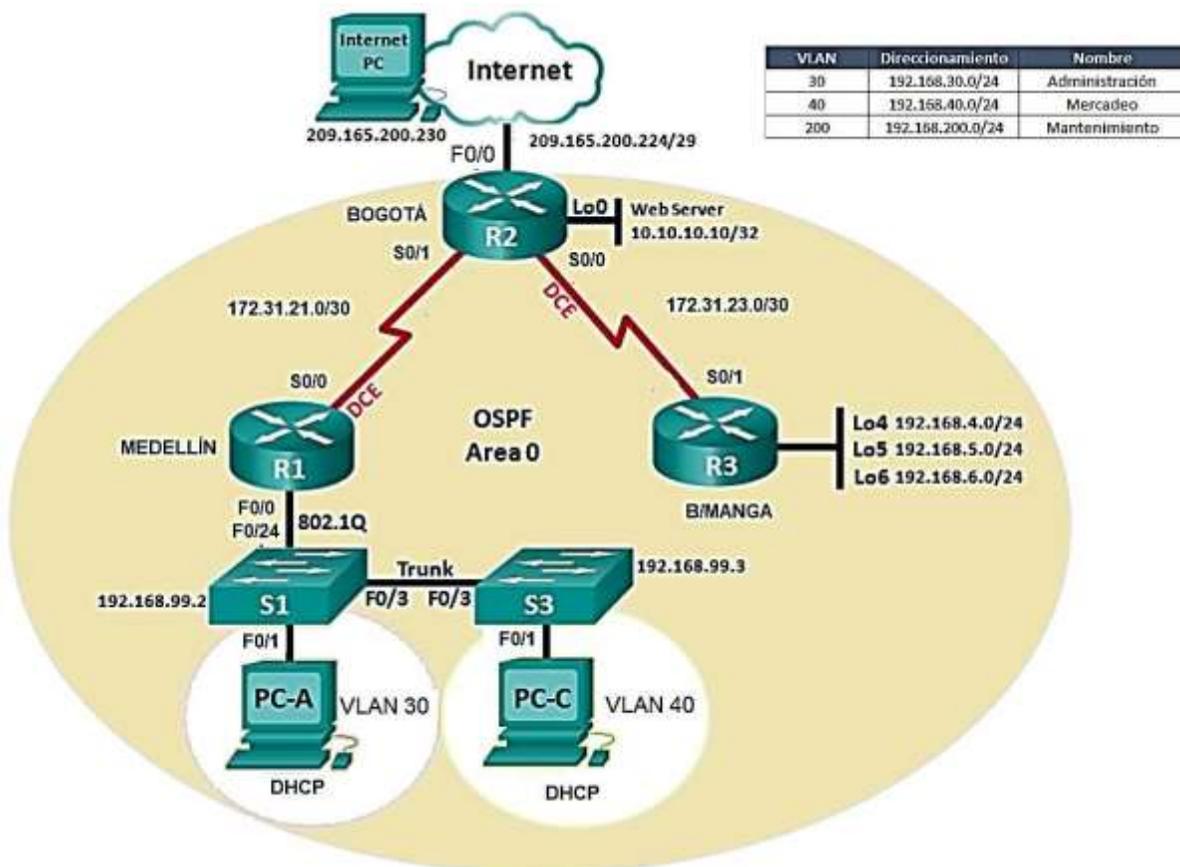
Finalmente, el informe deberá cumplir con las normas ICONTEC para la presentación de trabajos escritos, teniendo en cuenta que este documento deberá ser entregado al final del curso en el Repositorio Institucional, acorde con los lineamientos institucionales para grado. Proceso que les será socializado al finalizar el curso.

Es muy importante mencionar que esta actividad es de carácter INDIVIDUAL. El informe deberá estar acompañado de las respectivas evidencias de configuración de los dispositivos, las cuales generarán veracidad al trabajo realizado. **El informe deberá ser entregado en el espacio creado para tal fin en el Campus Virtual de la UNAD.**

Descripción del escenario propuesto para la prueba de habilidades

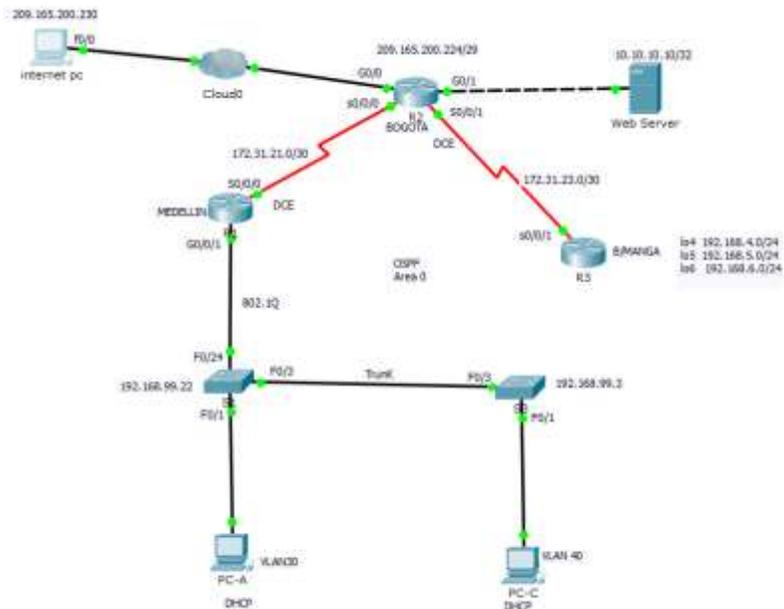
Escenario: Una empresa de Tecnología posee tres sucursales distribuidas en las ciudades de Bogotá, Medellín y Bucaramanga, en donde el estudiante será el administrador de la red, el cual deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con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

Topología de red

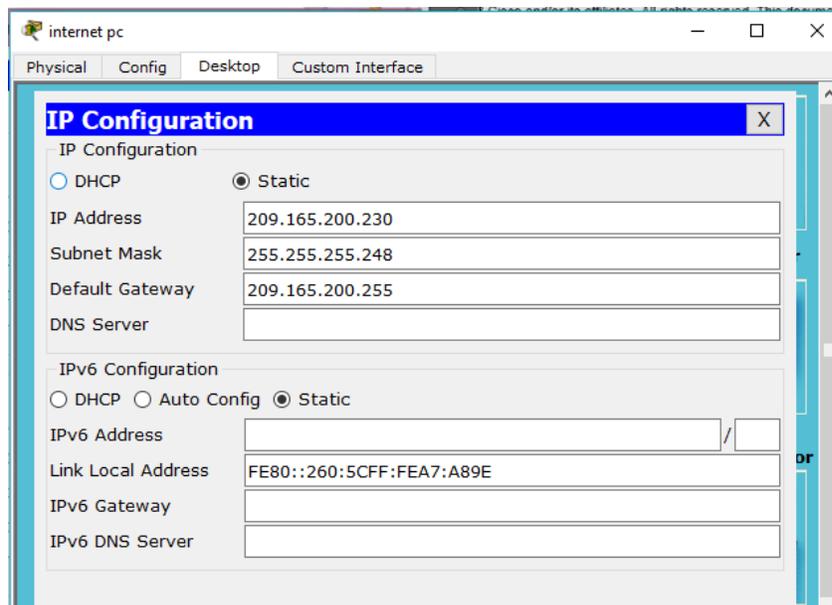


Desarrollo de la prueba de habilidades

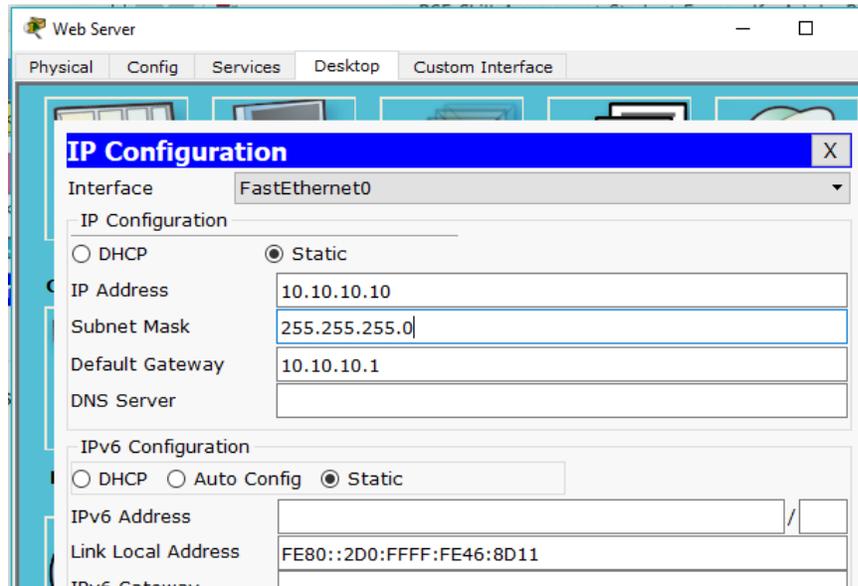
Configurar el direccionamiento IP acorde con la topología de red para cada uno de los dispositivos que forman parte del escenario



- Configurando Internet PC

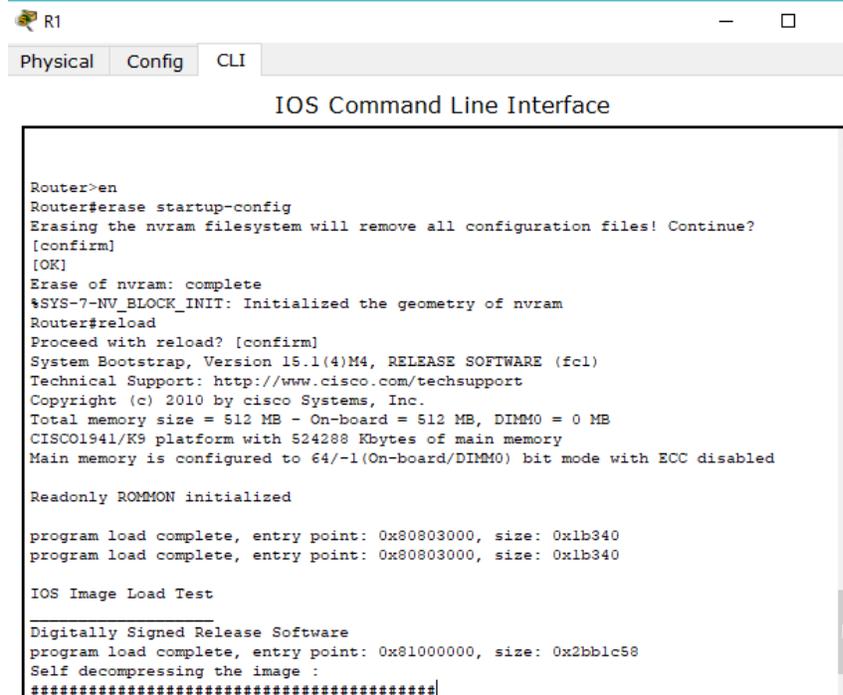


- Configurando Web Server



- R1

Eliminando configuración inicial y reiniciando el router



Configurando el route

R1

```

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
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-encryption
R1(config)#banner motd $acceso prohibido$
R1(config)#int s0/0/0
R1(config-if)#description connection to R2
R1(config-if)#ip add 172.31.21.1 255.255.255.252
R1(config-if)#no shut

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R1(config-if)#ip route 0.0.0.0 0.0.0.0 s0/0/0
%Default route without gateway, if not a point-to-point interface, may impact
performance

R1(config)#int s0/0/0
R1(config-if)#clock rate 128000
R1(config-if)#exit

```

R2

Configurando R2

```

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R2
R2(config)#enable secret class
R2(config)#line con 0
R2(config-line)#pass cisco
R2(config-line)#login
R2(config-line)#line vty 0 4
R2(config-line)#pass cisco
R2(config-line)#login
R2(config-line)#exit
R2(config)#service password-encryption
R2(config)#banner motd $acceso prohibido$
R2(config)#int s0/0/0
R2(config-if)#description connection to R1
R2(config-if)#ip add 172.31.21.2 255.255.255.252
R2(config-if)#no shut

R2(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

```

```

R2(config)#int s0/0/1
R2(config-if)#clock rate 128000
R2(config-if)#exit
R2(config)#int s0/0/1
R2(config-if)#ip add 172.31.23.1 255.255.255.252
R2(config-if)#no shut

R2(config-if)#int g0/0
R2(config-if)#description connection to internet
R2(config-if)#ip add 209.165.200.225 255.255.255.248
R2(config-if)#no shut

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

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

R2(config-if)#int g0/1
R2(config-if)#description connection to web server
R2(config-if)#ip add 10.10.10.1 255.255.255.0
R2(config-if)#no shut

R2(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

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

```

Configurando R3

```

Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no ip domain-lookup
Router(config)#hostname R3
R3(config)#enable secret cisco
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 prohibido!
R3(config)#int s0/0/1
R3(config-if)#ip add 172.31.23.2 255.255.255.252
R3(config-if)#no shut

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
R3(config-if)#int lo4

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

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

R3(config-if)#ip add 192.168.4.1 255.255.255.0

% Invalid input detected at '^' marker.

R3(config-if)#ip add 192.168.4.1 255.255.255.0
R3(config-if)#int lo5

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

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback5, changed state to up
R3(config-if)#ip add 192.168.5.1 255.255.255.0
R3(config-if)#int lo6

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

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback6, changed state to up
R3(config-if)#ip add 192.168.6.1 255.255.255.0
R3(config-if)#no shut

```

Eliminando configuración inicial S1

```
Switch>en
Switch#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
Switch#
Switch#
```

Reiniciando el router



```
Power supply serial number : DCAL02133JA
Model revision number : B0
Motherboard revision number : C0
Model number : WS-C2960-24TT
System serial number : F0C10221EY
Top Assembly Part Number : 800-24671-02
Top Assembly Revision Number : B0
Version ID : V03
CLI Code Number : COS9800BBA
Hardware Board Revision Number : 0x01

Switch Ports Model SW Version SW Image
-----
* 1 24 WS-C2960-24TT 12.2 C2960-LANBASE-H

Cisco IOS Software, C2960 Software (C2960-LANBASE-H), Version 12.2(25)FX, RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2009 by Cisco Systems, Inc.
Compiled Wed 11-Jun-09 11:06 by pt_team

Press RETURN to get started!

%LINE-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%LINE-5-CHANGED: Interface FastEthernet0/3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
```

- Verificando que las Vlan no existen en la flash

```
Switch#show flash
Directory of flash:/

   1  -rw-     4414921          <no date>  c2960-lanbase-mz.122-25.FX.bin
64016384 bytes total (59601463 bytes free)
```

- Configurando el switch 1

```
Switch>en
Switch#en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#no ip domain-lookup
Switch(config)#hostname s1
s1(config)#enable secret class
s1(config)#line con 0
s1(config-line)#pass cisco
s1(config-line)#login
s1(config-line)#line vty 0 4
s1(config-line)#pass cisco
s1(config-line)#login
s1(config-line)#exit
s1(config)#service password-encryption
s1(config)#banner motd $acceso prohibido$
```

Configurando VLANS en S1

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

S1(config-if)#ip add 192.168.30.2 255.255.255.128
S1(config-if)#no shut
S1(config-if)#exit
S1(config)#ip default-gateway 192.168.30.1
S1(config)#int f0/3
S1(config-if)#switchport mode trunk

S1(config-if)#switchport trunk native vlan 1
%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)#int range f0/1-2 , f0/4-23,g0/1-2
S1(config-if-range)#switchport mode access
S1(config-if-range)#int f0/24
S1(config-if)#switchport mode trunk
S1(config-if)#switchport trunk native vlan 1
S1(config-if)#int range f0/1-2 , f0/4-23,g0/1-2
S1(config-if-range)#switchport mode access
S1(config-if-range)#int f0/1
S1(config-if)#switchport access vlan 30
S1(config-if)#int range f0/2 , f0/4-23,g0/2
S1(config-if-range)#shut

%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
```

- **Configurando el switch 3**

```
Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#no ip domain-lookup
Switch(config)#hostname s3
s3(config)#enable secret class
s3(config)#line con 0
s3(config-line)#pass cisco
s3(config-line)#login
s3(config-line)#line vty 0 4
s3(config-line)#pass cisco
s3(config-line)#login
s3(config-line)#exit
s3(config)#service password-encryption
s3(config)#banner motd $acceso prohibido$
s3(config)#
```

Configurando VLANS en S3

```
Switch#en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#no ip domain-lookup
Switch(config)#hostname S3
S3(config)#enable secret class
S3(config)#line con 0
S3(config-line)#pass cisco
S3(config-line)#login
S3(config-line)#line vty 0 4
S3(config-line)#pass cisco
S3(config-line)#login
S3(config-line)#service password-encryption
S3(config)#banner motd $acceso prohibido$
S3(config)#vlan 30
S3(config-vlan)#name administracin
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 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 192.168.40.3 255.255.255.128
S3(config-if)#no shut
S3(config-if)#exit
S3(config)#ip default-gateway 192.168.40.1
S3(config)#int f0/3
S3(config-if)#switchport mode trunk
S3(config-if)#switchport trunk native vlan 1
S3(config-if)#int range f0/1-2, f0/4-23,g0/1-2
S3(config-if-range)#switchport mode access

% Invalid input detected at '' marker.

S3(config-if-range)#switchport mode access
S3(config-if-range)#int f0/1
S3(config-if)#switchport access vlan 40
S3(config-if)#int range f0/2, f0/4-23,g0/2
S3(config-if-range)#shut

%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
```

Configurando VLANs en el R1

```

R1(config)#int g0/1.30
R1(config-subif)#encapsulation dot1q 30
R1(config-subif)#ip add 192.168.30.1 255.255.255.128
R1(config-subif)#description ADMINISTRACION VLAN
R1(config-subif)#int g0/1.40
R1(config-subif)#encapsulation dot1q 40
R1(config-subif)#ip add 192.168.40.1 255.255.255.128
R1(config-subif)#description MERCADEO VLAN
R1(config-subif)#int g0/1.200
R1(config-subif)#encapsulation dot1q 200
R1(config-subif)#ip add 192.168.200.1 255.255.255.128
R1(config-subif)#description MANTENIMIENTO VLAN
R1(config-subif)#int g0/1
R1(config-if)#no shut

R1(config-if)#
*LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up
*LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
*LINK-5-CHANGED: Interface GigabitEthernet0/1.30, changed state to up
*LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1.30, changed state to up
*LINK-5-CHANGED: Interface GigabitEthernet0/1.40, changed state to up
*LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1.40, changed state to up
*LINK-5-CHANGED: Interface GigabitEthernet0/1.200, changed state to up
*LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1.200, changed state to up
  
```

1. 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

Router ID R1

```

R1(config-router)#router ospf 1
R1(config-router)#router-id 1.1.1.1
R1(config-router)#Reload or use "clear ip ospf process" command, for this to take effect
  
```

Router ID R2

```
R2(config-router)#router ospf 1
R2(config-router)#router-id 2.2.2.2
R2(config-router)#Reload or use "clear ip ospf process" command, for this to take effect
```

Router ID R3

```
R3(config)#router ospf 1
R3(config-router)#router-id 3.3.3.3
```

Configuración RIPv2 en R1 y todas las interfaces LAN como pasivas

```
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#do show ip route connected
C 172.31.21.0/30 is directly connected, Serial0/0/0
C 192.168.30.0/25 is directly connected, GigabitEthernet0/1.30
C 192.168.40.0/25 is directly connected, GigabitEthernet0/1.40
C 192.168.200.0/25 is directly connected, GigabitEthernet0/1.200
R1(config-router)#network 172.31.21.0
R1(config-router)#network 192.168.30.0
R1(config-router)#
R1(config-router)#network 192.168.40.0
R1(config-router)#network 192.168.200.0
R1(config-router)#passive-interface g0/1.30
R1(config-router)#passive-interface g0/1.40
R1(config-router)#passive-interface g0/1.200
R1(config-router)#no auto-summary
```

Configuración RIPv2 en R2 y las interfaces pasivas

```
R2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router rip
R2(config-router)#version 2
R2(config-router)#do show ip route connected
C 10.10.10.0/24 is directly connected, GigabitEthernet0/1
C 172.31.21.0/30 is directly connected, Serial0/0/0
C 172.31.23.0/30 is directly connected, Serial0/0/1
C 209.165.200.224/29 is directly connected, GigabitEthernet0/0
R2(config-router)#network 10.10.10.0
R2(config-router)#network 172.31.21.0
R2(config-router)#network 172.31.23.0
R2(config-router)#passive-interface GigabitEthernet0/1
R2(config-router)#no auto-summary
^
% Invalid input detected at '^' marker.

R2(config-router)#no auto-summary
```

Configuración RIPv2 en R3 y las loopback pasivas

```
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router rip
R3(config-router)#version 2
R3(config-router)#do show ip route connected
C 172.31.23.0/30 is directly connected, Serial10/0/1
C 192.168.4.0/24 is directly connected, Loopback4
C 192.168.5.0/24 is directly connected, Loopback5
C 192.168.6.0/24 is directly connected, Loopback6
R3(config-router)#network 172.31.23.0
R3(config-router)#network 192.168.4.0
R3(config-router)#network 192.168.5.0
R3(config-router)#network 192.168.6.0
R3(config-router)#passive-interface Loopback4
R3(config-router)#passive-interface Loopback5
R3(config-router)#passive-interface Loopback6
R3(config-router)#no auto-summary
```

Establecer el ancho de banda para enlaces seriales

```
R1(config)#int s0/0/0
R1(config-if)#bandwidth 128

R2(config-router)#int s0/0/0
R2(config-if)#bandwidth 182
R2(config-if)#int s0/0/1
R2(config-if)#bandwidth 182

R3(config-if)#int s0/0/1
R3(config-if)#bandwidth 128
```

Ajustar el costo en la métrica de S0/0

```
R1(config-if)#ip ospf cost 7500

R2(config-if)#ip ospf cost 7500
```

Verificar información de OSPF

Visualizar tablas de enrutamiento y routers conectados por OSPFv2

```
R2#show ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
1.1.1.1	0	FULL/ -	00:00:37	172.31.21.1	Serial10/0/0
3.3.3.3	0	FULL/ -	00:00:34	172.31.23.2	Serial10/0/1

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

```

R2
Physical Config CLI
IOS Command Line Interface

Neighbor ID Pri State Dead Time Address Interface
1.1.1.1 0 FULL/ - 00:00:27 172.31.21.1 Serial0/0/0
2.2.2.2 0 FULL/ - 00:00:24 172.31.23.2 Serial0/0/1
R2#show ip ospf interface

Serial0/0/1 is up, line protocol is up
Internet address is 172.31.23.1/30, Area 0
Process ID 1, Router ID 2.2.2.2, Network Type POINT-TO-POINT, Cost: 545
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 00:00:09
Index 1/1, Flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1, Adjacent neighbor count is 1
Adjacent with neighbor 2.2.2.2
Suppress hello for 0 neighbor(s)
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: 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 00:00:06
Index 2/2, Flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1, Adjacent neighbor count is 1
Adjacent with neighbor 1.1.1.1
Suppress hello for 0 neighbor(s)
GigabitEthernet0/1 is up, line protocol is up
Internet address is 10.10.10.1/24, Area 0
Process ID 1, Router ID 2.2.2.2, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State WAITING, Priority 1
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
No Hellos (Passive interface)
Index 3/3, Flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 0, Adjacent neighbor count is 0
Suppress hello for 0 neighbor(s)
R2#
R2#

```

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

```

R2#show ip ospf interface

Serial0/0/1 is up, line protocol is up
Internet address is 172.31.23.1/30, Area 0
Process ID 1, Router ID 2.2.2.2, Network Type POINT-TO-POINT, Cost: 545
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 00:00:01
Index 1/1, Flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1, Adjacent neighbor count is 1
Adjacent with neighbor 2.2.2.2
Suppress hello for 0 neighbor(s)
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: 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 00:00:07
Index 2/2, Flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1, Adjacent neighbor count is 1
Adjacent with neighbor 1.1.1.1
Suppress hello for 0 neighbor(s)
GigabitEthernet0/1 is up, line protocol is up
Internet address is 10.10.10.1/24, Area 0
Process ID 1, Router ID 2.2.2.2, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State WAITING, Priority 1
No designated router on this network
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
No Hellos (Passive interface)
Index 3/3, Flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 0, Adjacent neighbor count is 0
Suppress hello for 0 neighbor(s)

```

```
R2#show ip protocols
```

```
Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 2.2.2.2
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.31.23.0 0.0.0.3 area 0
    172.31.21.0 0.0.0.3 area 0
    10.10.10.0 0.0.0.255 area 0
  Passive Interface(s):
    GigabitEthernet0/1
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110           00:24:43
    2.2.2.2          110           00:10:59
    3.3.3.3          110           00:10:59
  Distance: (default is 110)
```

```
R2#show run
```

```
Building configuration...
```

```
Current configuration : 1165 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname R2
!
!
.
router ospf 1
  router-id 2.2.2.2
  log-adjacency-changes
  passive-interface GigabitEthernet0/1
  network 172.31.23.0 0.0.0.3 area 0
  network 172.31.21.0 0.0.0.3 area 0
  network 10.10.10.0 0.0.0.255 area 0
!
```

```
R2#show run
```

```
Building configuration...
```

```
Current configuration : 1165 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname R2
!
!
!
```

Verificando RIPv2 en R1

```

R1#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 8 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
  Interface          Send Recv Triggered RIP Key-chain
Serial0/0/0          2      2
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
  172.31.0.0
  192.168.30.0
  192.168.40.0
  192.168.200.0
Passive Interface(s):
  GigabitEthernet0/1.30
  GigabitEthernet0/1.40
  GigabitEthernet0/1.200
Routing Information Sources:
  Gateway            Distance      Last Update
  172.31.21.2        120           00:00:07
Distance: (default is 120)

R1#show ip route rip
 10.0.0.0/24 is subnetted, 1 subnets
R    10.10.10.0 [120/1] via 172.31.21.2, 00:00:01, Serial0/0/0
 172.31.0.0/16 is variably subnetted, 3 subnets, 2 masks
R    172.31.23.0/30 [120/1] via 172.31.21.2, 00:00:01, Serial0/0/0
R    192.168.4.0/24 [120/2] via 172.31.21.2, 00:00:01, Serial0/0/0
R    192.168.5.0/24 [120/2] via 172.31.21.2, 00:00:01, Serial0/0/0
R    192.168.6.0/24 [120/2] via 172.31.21.2, 00:00:01, Serial0/0/0
 192.168.200.0/24 is variably subnetted, 2 subnets, 2 masks

```

encapsulamiento

```

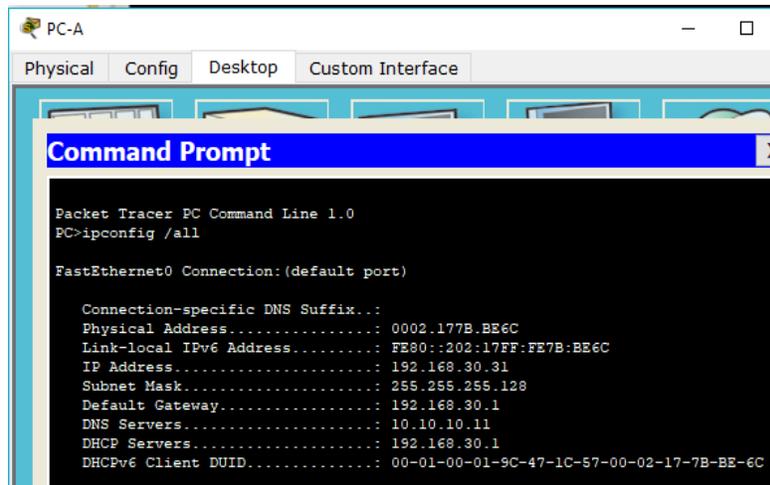
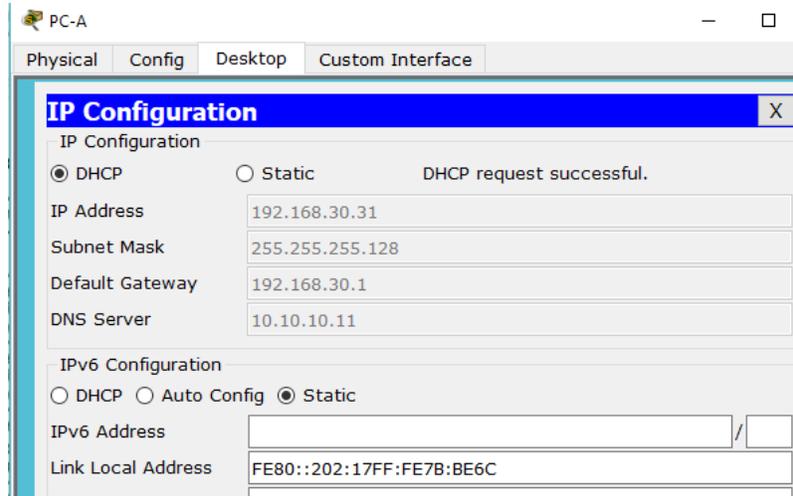
R1(config)#int g0/1.30
R1(config-subif)#descrip administracion LAN
R1(config-subif)#encapsulation dot1q 30
R1(config-subif)#ip add 192.168.30.1 255.255.255.0
R1(config-subif)#int g0/1.40
R1(config-subif)#descrip mercadeo LAN
R1(config-subif)#encapsulation dot1q 40
R1(config-subif)#ip add 192.168.40.1 255.255.255.0
R1(config-subif)#int g0/1.200
R1(config-subif)#descrip mantenimiento LAN
R1(config-subif)#encapsulation dot1q 200
R1(config-subif)#ip add 192.168.200.1 255.255.255.0
R1(config-subif)#int g0/1
R1(config-if)#no shut

```

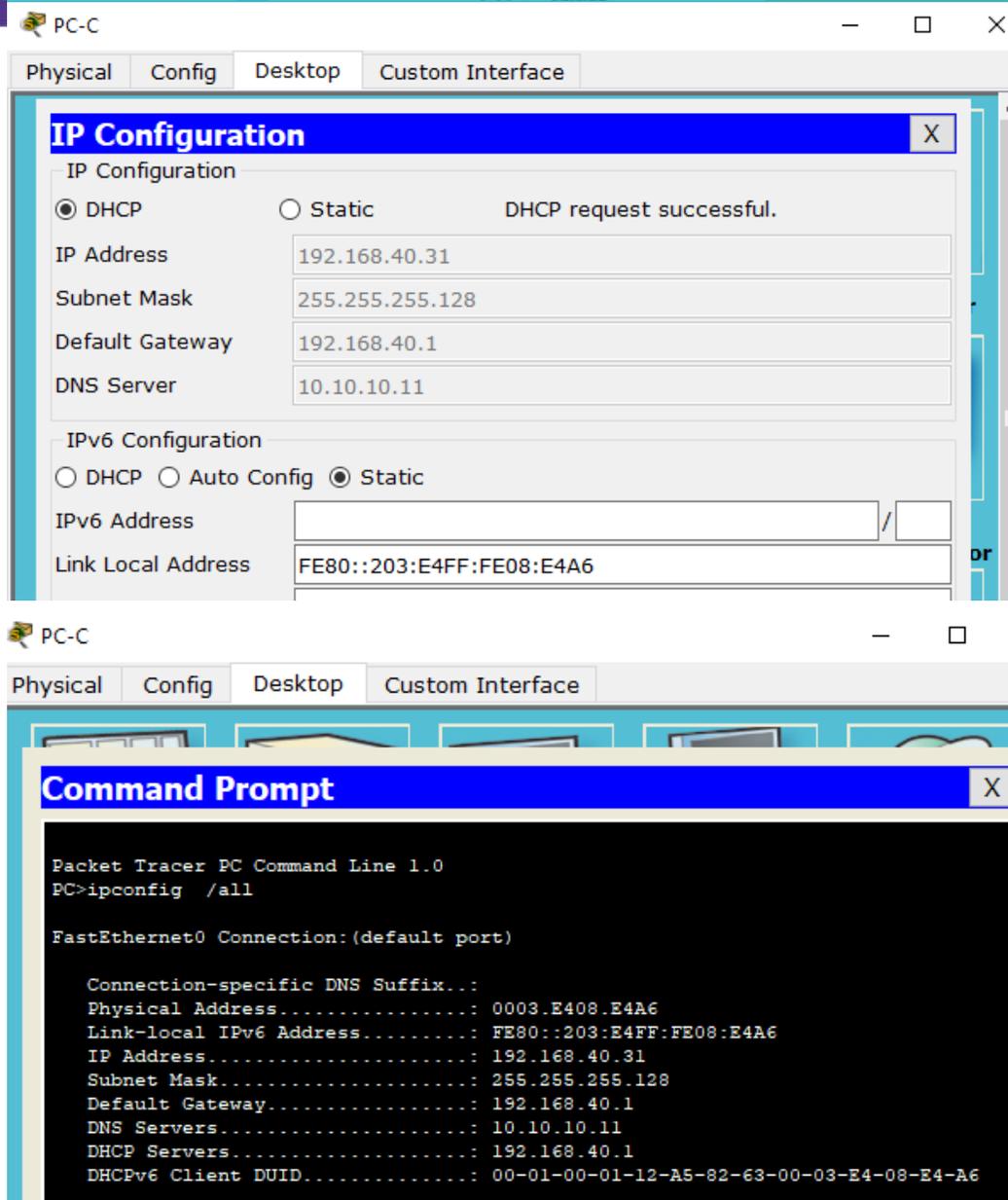
2. Implement DHCP and NAT for IPv4

Verificando que se aplico DCHCP en las PC

EN PC-A



EN PC-C



The top screenshot shows the 'IP Configuration' window for PC-C. It has tabs for 'Physical', 'Config', 'Desktop', and 'Custom Interface'. The 'IP Configuration' section is active, showing 'DHCP' selected. The 'DHCP request successful.' message is displayed. The fields are: IP Address: 192.168.40.31, Subnet Mask: 255.255.255.128, Default Gateway: 192.168.40.1, and DNS Server: 10.10.10.11. The 'IPv6 Configuration' section shows 'Static' selected with a Link Local Address of FE80::203:E4FF:FE08:E4A6.

The bottom screenshot shows the 'Command Prompt' window for PC-C. It displays the output of the 'ipconfig /all' command:

```

Packet Tracer PC Command Line 1.0
PC>ipconfig /all

FastEthernet0 Connection: (default port)

    Connection-specific DNS Suffix...:
    Physical Address. . . . .: 0003.E408.E4A6
    Link-local IPv6 Address . . . . .: FE80::203:E4FF:FE08:E4A6
    IP Address. . . . .: 192.168.40.31
    Subnet Mask . . . . .: 255.255.255.128
    Default Gateway . . . . .: 192.168.40.1
    DNS Servers . . . . .: 10.10.10.11
    DHCP Servers . . . . .: 192.168.40.1
    DHCPv6 Client DUID. . . . .: 00-01-00-01-12-A5-82-63-00-03-E4-08-E4-A6
  
```

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

```

R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.30
R1(config)#
  
```

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

<p>Configurar DHCP pool para VLAN 30</p>	<p>Name: ADMINIST RACION DNS- Server: 10.10.10.1 1 Domain-Name: ccna-unad.com Establecer default gateway.</p>
<p>Configurar DHCP pool para VLAN 40</p>	<p>Name: MERCADEO DNS-Server: 10.10.10.11 Domain-Name: ccna-unad.com Establecer default gateway.</p>

Configurar DHCP pool para VLAN 30 R1

```
R1(dhcp-config)#ip dhcp excluded-address 192.168.30.1 192.168.30.30
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.30
R1(config)#ip dhcp pool ADMINISTRACION
R1(dhcp-config)#network 192.168.30.0 255.255.255.128
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#domain-name cc-unad.com
^
% Invalid input detected at '^' marker.
R1(dhcp-config)#default-router 192.168.30.1
```

Configurar DHCP pool para VLAN 40

```
R1(dhcp-config)#ip dhcp pool MERCADEO
R1(dhcp-config)#network 192.168.40.0 255.255.255.128
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#domain-name cc-unad.com
^
% Invalid input detected at '^' marker.
R1(dhcp-config)#default-router 192.168.40.1
```

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

```
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#ip nat inside source static 10.10.10.10 209.165.200.229

R2(config)#int 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 nat inside
R2(config-if)#int g0/0
R2(config-if)#ip nat outside
R2(config-if)#exit

R2(config)#access-list 1 permit 192.168.30.0 0.0.0.128
R2(config)#access-list 1 permit 192.168.40.0 0.0.0.128
R2(config)#access-list 1 permit 192.168.4.0 0.0.3.255

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
```

Configurando ntp en los router

R2

```
password.
R2#clock set 2:00:00 2 june 2018
no*
```

R1

```
R1(config)#ntp server 172.31.21.2
R1(config)#ntp update-calendar
... ..
```

Traducion de la ruta estatica en R2

```
R2#show ip nat translations
Pro  Inside global      Inside local          Outside local         Outside global
---  209.165.200.229    10.10.10.10          ---                   ---
```

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

R2.

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

7. 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#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip access-list standard ADMIN-MGT
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 ADMIN-MGT in
R2(config-line)#transport input telnet
```

verificando listas de control de acceso permite ingresar desde R1 a

R2

```
R1>en
Password:
R1#telnet 172.31.21.2
Trying 172.31.21.2 ...Openacceso prohibido
```

User Access Verification

Password:

R2>exit

[Connection to 172.31.21.2 closed by foreign host]

De R3 a R1

```
R3>en
Password:
R3#telnet 172.31.21.2
Trying 172.31.21.2 ...
% Connection refused by remote host
```

Listas de acceso en R2

```
R2#show access-list
Standard IP access list 1
 10 permit 192.168.30.0 0.0.0.128
 20 permit 192.168.40.0 0.0.0.128
 30 permit 192.168.4.0 0.0.3.255
Standard IP access list ADMIN-MGT
 10 permit host 172.31.21.1
```

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

Ping de R1 a R2

```
R1>en
R1#ping 172.31.21.2

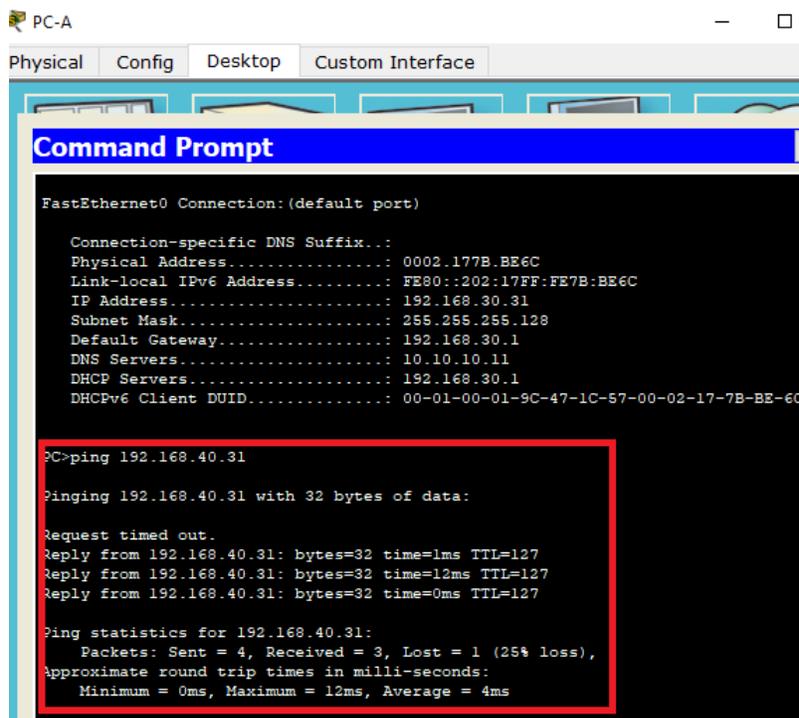
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.21.2, timeout is 2 seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/8/36 ms
```

Ping de R2 a R3

```
R2>en
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 = 1/7/35 ms
```

ping de PC-A a PC-C



```
PC-A
Physical Config Desktop Custom Interface

FastEthernet0 Connection: (default port)
Connection-specific DNS Suffix...:
Physical Address.....: 0002.177B.BE6C
Link-local IPv6 Address.....: FE80::202:17FF:FE7B:BE6C
IP Address.....: 192.168.30.31
Subnet Mask.....: 255.255.255.128
Default Gateway.....: 192.168.30.1
DNS Servers.....: 10.10.10.11
DHCP Servers.....: 192.168.30.1
DHCPv6 Client DUID.....: 00-01-00-01-9C-47-1C-57-00-02-17-7B-BE-6C

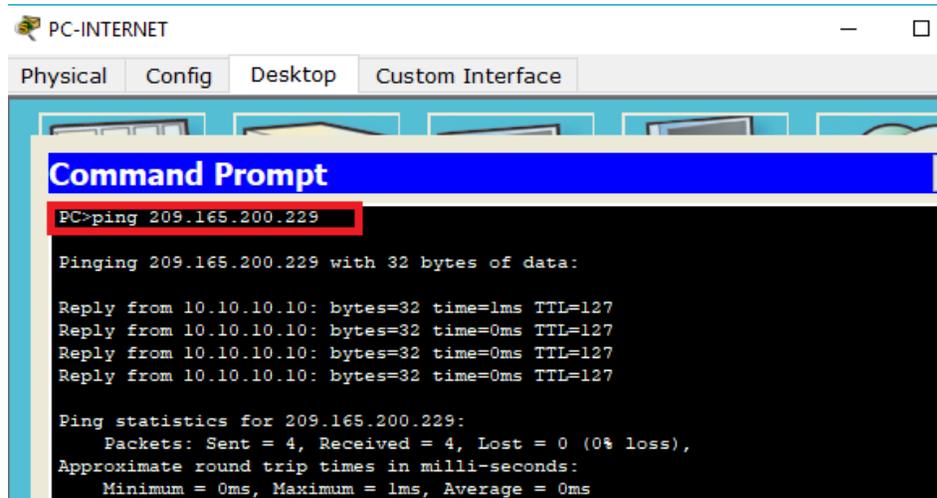
PC>ping 192.168.40.31

Pinging 192.168.40.31 with 32 bytes of data:

Request timed out.
Reply from 192.168.40.31: bytes=32 time=1ms TTL=127
Reply from 192.168.40.31: bytes=32 time=12ms TTL=127
Reply from 192.168.40.31: bytes=32 time=0ms TTL=127

Ping statistics for 192.168.40.31:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 12ms, Average = 4ms
```

Ping de pc internet a INTERNET



```

PC-INTERNET
Physical Config Desktop Custom Interface

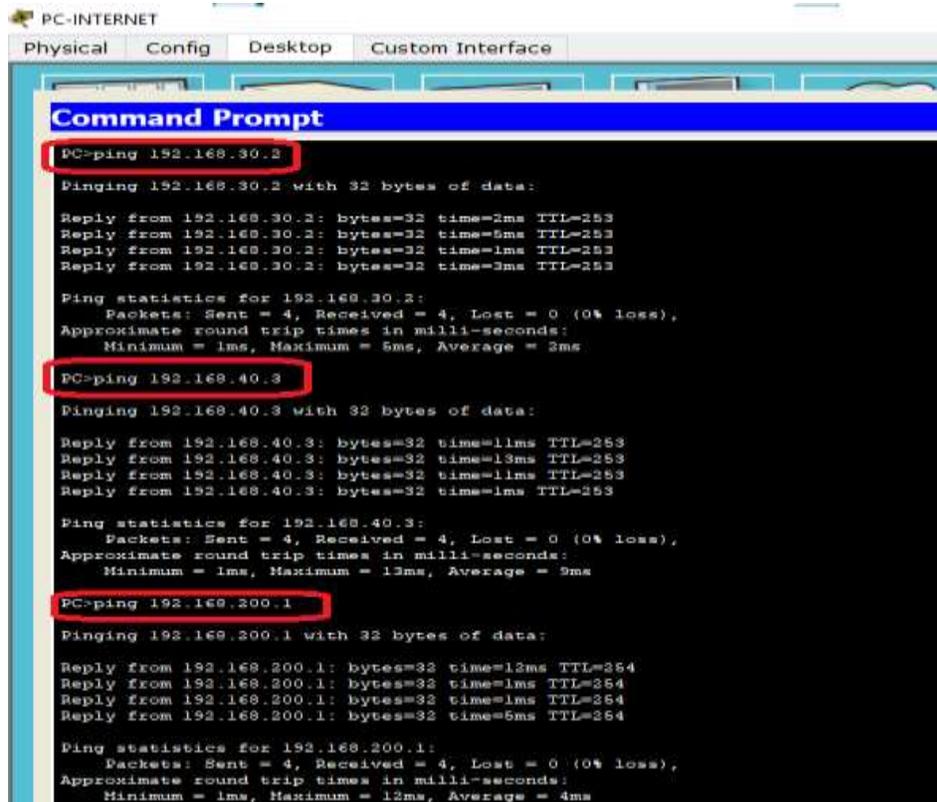
Command Prompt
PC>ping 209.165.200.229

Pinging 209.165.200.229 with 32 bytes of data:

Reply from 10.10.10.10: bytes=32 time=1ms TTL=127
Reply from 10.10.10.10: bytes=32 time=0ms TTL=127
Reply from 10.10.10.10: bytes=32 time=0ms TTL=127
Reply from 10.10.10.10: bytes=32 time=0ms TTL=127

Ping statistics for 209.165.200.229:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
  
```

Ping a las vlans desde PC-internet



```

PC-INTERNET
Physical Config Desktop Custom Interface

Command Prompt
PC>ping 192.168.30.2

Pinging 192.168.30.2 with 32 bytes of data:

Reply from 192.168.30.2: bytes=32 time=2ms TTL=253
Reply from 192.168.30.2: bytes=32 time=5ms TTL=253
Reply from 192.168.30.2: bytes=32 time=1ms TTL=253
Reply from 192.168.30.2: bytes=32 time=3ms TTL=253

Ping statistics for 192.168.30.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 5ms, Average = 3ms

PC>ping 192.168.40.3

Pinging 192.168.40.3 with 32 bytes of data:

Reply from 192.168.40.3: bytes=32 time=11ms TTL=253
Reply from 192.168.40.3: bytes=32 time=13ms TTL=253
Reply from 192.168.40.3: bytes=32 time=11ms TTL=253
Reply from 192.168.40.3: bytes=32 time=1ms TTL=253

Ping statistics for 192.168.40.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 13ms, Average = 9ms

PC>ping 192.168.200.1

Pinging 192.168.200.1 with 32 bytes of data:

Reply from 192.168.200.1: bytes=32 time=12ms TTL=254
Reply from 192.168.200.1: bytes=32 time=1ms TTL=254
Reply from 192.168.200.1: bytes=32 time=1ms TTL=254
Reply from 192.168.200.1: bytes=32 time=5ms TTL=254

Ping statistics for 192.168.200.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 12ms, Average = 4ms
  
```

```

PC>ping 209.165.200.230

Pinging 209.165.200.230 with 32 bytes of data:

Reply from 209.165.200.230: bytes=32 time=17ms TTL=128
Reply from 209.165.200.230: bytes=32 time=9ms TTL=128
Reply from 209.165.200.230: bytes=32 time=9ms TTL=128
Reply from 209.165.200.230: bytes=32 time=2ms TTL=128

Ping statistics for 209.165.200.230:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 17ms, Average = 9ms

PC>
  
```

Ping desde pc internet a los PC-A y PC-C

```

PC>ping 192.168.30.31

Pinging 192.168.30.31 with 32 bytes of data:

Reply from 192.168.30.31: bytes=32 time=3ms TTL=126
Reply from 192.168.30.31: bytes=32 time=5ms TTL=126
Reply from 192.168.30.31: bytes=32 time=13ms TTL=126
Reply from 192.168.30.31: bytes=32 time=11ms TTL=126

Ping statistics for 192.168.30.31:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 3ms, Maximum = 13ms, Average = 8ms

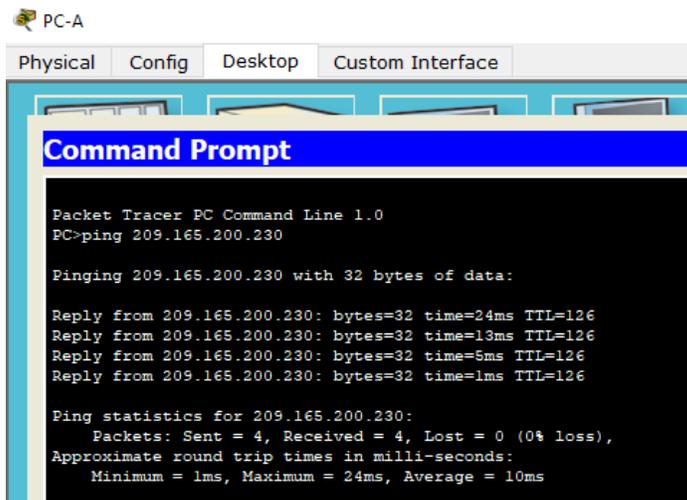
PC>ping 192.168.40.31

Pinging 192.168.40.31 with 32 bytes of data:

Reply from 192.168.40.31: bytes=32 time=3ms TTL=126
Reply from 192.168.40.31: bytes=32 time=12ms TTL=126
Reply from 192.168.40.31: bytes=32 time=1ms TTL=126
Reply from 192.168.40.31: bytes=32 time=13ms TTL=126

Ping statistics for 192.168.40.31:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 13ms, Average = 7ms
  
```

Ping de PC-A a PC-internet



PC-A

Physical Config Desktop Custom Interface

Command Prompt

```

Packet Tracer PC Command Line 1.0
PC>ping 209.165.200.230

Pinging 209.165.200.230 with 32 bytes of data:

Reply from 209.165.200.230: bytes=32 time=24ms TTL=126
Reply from 209.165.200.230: bytes=32 time=13ms TTL=126
Reply from 209.165.200.230: bytes=32 time=5ms TTL=126
Reply from 209.165.200.230: bytes=32 time=1ms TTL=126

Ping statistics for 209.165.200.230:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 24ms, Average = 10ms
  
```

Verificando conexión entre switch y router

Ping de s1 a R1, VLAN 30 address

```
S1#ping 192.168.30.1

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

Ping de S1 A vlan 40

```
S1#ping 192.168.40.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.40.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms
```

Ping de S1 A vlan 200

```
S1#ping 192.168.200.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.200.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/9/47 ms
```

Ping de S1 A R1

```
S1#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 = 0/0/1 ms
```

Ping de s3 a Vlan 30

```
S3#ping 192.168.30.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.30.1, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/1 ms
```

Ping de S3 A vlan 40

```
S3#ping 192.168.40.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.40.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms
```

Ping de S3 A vlan 200

```
S3#ping 192.168.200.1
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 192.168.200.1, timeout is 2 seconds
```

```
!!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms
```

Ping de S3 A R1

```
S3#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 = 0/1/5 ms
```

Conclusiones

Con la realización de este trabajo se logro aplicar los conocimientos adquiridos en configuracion tanto de pc como de router,switchs ,servidores web ,vlans ,aplicar conociminetos de enrutamiento OSFV2 , servidores DHCP y NAT para IPV4 .

Se logro establecer comunicacion entre routers , switch ,pc y servidores web reforzando y aplicando conocimientos adquiridos en el desarrollo del diplomado de profundizacion CISCO .

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