

CURSO DE PROFUNDIZACION CISCO (DISEÑO E IMPLEMENTACIÓN DE
SOLUCIONES INTEGRADAS LAN – WAN)

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INGENIERIA EN SISTEMAS

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RESUMEN

Se ha dispuesto a realizar el desarrollo de un componente práctico, dirigido a la implementación y el diseño de una red LAN/WAN. Utilizando las debidas técnicas de configuración de routing y swiching. Permitiendo desarrollar así un sistema de red funcional y eficiente. Con unas funciones y características definidas y programadas que facilitan la utilización y rendimiento de una red. Se realizan diferentes tipos de configuraciones y maneras de implementar una red, tales como la configuración de red con IPv4 y con IPv6 implementando protocolos como los DHCP y NAT para la IPv4 y configuración como la OSPFv2. Se realiza unas capturas de pantalla de los detalles de los para para la configuración de una red con el programa de simulación packet tracer.

Durante el desarrollo del trabajo esta encaminado a la implementación y el diseño de una red LAN/WAN, sobre la plataforma CISCO y la herramienta Packet Traicer donde se pudo simular la red y su funcionamiento basados en el problema, sobre todo con funciones y características definidas y programadas que proveen el manejo y utilidad de una red. En consecuencia se efectúan diferentes tipos de configuraciones y maneras de realizar una red, tales como la configuración de red con IPv4 y con IPv6 implementando protocolos como los DHCP y NAT para la IPv4 y configuración como la OSPFv2.

Además cuenta con guía desarrolladas paso a paso lo hecho en los simuladores y soportado a través de pantallazos

Palabras clave: Router, Cisco, LAN, VLAN.

Abstract

It has been prepared to carry out the development of a practical component, aimed at the implementation and design of a LAN / WAN network. Using the proper routing and switching configuration techniques. Allowing to develop a functional and efficient network system. With defined and programmed functions and characteristics that facilitate the use and performance of a network. Different types of configurations and ways of implementing a network are carried out, such as the configuration of the network with IPv4 and with IPv6 implementing protocols such as DHCP and NAT for IPv4 and configuration such as OSPFv2. Screenshots of the para details are made for the configuration of a network with the packet tracer simulation program.

During the development of the work is aimed at the implementation and design of a LAN / WAN, on the CISCO platform and the Packet Traicer tool where the network and its operation could be simulated based on the problem, especially with defined functions and characteristics and programmed that provide the management and utility of a network. As a result, different types of configurations and ways of making a network are carried out, such as the network configuration with IPv4 and with IPv6, implementing protocols such as DHCP and NAT for IPv4 and configuration such as OSPFv2.

It also has a guide developed step by step what has been done in the simulators and supported through screenshots

INTRODUCCIÓN

Los conocimientos tecnológicos se ha orientado a la necesidad de saber esgrimir, desempeñando AL CURSO DE PROFUNDIZACION CISCO (DISEÑO E IMPLMETACION DE SOLUCIONES INTEGRADAS LAN-WAN) en efecto trata de profundización en redes, por medio de la cual logramos aprender a efectuar vínculo con la intención de configuración de sistemas de red soportados en VLAN, configuración de control de ACL para IPv4, implementación de DHCP y NAT para IPv4, configuración OSPFv2

En efecto los escenarios (practicar) trabajados en el presente diplomado, del mismo modo con ello existieron elaborados en el entorno de trabajo de red emulado en la herramienta Packet Tracer, en el cual se planteó, relaciono y se ejecutaron las configuraciones pertinentes según la topología de la red a trabajar, obteniendo de esta forma poner en habilidad los conocimientos logrados a lo largo del diplomado de profundización.

Para sintetizar el presente documento tiene como intención ser exhibido como trabajo de grado en Ingeniería de Sistemas de la escuela de ciencias básicas, tecnología e ingeniería (ECBTI) de la Universidad Nacional Abierta y a Distancia UNAD, representando así la culminación de un proceso arduo que permite la obtención de un título y la complacencia del desarrollo exitoso de una meta trazada

2. OBJETIVOS

2.1. OBJETIVO GENERAL

Desarrollar la prueba de habilidades prácticas de carácter satisfactoria aplicadas en las actividades planteadas por el DIPLOMADO DE PROFUNDIZACIÓN CISCO (DISEÑO E IMPLEMENTACIÓN DE SOLUCIONES INTEGRADAS LAN / WAN), adquiriendo conocimientos y exponiéndolas por medio del simulador Packet Tracer

2.2. OBJETIVOS ESPECÍFICOS

Efectuar configuraciones de routers y swiches solucionando problemas relacionados con la configuración de estos dispositivos.

Desarrollar capacidades para estar al tanto de los beneficios de los router en los enrutamientos dinámicos del tráfico.

Configurar y controlar ACL para el protocolo de conexión IPv4 y descubrir los medios utilizados para trasladar datos a través de la red.

Desarrollar destrezas para configuras adecuadamente los dispositivos Router y Switch para optimizar las métricas.

Exponer las capacidades alcanzadas en el curso para configurar estos dispositivos.

Realizar las configuraciones pertinentes en cada uno de los dispositivos en cuanto a direccionamiento, configuración de VLAN's, OSPFv2, RIPv2 entre otros. Con el fin de dar solución a los escenarios planteados.

ESCENARIO 1

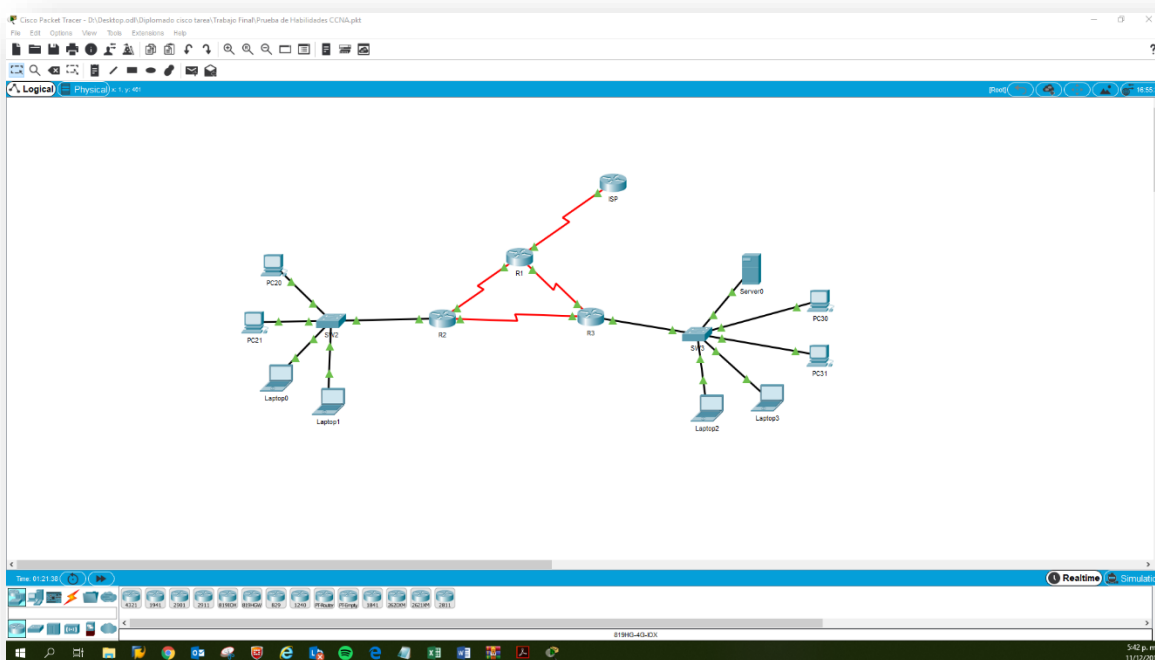


Tabla de direccionamiento

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

	Se0/0/0	10.0.0.6	255.255.255.252	N/D
	Se0/0/1	10.0.0.10	255.255.255.252	N/D
SW2	VLAN 100	N/D	N/D	N/D
	VLAN 200	N/D	N/D	N/D
SW3	VLAN1	N/D	N/D	N/D

PC20	NIC	DHCP	DHCP	DHCP
PC21	NIC	DHCP	DHCP	DHCP
PC30	NIC	DHCP	DHCP	DHCP
PC31	NIC	DHCP	DHCP	DHCP
Laptop20	NIC	DHCP	DHCP	DHCP
Laptop21	NIC	DHCP	DHCP	DHCP
Laptop30	NIC	DHCP	DHCP	DHCP
Laptop31	NIC	DHCP	DHCP	DHCP

Tabla de asignación de VLAN y de puertos

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

Tabla de enlaces troncales

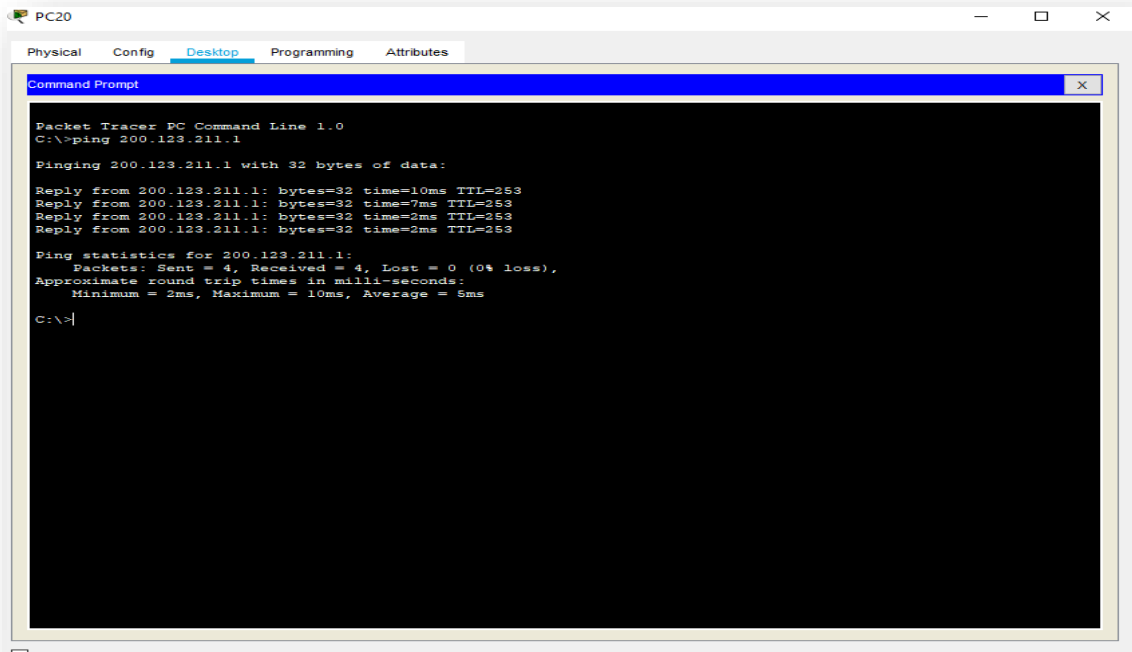
Dispositivo local	Interfaz local	Dispositivo remoto
SW2	Fa0/2-3	100

Descripción de las actividades

- **SW1** VLAN y las asignaciones de puertos de VLAN deben cumplir con la tabla 1.
- Los puertos de red que no se utilizan se deben deshabilitar.
- **La información** de dirección IP **R1, R2** y R3 debe cumplir con la tabla 1.
- **Laptop20, Laptop21, PC20, PC21, Laptop30, Laptop31, PC30 y PC31** deben obtener información IPv4 del servidor DHCP.
- **R1** debe realizar una NAT con sobrecarga sobre una dirección IPv4 pública. Asegúrese de que todos los terminales pueden comunicarse con Internet pública (haga ping a la dirección ISP) y la lista de acceso estándar se **llama INSIDE-DEVS**.
- **R1** debe tener una ruta estática predeterminada al ISP que se configuró y que incluye esa ruta en **el dominio** RIPv2.
- **R2** es un servidor de DHCP para los dispositivos conectados al puerto FastEthernet0/0.
- **R2** debe, además de enrutamiento a otras partes de la red, ruta entre las VLAN 100 y 200.
- El Servidor0 es sólo un servidor IPv6 y solo debe ser accesibles para los dispositivos en R3 (ping).
- La NIC instalado en direcciones IPv4 e IPv6 de Laptop30, de Laptop31, de PC30 y obligación de configurados PC31 simultáneas (dual-stack). Las direcciones se deben configurar mediante DHCP y DHCPv6.
- La interfaz FastEthernet 0/0 del R3 también deben tener direcciones IPv4 e IPv6 configuradas (dual- stack).
- R1, R2 y R3 intercambian información de routing mediante RIP versión 2.
- R1, R2 y R3 deben saber sobre las rutas de cada uno y la ruta predeterminada desde R1.
- Verifique la conectividad. Todos los terminales deben poder hacer ping entre sí y a la dirección IP del ISP. Los terminales bajo **el R3** deberían poder hacer IPv6-ping entre ellos y el servidor.

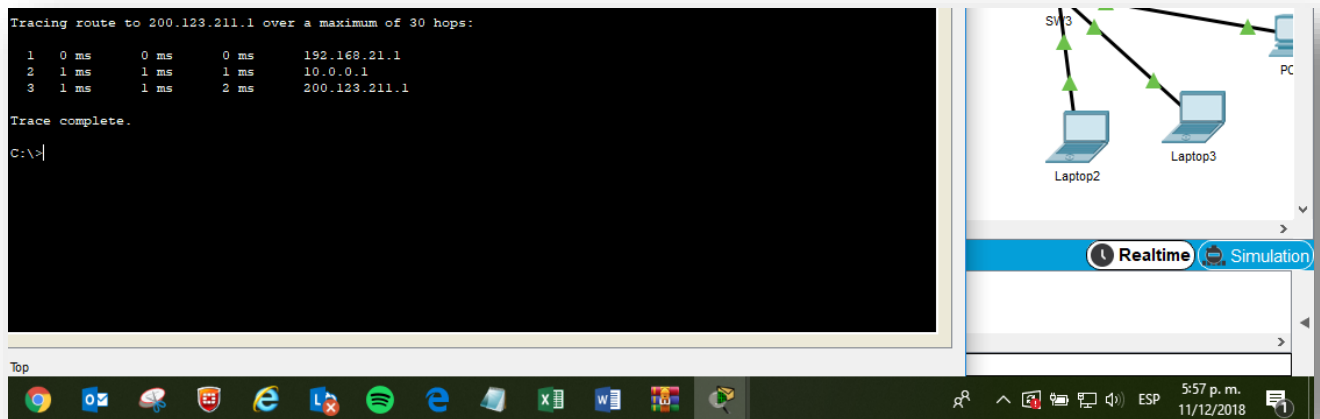
Desarrollo del escenario 1

Se realiza ping de pc 20 a ISP



```
PC20
Physical Config Desktop Programming Attributes
Command Prompt
Packet Tracer PC Command Line 1.0
C:\>ping 200.123.211.1
Pinging 200.123.211.1 with 32 bytes of data:
Reply from 200.123.211.1: bytes=32 time=10ms TTL=253
Reply from 200.123.211.1: bytes=32 time=7ms TTL=253
Reply from 200.123.211.1: bytes=32 time=2ms TTL=253
Reply from 200.123.211.1: bytes=32 time=2ms TTL=253
Ping statistics for 200.123.211.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 10ms, Average = 6ms
C:\>
```

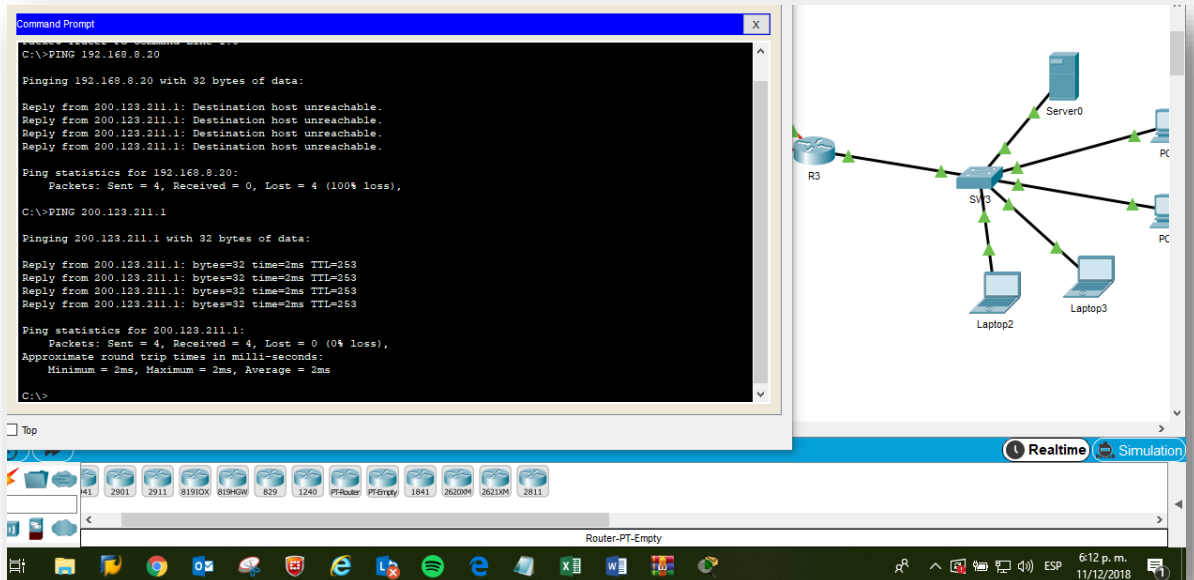
Se realiza tracert de PC 20 ISP



```
Tracing route to 200.123.211.1 over a maximum of 30 hops:
  0  0 ms  0 ms  0 ms  192.168.21.1
  1  1 ms  1 ms  1 ms  10.0.0.1
  2  1 ms  1 ms  2 ms  200.123.211.1
Trace complete.
C:\>
```

The network diagram on the right shows a topology with an ISP at the top, connected to two laptops labeled Laptop2 and Laptop3. A PC is also connected to the network. The diagram is displayed in a window with 'Realtime' and 'Simulation' modes.

Se realiza ping de Laptop 0



❖ Configuración SW2.

- ✓ **Cambio de nombre:**
Switch(config)#hostname SW2
- ✓ **Configuración de Vlan:**
SW2(config)#vlan 100
SW2(config-vlan)#name LAPTOPS

SW2(config)#vlan 200
SW2(config-vlan)#name DESTOPS
- ✓ **Configurar interfaz mode Access:**
SW2(config)#interface range f0/2-3
SW2(config-if-range)#switchport mode access
SW2(config-if-range)#switchport access vlan 100
SW2(config-if-range)#description LAPTOPS

SW2(config)#interface range f0/4-5
SW2(config-if-range)#switchport mode access
SW2(config-if-range)#switchport access vlan 200

SW2(config-if-range)#description DESTOPS

✓ **Configurar interfaz mode trunk:**

SW2(config)#interface f0/1

SW2(config-if)#switchport mode trunk

SW2(config-if)#description CNX-R2

❖ **Deshabilitar los puertos de red que no se utilizaran:**

SW2(config)#int range f0/6-24

SW2(config-if-range)#shutdown

- %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

❖ **Configuración Router ISP**

❖ **Cambio de nombre:**

```
Router(config)#hostname ISP
```

```
ISP(config)#interface s0/0/0
```

```
ISP(config-if)#ip address 200.123.211.1 255.255.255.0
```

```
ISP(config-if)#no shutdown
```

❖ **Configuración Router 1**

❖ **Cambio de nombre:**

```
Router(config)#hostname R1
```

❖ **Configurar interfaces Seriales:**

```
R1(config)#interface S0/0/0
```

```
R1(config-if)#ip address 200.123.211.2 255.255.255.0
R1(config-if)#no shutdown
```

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

```
R1(config)#interface s0/1/1
R1(config-if)#ip address 10.0.0.5 255.255.255.252
R1(config-if)#no shutdown
```

❖ **Configurar ruta statica default:**

```
R1(config)#ip route 0.0.0.0 0.0.0.0 200.123.211.1
```

❖ **Configurar Rip V2:**

```
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#network 10.0.0.0
R1(config-router)#network 10.0.0.4
R1(config-router)#default-information originate
```

❖ **Configurar NAT:**

```
R1(config)#ip nat pool INSIDE-DEVS 200.123.211.2 200.123.211.128
netmask 255.255.255.0
R1(config)#access-list 1 permit 192.168.0.0 0.0.255.255
R1(config)#access-list 1 permit 10.0.0.0 0.0.0.255
R1(config)#ip nat inside source list 1 interface s0/0/00 overload
```

```
R1(config)#interface s0/1/0
R1(config-if)#ip nat inside
R1(config-if)#exit
```

```
R1(config)#interface s0/1/1
R1(config-if)#ip nat inside
R1(config-if)#exit
```

```
R1(config)#interface s0/0/0
R1(config-if)#ip nat outside
R1(config-if)#exit
```

❖ **Configuración Router 2**

❖ **Cambio de nombre:**

```
Router(config)#hostname R2
```

❖ **Configurar interfaces:**

```
R2(config)#interface s0/0/0  
R2(config-if)#ip address 10.0.0.2 255.255.255.252  
R2(config-if)#no shutdown
```

```
R2(config)#interface s0/0/1  
R2(config-if)#ip address 10.0.0.9 255.255.255.252  
R2(config-if)#no shutdown
```

❖ **Configurar subinterfaces para las Vlan:**

```
R2(config)#interface f0/0.100  
R2(config-subif)#encapsulation dot1Q 100  
R2(config-subif)#ip address 192.168.20.1 255.255.255.0
```

```
R2(config)#interface f0/0.200  
R2(config-subif)#encapsulation dot1Q 200  
R2(config-subif)#ip address 192.168.21.1 255.255.255.0  
R2(config-subif)#exit  
R2(config)#int f0/0  
R2(config-if)#no shutdown
```

❖ **Configurar DHCP:**

```
R2(config)#ip dhcp pool LAPTOPS  
R2(dhcp-config)#network 192.168.20.1 255.255.255.0  
R2(dhcp-config)#default-router 192.168.20.1
```

```
R2(config)#ip dhcp pool DESTOPS  
R2(dhcp-config)#network 192.168.21.1 255.255.255.0  
R2(dhcp-config)#default-router 192.168.21.1
```

❖ **Configurar Rip V2:**

```
R2(config)#router rip  
R2(config-router)#version 2  
R2(config-router)#network 192.168.30.0  
R2(config-router)#network 192.168.20.0  
R2(config-router)#network 192.168.21.0
```



```
R2(config-router)#network 10.0.0.0
R2(config-router)#network 10.0.0.8
```

❖ Configuración Router 3

✓ **Cambio de nombre:**
Router(config)#hostname R3

✓ **Configurar IPv6:**

```
R3(config)#ipv6 unicast-routing
R3(config)#interface f0/0
R3(config-if)#ip address 192.168.30.1 255.255.255.0
R3(config-if)#ipv6 address 2001:db8:130::9C0:80F:301/64
R3(config-if)#ipv6 dhcp server vlan_1
R3(config-if)#ipv6 nd other-config-flag
R3(config-if)#no shutdown
```

✓ **Configurar interfaces:**

```
R3(config)#interface s0/0/0
R3(config-if)#ip address 10.0.0.6 255.255.255.252
R3(config-if)#no shutdown
```

```
R3(config)#interface s0/0/1
R3(config-if)#ip address 10.0.0.10 255.255.255.252
R3(config-if)#no shutdown
```

✓ **Configurar DHCP IPv4:**

```
R3(config)#ip dhcp pool vlan_1
R3(dhcp-config)#network 192.168.30.1 255.255.255.0
R3(dhcp-config)#default-router 192.168.30.1
R3(dhcp-config)#exit
```

✓ **Configurar DHCP IPv6:**

```
R3(config)#ipv6 dhcp pool vlan_1
R3(config-dhcpv6)#dns-server 2001:db8:130::
R3(config-dhcpv6)#exit
```

✓ **Configurar Rip V2:**

```
R3(config)#router rip
R3(config-router)#version 2
R3(config-router)#network 192.168.0.0
R3(config-router)#network 10.0.0.4
R3(config-router)#network 10.0.0.8
```

ESCENARIO 2

Description de la actividad

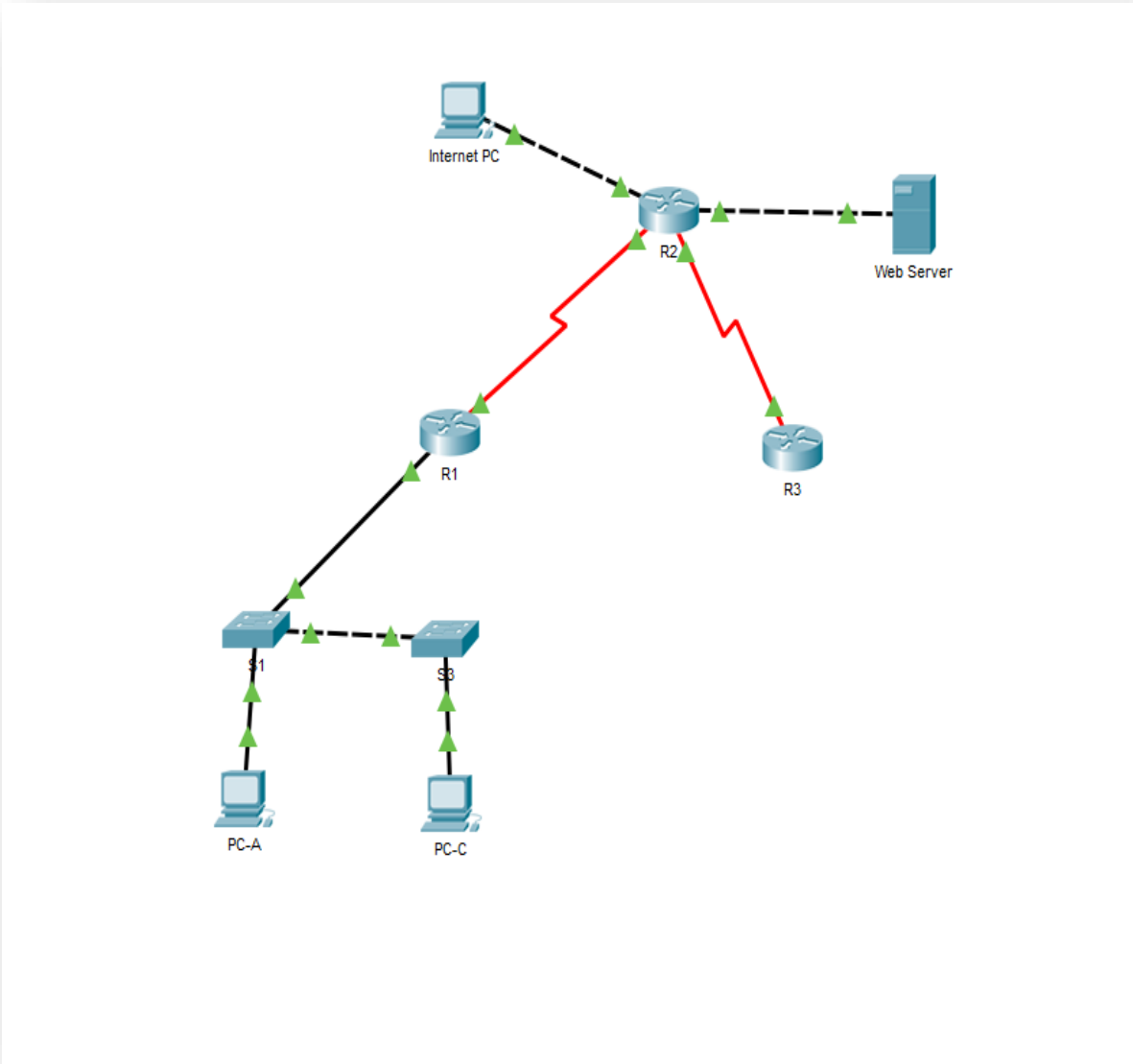
Una empresa de Tecnología posee tres sucursales distribuidas en las ciudades de Miami, Bogotá y Buenos Aires, en donde el estudiante será el administrador de la red, el cual deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con los lineamientos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

1. Implement DHCP and NAT for IPv4
2. Configurar R1 como servidor DHCP para las VLANs 30 y 40.
3. Reservar las primeras 30 direcciones IP de las VLAN 30 y 40 para configuraciones estáticas.

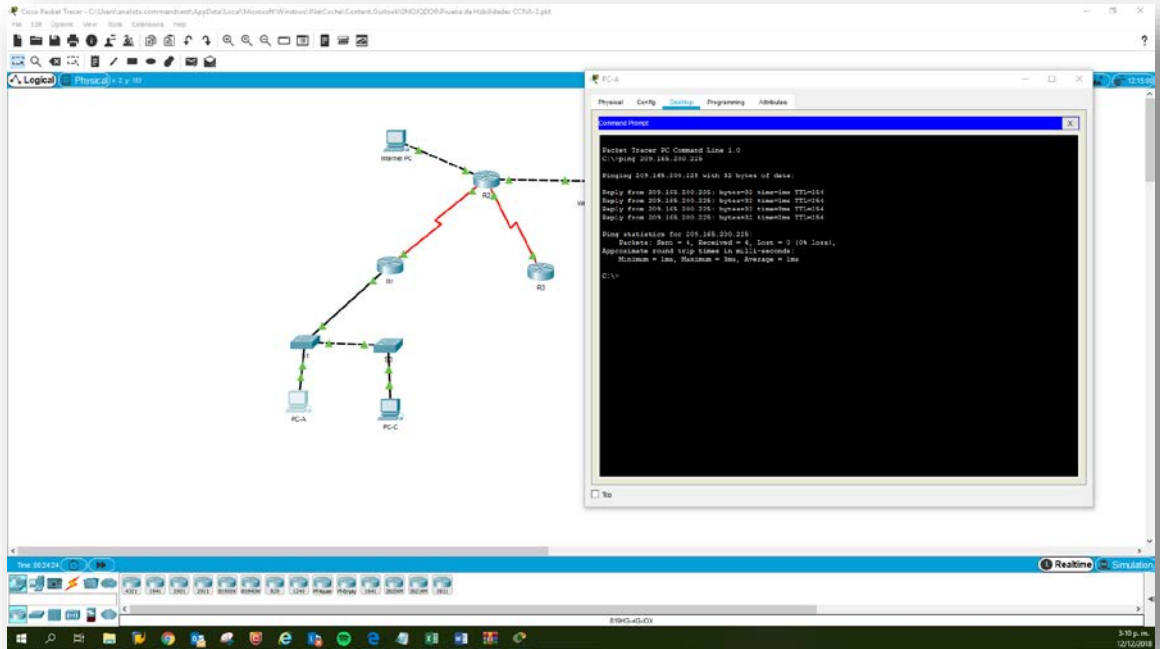
Configurar DHCP pool para VLAN 30	Name: ADMINISTRACION DNS-Server: 10.10.10.11 Domain-Name: ccna-unad.com Establecer default gateway.
Configurar DHCP pool para VLAN 40	Name: MERCADEO DNS-Server: 10.10.10.11 Domain-Name: ccna-unad.com Establecer default gateway.

4. Configurar NAT en R2 para permitir que los host puedan salir a internet
5. 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.
6. 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.
7. Verificar procesos de comunicación y redireccionamiento de tráfico en los routers mediante el uso de Ping y Traceroute.

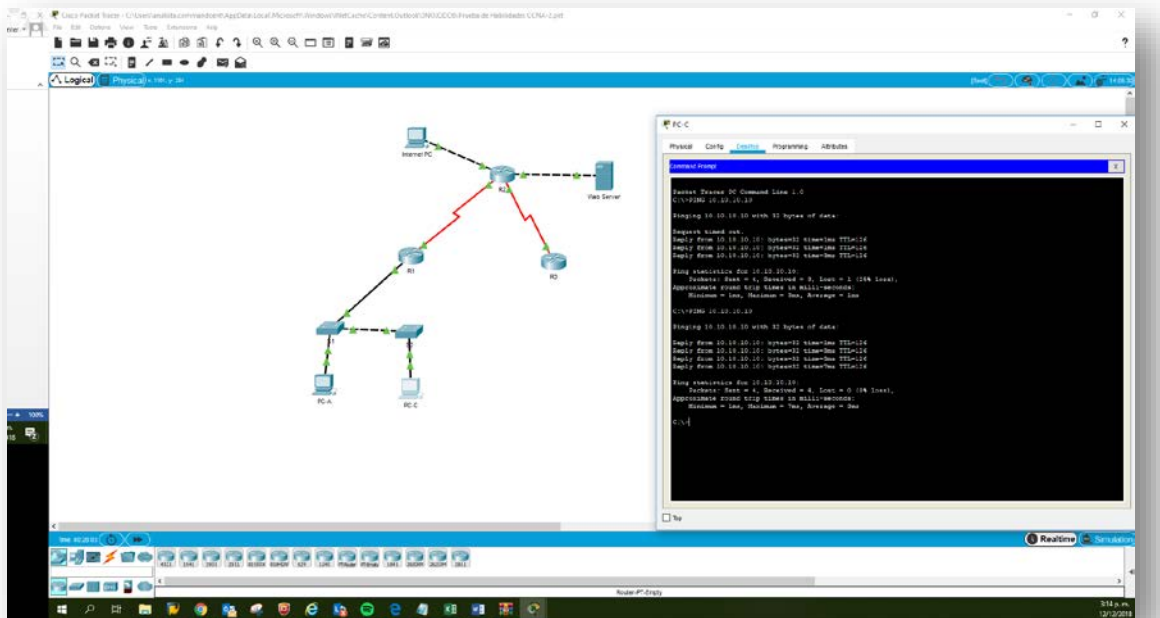
Desarrollo del Escenario 2.



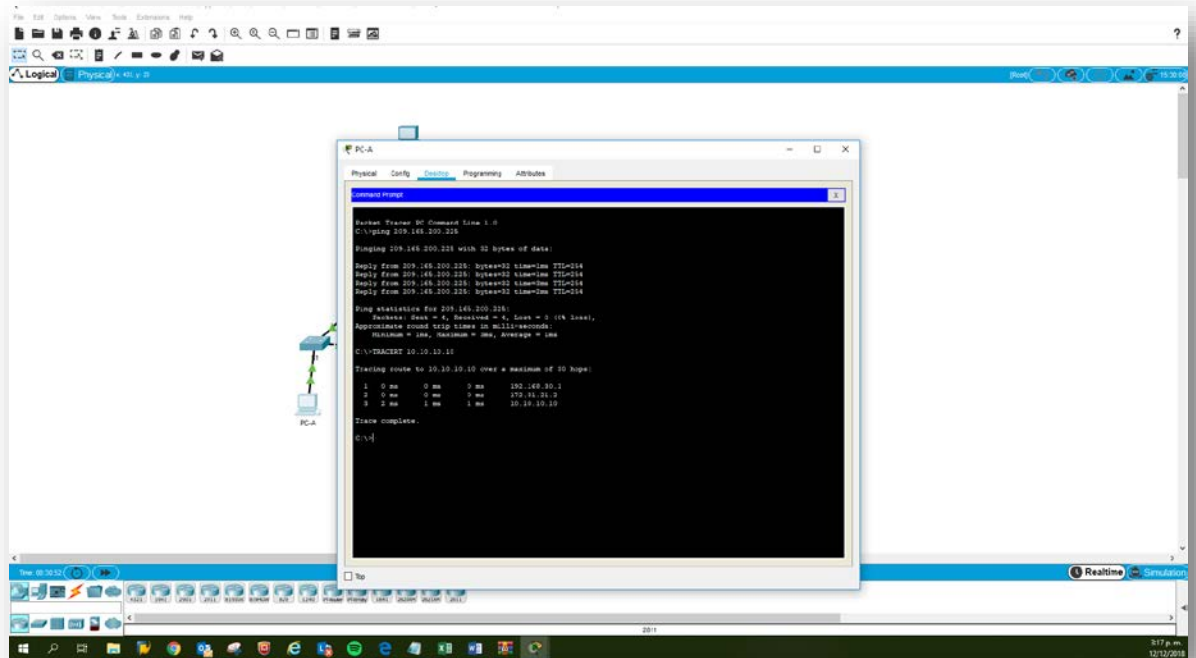
Se realiza ping de PC-A a router R2



Se realiza ping PC-C a Router R2



Tracer de PC-A a web Server



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

❖ Configuración Router 2:

```
interface GigabitEthernet0/0
ip address 209.165.200.225 255.255.255.248
no shutdown
```

```
interface GigabitEthernet0/1
description Web_Server
ip address 10.10.10.1 255.255.255.0
no shutdown
```

```
!
interface Serial0/0/0
description CNX-R3
ip address 172.31.23.2 255.255.255.252
no shutdown
!
```

```
interface Serial0/0/1
description CNX-R1
ip address 172.31.21.2 255.255.255.252
no shutdown
!
```

❖ Configuración Router 1:

```
interface Serial0/0/0
description CNX-R2
ip address 172.31.21.1 255.255.255.252
no shutdown
!
```

❖ Configuración Router 3:

```
interface Serial0/0/1
description CNX-R2
ip address 172.31.23.1 255.255.255.252
no shutdown
```

```
interface Loopback4
ip address 192.168.4.1 255.255.255.0
!
```

```
interface Loopback5
ip address 192.168.5.1 255.255.255.0
!
```

```
interface Loopback6
ip address 192.168.6.1 255.255.255.0
```

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

❖ Configuración Router 1:

```
interface GigabitEthernet0/0.30
description Vlan_Administracion
encapsulation dot1Q 30
ip address 192.168.30.1 255.255.255.0
!
```

```
interface GigabitEthernet0/0.40
description Vlan_Mercadeo
encapsulation dot1Q 40
ip address 192.168.40.1 255.255.255.0
!
```

```
interface GigabitEthernet0/0.200
description Vlan_Matenimiento
encapsulation dot1Q 200
ip address 192.168.200.1 255.255.255.0
!
interface GigabitEthernet0/0
no shutdown
!
```

❖ Configuración S1:

```
Vlan 30
Name Administracion
```

```
Vlan 40
Name Mercadeo
```

```
Vlan 200
Name Mantenimiento
```

```
interface FastEthernet0/24
description CNX-R1
switchport mode trunk
no shutdown
```

```
interface FastEthernet0/1
switchport access vlan 30
switchport mode Access
no shutdown
!
```

```
interface FastEthernet0/3
description CNX-S3
switchport mode trunk
no shutdown
```

❖ Configuración S3:

```
Vlan 30
Name Administracion
```

```
Vlan 40
Name Mercadeo
```


Vlan 200
Name Mantenimiento

```
interface FastEthernet0/1
switchport access vlan 40
switchport mode Access
no shutdown
!
interface FastEthernet0/3
description CNX-S1
switchport mode trunk
no shutdown
```

➤ **En el Switch 3 deshabilitar DNS lookup**

```
no ip domain-lookup
```

➤ **Asignar direcciones IP a los Switches acorde a los lineamientos.**

❖ **Configuración S1:**

```
interface Vlan30
description Administracion
ip address 192.168.30.2 255.255.255.0
!
ip default-gateway 192.168.30.1
!
```

❖ **Configuración S3:**

```
interface Vlan30
description Administracion
ip address 192.168.30.3 255.255.255.0
!
ip default-gateway 192.168.30.1
```

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

❖ **Comando para desactivar las interfaces:**

```
Shutdown
```

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

```
ip dhcp pool ADMINISTRACION
network 192.168.30.0 255.255.255.0
default-router 192.168.30.1
dns-server 10.10.10.11
domain-name ccna-unad.com
```

```
ip dhcp pool MERCADEO
network 192.168.40.0 255.255.255.0
default-router 192.168.40.1
dns-server 10.10.10.11
domain-name ccna-unad.com
```

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

```
ip dhcp excluded-address 192.168.30.1 192.168.30.30
ip dhcp excluded-address 192.168.40.1 192.168.40.30
```

- **Configurar el protocolo de enrutamiento OSPFv2 bajo los siguientes criterios:**

OSPFv2 area 0

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

❖ Configuración Router 1:

```
router ospf 1
router-id 1.1.1.1
log-adjacency-changes
```

```
passive-interface GigabitEthernet0/0.30
passive-interface GigabitEthernet0/0.40
passive-interface GigabitEthernet0/0.200
network 172.31.21.0 0.0.0.3 area 0
network 192.168.30.0 0.0.0.255 area 0
network 192.168.40.0 0.0.0.255 area 0
network 192.168.200.0 0.0.0.255 area 0
!

interface Serial0/0/0
bandwidth 256
ip ospf cost 9500
!
```

❖ Configuración Router 2:

```
router ospf 1
router-id 5.5.5.5
log-adjacency-changes
passive-interface GigabitEthernet0/1
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
!

interface Serial0/0/0
bandwidth 256
ip ospf cost 9500
!
interface Serial0/0/1
bandwidth 256
ip ospf cost 9500
!
```

❖ Configuración Router 3:

```
router ospf 1
router-id 8.8.8.8
log-adjacency-changes
passive-interface Loopback4
passive-interface Loopback5
```

```

passive-interface Loopback6
network 172.31.23.0 0.0.0.3 area 0
network 192.168.4.0 0.0.0.255 area 0
network 192.168.5.0 0.0.0.255 area 0
network 192.168.6.0 0.0.0.255 area 0
!
interface Serial0/0/1
bandwidth 256
ip ospf cost 9500
!

```

➤ **Verificar información de OSPF**

❖ **Visualizar tablas de enrutamiento y routers conectados por OSPFv2 (show ip route & show ip ospf neighbor)**

```

R1#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 172.31.21.2 to network 0.0.0.0

    10.0.0.0/24 is subnetted, 1 subnets
O       10.10.10.0/24 [110/9501] via 172.31.21.2, 10:05:50, Serial0/0/0
    172.31.0.0/16 is variably subnetted, 3 subnets, 2 masks
C       172.31.21.0/30 is directly connected, Serial0/0/0
L       172.31.21.1/32 is directly connected, Serial0/0/0
O       172.31.23.0/30 [110/19000] via 172.31.21.2, 10:05:50, Serial0/0/0
    192.168.4.0/32 is subnetted, 1 subnets
O       192.168.4.1/32 [110/19001] via 172.31.21.2, 10:05:40, Serial0/0/0
    192.168.5.0/32 is subnetted, 1 subnets
O       192.168.5.1/32 [110/19001] via 172.31.21.2, 10:05:40, Serial0/0/0
    192.168.6.0/32 is subnetted, 1 subnets
O       192.168.6.1/32 [110/19001] via 172.31.21.2, 10:05:40, Serial0/0/0
    192.168.30.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.30.0/24 is directly connected, GigabitEthernet0/0.30
L       192.168.30.1/32 is directly connected, GigabitEthernet0/0.30
    192.168.40.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.40.0/24 is directly connected, GigabitEthernet0/0.40
L       192.168.40.1/32 is directly connected, GigabitEthernet0/0.40
    192.168.200.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.200.0/24 is directly connected, GigabitEthernet0/0.200
L       192.168.200.1/32 is directly connected, GigabitEthernet0/0.200
S*    0.0.0.0/0 [1/0] via 172.31.21.2

```

```
R1#show ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
5.5.5.5	0	FULL/ -	00:00:30	172.31.21.2	Serial0/0/0

```
R2# show 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

```
10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    10.10.10.0/24 is directly connected, GigabitEthernet0/1
L    10.10.10.1/32 is directly connected, GigabitEthernet0/1
172.31.0.0/16 is variably subnetted, 4 subnets, 2 masks
C    172.31.21.0/30 is directly connected, Serial0/0/1
L    172.31.21.2/32 is directly connected, Serial0/0/1
C    172.31.23.0/30 is directly connected, Serial0/0/0
L    172.31.23.2/32 is directly connected, Serial0/0/0
192.168.4.0/32 is subnetted, 1 subnets
O    192.168.4.1/32 [110/9501] via 172.31.23.1, 10:08:00, Serial0/0/0
192.168.5.0/32 is subnetted, 1 subnets
O    192.168.5.1/32 [110/9501] via 172.31.23.1, 10:08:00, Serial0/0/0
192.168.6.0/32 is subnetted, 1 subnets
O    192.168.6.1/32 [110/9501] via 172.31.23.1, 10:08:00, Serial0/0/0
O    192.168.30.0/24 [110/9501] via 172.31.21.1, 10:08:00, Serial0/0/1
O    192.168.40.0/24 [110/9501] via 172.31.21.1, 10:08:00, Serial0/0/1
O    192.168.200.0/24 [110/9501] via 172.31.21.1, 10:08:00, Serial0/0/1
209.165.200.0/24 is variably subnetted, 2 subnets, 2 masks
C    209.165.200.224/29 is directly connected, GigabitEthernet0/0
L    209.165.200.225/32 is directly connected, GigabitEthernet0/0
```

```
R2#
```

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

Neighbor ID	Pri	State	Dead Time	Address	Interface
8.8.8.8	0	FULL/ -	00:00:39	172.31.23.1	Serial0/0/0
1.1.1.1	0	FULL/ -	00:00:38	172.31.21.1	Serial0/0/1

```
R2#
```

```
R3# show 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 172.31.23.2 to network 0.0.0.0
```

```
10.0.0.0/24 is subnetted, 1 subnets
O    10.10.10.0/24 [110/9501] via 172.31.23.2, 10:09:28, Serial0/0/1
172.31.0.0/16 is variably subnetted, 3 subnets, 2 masks
O    172.31.21.0/30 [110/19000] via 172.31.23.2, 10:09:28, Serial0/0/1
C    172.31.23.0/30 is directly connected, Serial0/0/1
L    172.31.23.1/32 is directly connected, Serial0/0/1
192.168.4.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.168.4.0/24 is directly connected, Loopback4
L    192.168.4.1/32 is directly connected, Loopback4
192.168.5.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.168.5.0/24 is directly connected, Loopback5
L    192.168.5.1/32 is directly connected, Loopback5
192.168.6.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.168.6.0/24 is directly connected, Loopback6
L    192.168.6.1/32 is directly connected, Loopback6
O    192.168.30.0/24 [110/19001] via 172.31.23.2, 10:09:28, Serial0/0/1
O    192.168.40.0/24 [110/19001] via 172.31.23.2, 10:09:28, Serial0/0/1
O    192.168.200.0/24 [110/19001] via 172.31.23.2, 10:09:28, Serial0/0/1
S*   0.0.0.0/0 [1/0] via 172.31.23.2
```

```
R3# |
```

```
R3# show ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
5.5.5.5	0	FULL/ -	00:00:30	172.31.23.2	Serial0/0/1

```
R3# |
```

- Visualizar lista resumida de interfaces por OSPF en donde se ilustre el costo de cada interface (“show ip ospf interface brief” & show ip ospf interface)

```
R1#show ip ospf interface

GigabitEthernet0/0.30 is up, line protocol is up
  Internet address is 192.168.30.1/24, Area 0
  Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 1.1.1.1, Interface address 192.168.30.1
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    No Hellos (Passive interface)
  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 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
GigabitEthernet0/0.40 is up, line protocol is up
  Internet address is 192.168.40.1/24, Area 0
  Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 1.1.1.1, Interface address 192.168.40.1
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    No Hellos (Passive interface)
  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 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
GigabitEthernet0/0.200 is up, line protocol is up
  Internet address is 192.168.200.1/24, Area 0
  Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 1.1.1.1, Interface address 192.168.200.1
  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)
Serial0/0/0 is up, line protocol is up
  Internet address is 172.31.21.1/30, Area 0
  Process ID 1, Router ID 1.1.1.1, Network Type POINT-TO-POINT, Cost: 9500
  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 00:00:05
  Index 4/4, 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 5.5.5.5
  Suppress hello for 0 neighbor(s)
R1#
```

```
R2#show ip ospf interface
```

```
GigabitEthernet0/1 is up, line protocol is up
  Internet address is 10.10.10.1/24, Area 0
  Process ID 1, Router ID 5.5.5.5, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 5.5.5.5, Interface address 10.10.10.1
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  No Hellos (Passive interface)
  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 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
Serial0/0/1 is up, line protocol is up
  Internet address is 172.31.21.2/30, Area 0
  Process ID 1, Router ID 5.5.5.5, Network Type POINT-TO-POINT, Cost: 9500
  Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  Hello due in 00:00:04
  Index 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)
Serial0/0/0 is up, line protocol is up
  Internet address is 172.31.23.2/30, Area 0
  Process ID 1, Router ID 5.5.5.5, Network Type POINT-TO-POINT, Cost: 9500
  Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  Hello due in 00:00:04
  Index 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 1, Adjacent neighbor count is 1
  Adjacent with neighbor 8.8.8.8
  Suppress hello for 0 neighbor(s)
```

```
R2#
```

```
---
```



```
R3#show ip ospf interface
```

```
Loopback4 is up, line protocol is up
  Internet address is 192.168.4.1/24, Area 0
  Process ID 1, Router ID 8.8.8.8, Network Type LOOPBACK, Cost: 1
  Loopback interface is treated as a stub Host
Loopback5 is up, line protocol is up
  Internet address is 192.168.5.1/24, Area 0
  Process ID 1, Router ID 8.8.8.8, Network Type LOOPBACK, Cost: 1
  Loopback interface is treated as a stub Host
Loopback6 is up, line protocol is up
  Internet address is 192.168.6.1/24, Area 0
  Process ID 1, Router ID 8.8.8.8, Network Type LOOPBACK, Cost: 1
  Loopback interface is treated as a stub Host
Serial0/0/1 is up, line protocol is up
  Internet address is 172.31.23.1/30, Area 0
  Process ID 1, Router ID 8.8.8.8, Network Type POINT-TO-POINT, Cost: 9500
  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 00:00:03
  Index 4/4, 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 5.5.5.5
  Suppress hello for 0 neighbor(s)
```

```
R3#
```

```
---
```

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

```
R1#show ip protocols

Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 1.1.1.1
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.31.21.0 0.0.0.3 area 0
    192.168.30.0 0.0.0.255 area 0
    192.168.40.0 0.0.0.255 area 0
    192.168.200.0 0.0.0.255 area 0
  Passive Interface(s):
    GigabitEthernet0/0.30
    GigabitEthernet0/0.40
    GigabitEthernet0/0.200
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110          00:12:18
    5.5.5.5          110          00:12:13
    8.8.8.8          110          00:12:16
  Distance: (default is 110)

R1#
R2#show ip protocols

Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 5.5.5.5
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.31.21.0 0.0.0.3 area 0
    172.31.23.0 0.0.0.3 area 0
    10.10.10.0 0.0.0.255 area 0
  Passive Interface(s):
    GigabitEthernet0/1
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110          00:12:50
    5.5.5.5          110          00:12:44
    8.8.8.8          110          00:12:47
  Distance: (default is 110)

R2#
```

```

R3#show ip protocols

Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 8.8.8.8
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.31.23.0 0.0.0.3 area 0
    192.168.4.0 0.0.0.255 area 0
    192.168.5.0 0.0.0.255 area 0
    192.168.6.0 0.0.0.255 area 0
  Passive Interface(s):
    Loopback4
    Loopback5
    Loopback6
  Routing Information Sources:
    Gateway         Distance      Last Update
    1.1.1.1          110           00:13:17
    5.5.5.5          110           00:13:11
    8.8.8.8          110           00:13:14
  Distance: (default is 110)

R3#
R3#
R3#

```

➤ **Configurar NAT en R2 para permitir que los host puedan salir a internet**

```

ip nat pool Navegacion 209.165.200.225 209.165.200.229 netmask
255.255.255.248
access-list 1 permit 192.168.30.0 0.0.0.255
access-list 1 permit 192.168.40.0 0.0.0.255
access-list 1 permit 192.168.200.0 0.0.0.255
access-list 1 permit 192.168.4.0 0.0.0.255
access-list 1 permit 192.168.5.0 0.0.0.255
access-list 1 permit 192.168.6.0 0.0.0.255
access-list 1 permit 10.10.10.0 0.0.0.255
ip nat inside source list 1 pool Navegacion overload

interface GigabitEthernet0/0
ip nat outside
!
interface GigabitEthernet0/1
ip nat inside
!
interface Serial0/0/0
ip nat inside

```

```
!  
interface Serial0/0/1  
ip nat inside  
!
```

- **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.**

Aplicadas para el NAT:

```
access-list 1 permit 192.168.30.0 0.0.0.255  
access-list 1 permit 192.168.40.0 0.0.0.255  
access-list 1 permit 192.168.200.0 0.0.0.255  
access-list 1 permit 192.168.4.0 0.0.0.255  
access-list 1 permit 192.168.5.0 0.0.0.255  
access-list 1 permit 192.168.6.0 0.0.0.255  
access-list 1 permit 10.10.10.0 0.0.0.255
```

- **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.**

```
access-list 100 permit tcp 192.168.30.0 0.0.0.255 host 10.10.10.10 eq www  
access-list 100 deny tcp any host 10.10.10.10 eq www  
access-list 100 permit ip any any
```

```
access-list 101 permit icmp any any echo-replay
```

Conclusiones

- Mediante la realización del presente trabajo se aplicaron los conocimientos adquiridos en EL curso diplomado de Profundización CISCO por medio de la realización de ejercicios prácticos en las herramientas PACKET TRACER y SMARTLAB.
- Se analizaron y aplicaron los temas: VLAN, los enlaces troncales de los switches Cisco, el enrutamiento entre VLAN, NAT, OSPF
- Se documentó el paso a paso realizado, configuraciones, conexiones y pruebas realizadas a lo largo de la actividad.

Referencias Bibliográficas

- CISCO. (2014). Exploración de la red. Fundamentos de Networking. Recuperado de
- <https://static-course-assets.s3.amazonaws.com/ITN50ES/module1/index.html#1.0.1.1>
- CISCO. (2014). Capa de Transporte. Fundamentos de Networking. Recuperado de <https://static-course-assets.s3.amazonaws.com/ITN50ES/module7/index.html#7.0.1.1>
- CISCO. (2014). Asignación de direcciones IP. Fundamentos de Networking. Recuperado de <https://static-course-assets.s3.amazonaws.com/ITN50ES/module8/index.html#8.0.1.1>
- CISCO. (2014). Introducción a redes conmutadas. Principios de Enrutamiento y Conmutación. Recuperado de <https://static-course-assets.s3.amazonaws.com/RSE50ES/module1/index.html#1.0.1.1>
- CISCO. (2014). Configuración y conceptos básicos de Switching. Principios de Enrutamiento y Conmutación. Recuperado de <https://static-course-assets.s3.amazonaws.com/RSE50ES/module2/index.html#2.0.1.1>
- CISCO. (2014). VLANs. Principios de Enrutamiento y Conmutación. Recuperado de <https://static-course-assets.s3.amazonaws.com/RSE50ES/module3/index.html#3.0.1.1>
- CISCO. (2014). Introducción a redes conmutadas. Principios de Enrutamiento y Conmutación. Recuperado de <https://static-course-assets.s3.amazonaws.com/RSE50ES/module1/index.html#1.0.1.1>
- CISCO. (2014). Configuración y conceptos básicos de Switching. Principios de Enrutamiento y Conmutación. Recuperado de <https://static-course-assets.s3.amazonaws.com/RSE50ES/module2/index.html#2.0.1.1>

