

Diplomado de Profundización Cisco (Diseño e Implementación de Soluciones Integradas

Lan / Wan) (Opci 203092A_471)

Pruebas de Habilidades CCNA

Configuración Básica Red de datos para Pymes

Presentado Por:

Mario Leonardo Andrade Barrero

C.C 5'821.751

Grupo: 203092_11

Presentado a:

Ingeniero: Efraín Alejandro Pérez

**Universidad Nacional Abierta Y A Distancia
Escuela de Ciencias Básicas, Tecnología e Ingeniería**

Programa de Ingeniería Electrónica

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Introducción

En el presente trabajo se realiza la prueba de habilidades CCNA, en donde se demuestra todo lo aprendido durante el diplomado de profundización, con los conocimientos adquiridos colocados en práctica y demostrados en este trabajo.

Se demuestra la configuración básica de una red de datos para Pymes, en los cuales se aplican conceptos de enrutamiento, seguridad y disponibilidad y un recurso web para la empresa, la conectividad de redes es fundamental para el funcionamiento de toda empresa, negocio y entidad, ya que con ellas podemos utilizar todas aquellas ventajas, servicios y recursos que nos ofrece.

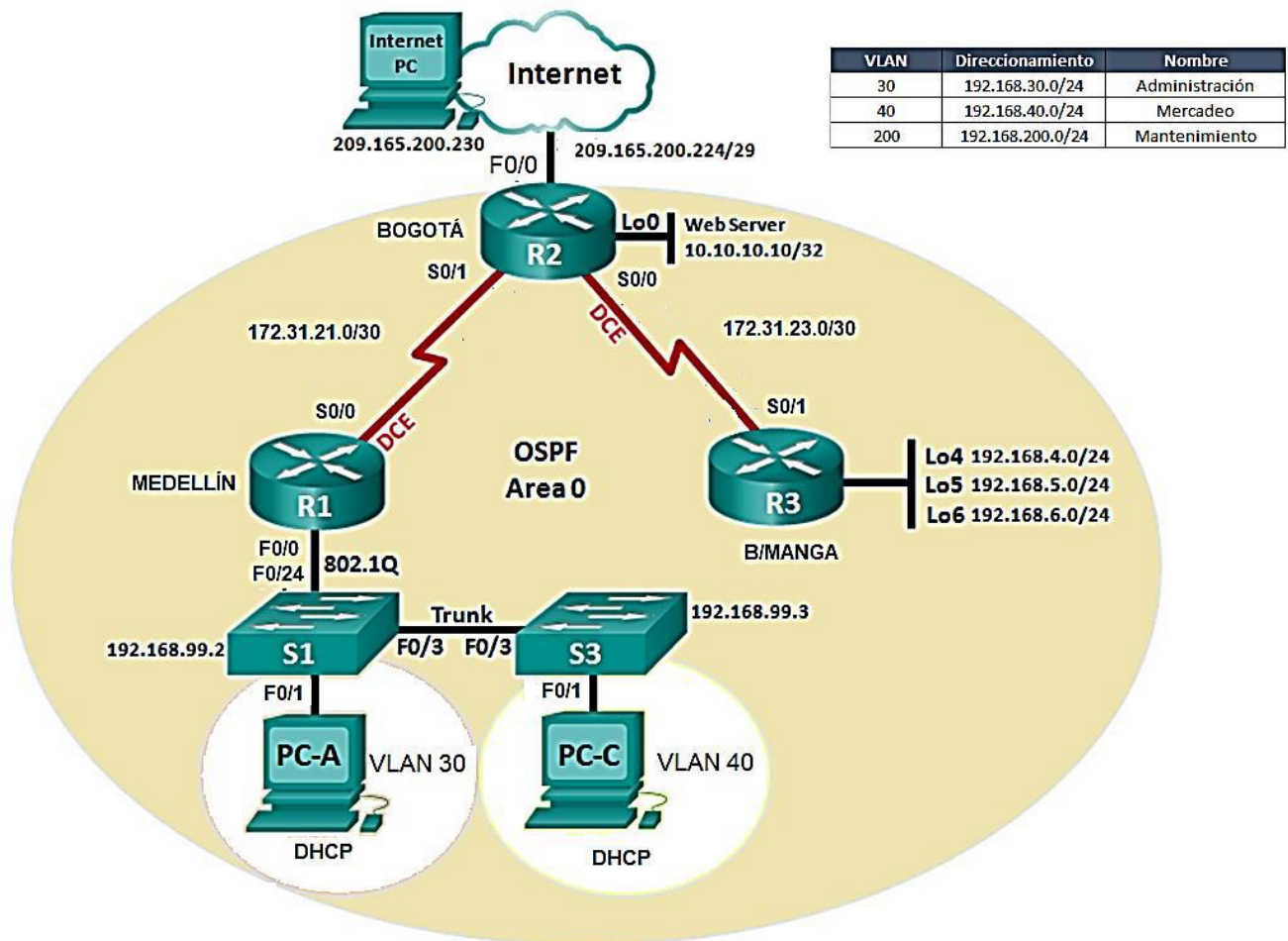
No es nada fácil la configuración de una red con una gran variedad de protocolos rutas de acceso y listas de acceso pero los distintos ejercicios, trabajos colaborativos y el material didáctico que ofrece el curso de CCNA son de gran ayuda para la realización y puesta en práctica de todos esos conocimientos adquiridos.

Contenido Temático

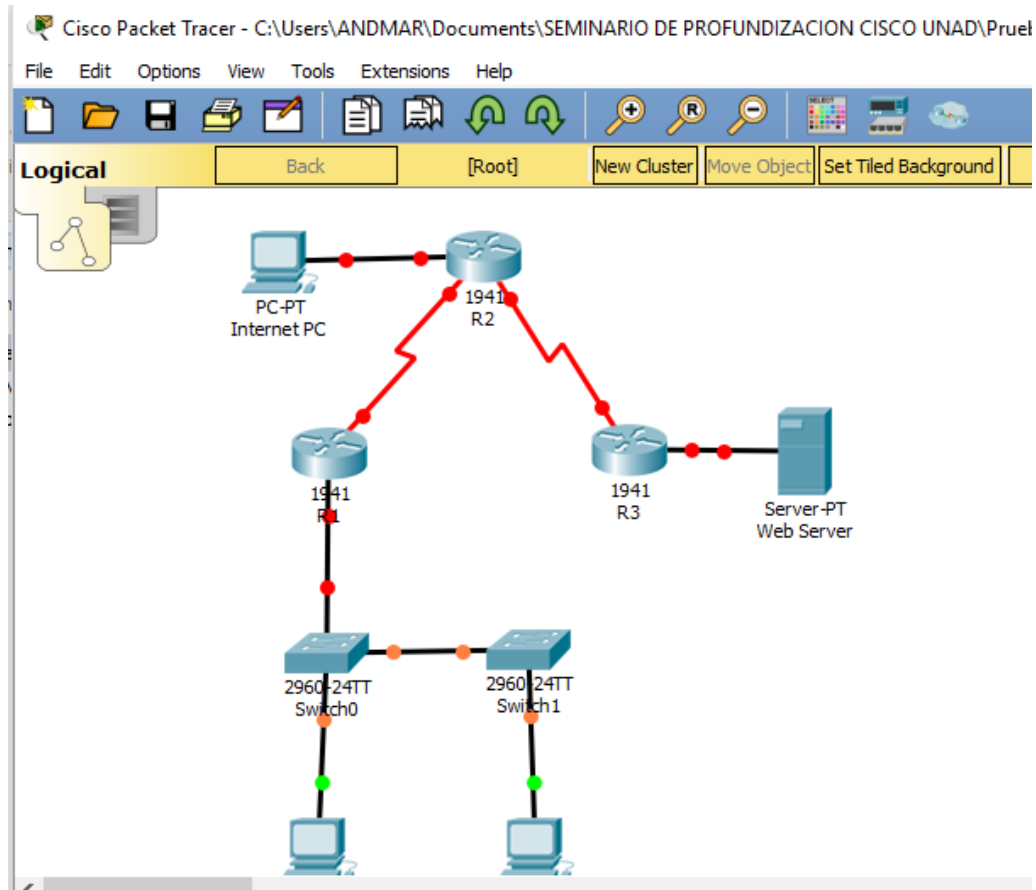
Descripción del escenario propuesto para la prueba de habilidades

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



Configuramos la red en packet Tracer, se debio colocar un server web debido a que packet tracer no sopota Lo.



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

R// se configuran los direccionamientos Ip de cada dispositivo del escenario así:

Configuración PC Internet.

Internet PC

Physical Config Desktop Programming Attributes

IP Configuration

IP Configuration

DHCP Static

IP Address 209.165.200.230

Subnet Mask 255.255.255.248

Default Gateway 209.165.200.225

DNS Server 0.0.0.0

Configuración routers

R1

Physical Config CLI Attributes

IOS Command Line Interface

```
!  
interface Serial0/0/0  
description Medellin  
ip address 172.31.21.1 255.255.255.252  
clock rate 128000  
!  
interface Serial0/0/1  
no ip address  
clock rate 2000000  
shutdown  
!
```

R2

Physical

Config

CLI

Attributes

IOS Command Line Interface

```
!  
!  
interface GigabitEthernet0/0  
description Internet  
ip address 209.165.200.225 255.255.255.248  
duplex auto  
speed auto  
!  
interface GigabitEthernet0/1  
description Conexion al Servidor  
ip address 10.10.10.1 255.255.255.0  
duplex auto  
speed auto  
!  
interface Serial0/0/0  
ip address 172.32.23.2 255.255.255.252  
clock rate 128000  
!  
interface Serial0/0/1  
description Bogota  
ip address 172.31.21.2 255.255.255.252  
!
```

R3

Physical

Config

CLI

Attributes

IOS Command Line Interface

```
speed auto  
shutdown  
!  
interface GigabitEthernet0/1  
no ip address  
duplex auto  
speed auto  
shutdown  
!  
interface Serial0/0/0  
no ip address  
clock rate 2000000  
shutdown  
!  
interface Serial0/0/1  
ip address 172.32.23.1 255.255.255.252  
!
```

R3

```
Physical Config CLI Attributes
IOS Command Line Interface
!
!
!
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
!
```

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

OSPFv2 area 0

Configuration Item or Task	Specification
Router ID R1	1.1.1.1
Router ID R2	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

Verificar información de OSPF

- Visualizar tablas de enrutamiento y routers conectados por OSPFv2

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

Neighbor ID      Pri   State           Dead Time   Address
Interface
1.1.1.1          0    FULL/ -         00:00:38   172.31.21.1
Serial0/0/1
R2#
```

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


```
Physical  Config  CLI  Attributes

IOS Command Line Interface

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 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 00:00:04
  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
  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#
```

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

R2

Physical Config CLI Attributes

IOS Command Line Interface

```
Neighbor count is 0, Adjacent neighbor count is 0
Suppress hello for 0 neighbor(s)
R2#
R2#show ip
R2#show ip pro
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:
    172.31.21.0 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          00:06:24
    2.2.2.2          110          00:09:03
  Distance: (default is 110)

R2#
```

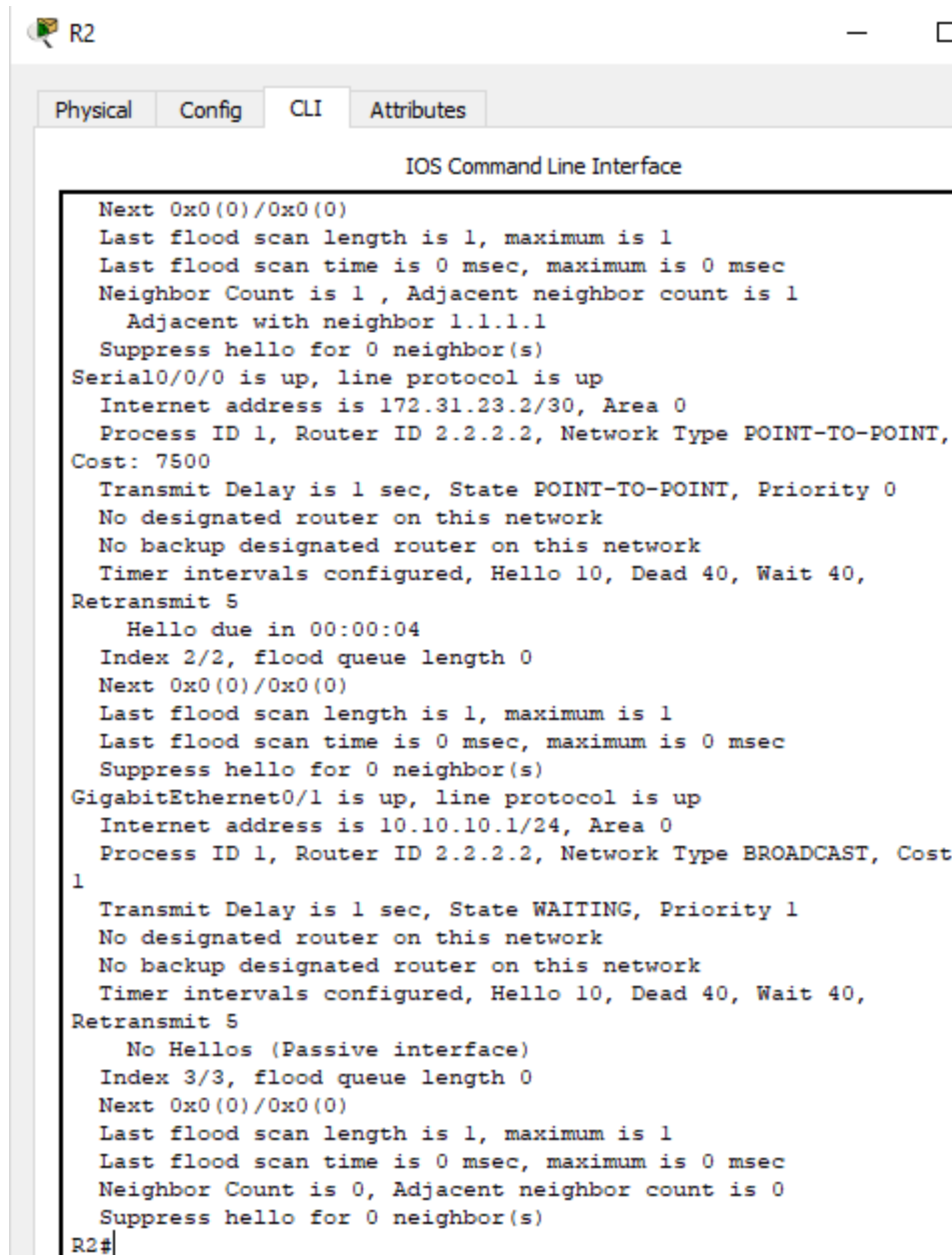
```
R2#show ip rou
R2#show ip route osp
R2#show ip route ospf
O   192.168.30.0 [110/7501] via 172.31.21.1, 00:34:53,
Serial0/0/1
O   192.168.40.0 [110/7501] via 172.31.21.1, 00:34:53,
Serial0/0/1
O   192.168.200.0 [110/7501] via 172.31.21.1, 00:34:53,
Serial0/0/1

R2#
```

Ctrl+F6 to exit CLI focus

Copy

Paste



The screenshot shows a network device named R2 with a window titled "IOS Command Line Interface". The window has tabs for "Physical", "Config", "CLI", and "Attributes", with "CLI" selected. The output of the CLI shows the status of two interfaces:

```
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 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 00:00:04
  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
  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#
```

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

S1

```
Physical Config CLI Attributes
IOS Command Line Interface

S1>
S1>en
S1#show vl
S1#show vlan br
S1#show vlan brief

VLAN Name                Status    Ports
-----
1    default                active    Fa0/2, Fa0/4, Fa0/5,
Fa0/7, Fa0/8, Fa0/9,
Fa0/11, Fa0/12, Fa0/13,
Fa0/15, Fa0/16, Fa0/17,
Fa0/19, Fa0/20, Fa0/21,
Fa0/23, Gig0/1, Gig0/24
30   Administracion          active    Fa0/1
40   Mercadeo                active
200  Mantenimiento            active
1002 fddi-default             active
1003 token-ring-default     active
1004 fddinet-default         active
1005 trnet-default          active

S1#
```

R2

```
Physical Config CLI Attributes
IOS Command Line Interface

bandwidth 128
ip address 172.31.21.2 255.255.255.252
ip ospf cost 7500
!
interface Vlan1
no ip address
shutdown
!
router ospf 1
router-id 2.2.2.2
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
!
ip classless
```

4. En el Switch 3 deshabilitar DNS lookup
5. Asignar direcciones IP a los Switches acorde a los lineamientos.
6. Desactivar todas las interfaces que no sean utilizadas en el esquema de red.
7. Implementar DHCP and NAT for IPv4

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

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

```
R1(config)#ip dh
R1(config)#ip dhcp ex
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)#
```

Ctrl+F6 to exit CLI focus

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Configurar DHCP pool para VLAN 30

Name: ADMINISTRACION
DNS-Server: 10.10.10.11
Domain-Name: ccna-unad.com
Establecer default gateway.

```
R1(config)#ip dhcp pool ADMINISTRACION
R1(dhcp-config)#dns
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#doma
R1(dhcp-config)#domain
R1(dhcp-config)#domain-name ccna-unad.edu.co
^
% Invalid input detected at '^' marker.

R1(dhcp-config)#de
R1(dhcp-config)#default-router 192.168.30.1
R1(dhcp-config)#nete
R1(dhcp-config)#net
R1(dhcp-config)#network 192.168.30.0 255.255.255.0
R1(dhcp-config)#
```

Ctrl+F6 to exit CLI focus

Cop

Configurar DHCP pool para VLAN 40

Name: MERCADEO
DNS-Server: 10.10.10.11
Domain-Name: ccna-unad.com
Establecer default gateway.

```
R1(config)#ip dhcp pool MERCADEO
R1(dhcp-config)#dn
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#domain-name ccna-unad.edu.co
^
% Invalid input detected at '^' marker.

R1(dhcp-config)#def
R1(dhcp-config)#default-router 192.168.40.1
R1(dhcp-config)#net
R1(dhcp-config)#network 192.168.40.0 255.255.255.0
R1(dhcp-config)#
```

Ctrl+F6 to exit CLI focus

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

```
R2>EN
R2#con te
% Ambiguous command: "con te"
R2#conf te
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ip nat is
R2(config)#ip nat in
R2(config)#ip nat inside so
R2(config)#ip nat inside source s
R2(config)#ip nat inside source static 10.10.10.10 209.165.200.209
R2(config)#
```

Ctrl+F6 to exit CLI focus

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Paste

11. 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.

```
2019-09-03 10:10:10 R2#conf te
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#acc
R2(config)#access-list 1 per
R2(config)#access-list 1 permit 192.168.30.0 0.0.0.255
R2(config)#access-list 1 permit 192.168.40.0 0.0.0.255
R2(config)#access-list 1 permit 192.168.4.0 0.0.3.255
R2(config)#
```

Ctrl+F6 to exit CLI focus

Copy

P

12. 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#show access-lists
Standard IP access list 1
 10 permit 192.168.30.0 0.0.0.255
 20 permit 192.168.40.0 0.0.0.255
 30 permit 192.168.4.0 0.0.3.255
Standard IP access list ADMINISTRACION-A
 10 permit host 172.31.21.1 (2 match(es))
Extended IP access list 101
 10 permit tcp any host 209.165.200.229 eq www
 20 permit icmp any any echo-reply (18 match(es))
R2#

```

Ctrl+F6 to exit CLI focus

Physical Config CLI Attributes

IOS Command Li

```

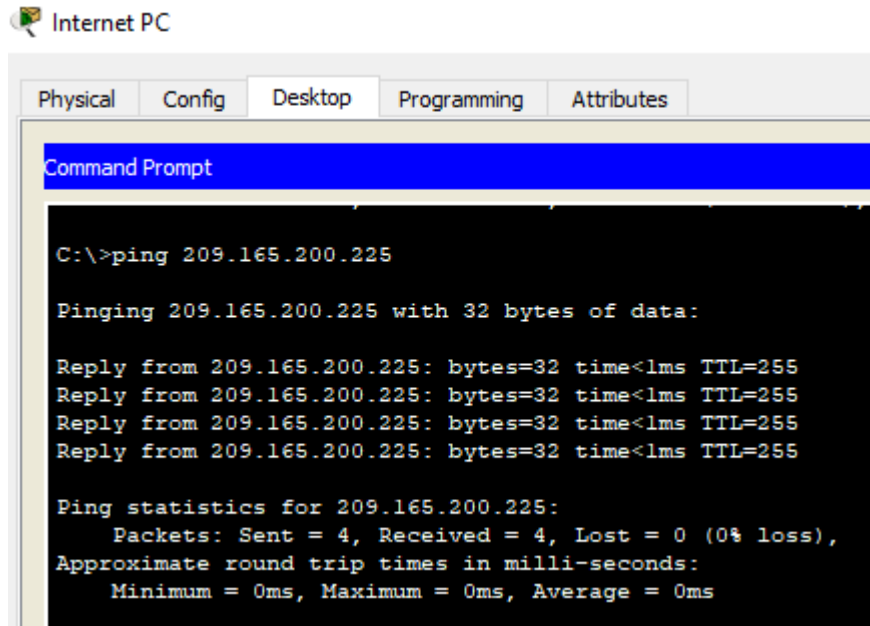
!
!
!
interface GigabitEthernet0/0
description conexion Internet
ip address 209.165.200.225 255.255.255.248
ip access-group 101 in
ip nat outside
duplex auto
speed auto
!
interface GigabitEthernet0/1
ip address 10.10.10.1 255.255.255.0
ip access-group 101 out
ip nat inside
duplex auto
speed auto
!
interface Serial10/0/0
description conexion a Bucaramanga
bandwidth 128
ip address 172.31.23.2 255.255.255.252
ip ospf cost 7500
ip access-group 101 out
clock rate 128000
!
interface Serial10/0/1
bandwidth 128
ip address 172.31.21.2 255.255.255.252
ip ospf cost 7500
ip access-group 101 out
!
interface Vlan1
no ip address
shutdown
!
router ospf 1
router-id 2.2.2.2

```

Ctrl+F6 to exit CLI focus

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

- Se realiza ping desde la PC internet a la g0/0 209.165.200.225



Internet PC

Physical Config Desktop Programming Attributes

Command Prompt

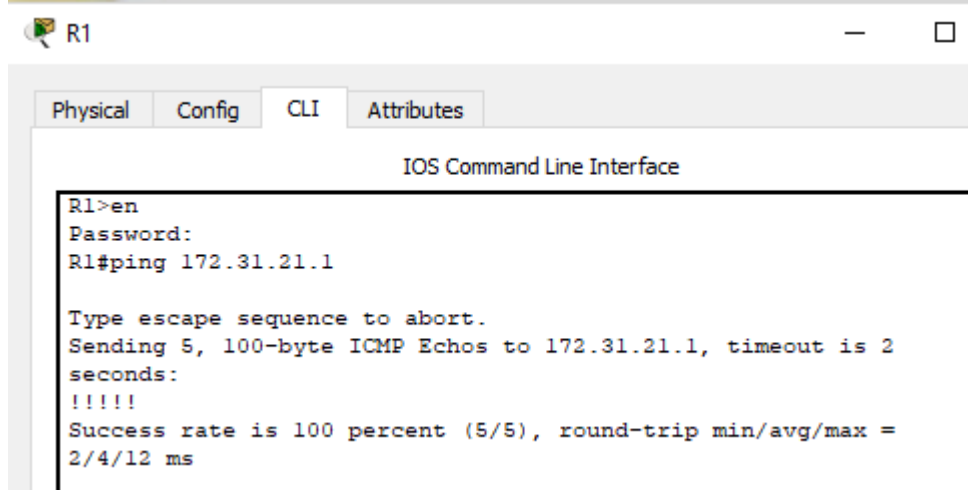
```
C:\>ping 209.165.200.225

Pinging 209.165.200.225 with 32 bytes of data:

Reply from 209.165.200.225: bytes=32 time<1ms TTL=255
Reply from 209.165.200.225: bytes=32 time<1ms TTL=255
Reply from 209.165.200.225: bytes=32 time<1ms TTL=255
Reply from 209.165.200.225: bytes=32 time<1ms TTL=255

Ping statistics for 209.165.200.225:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

- Se realiza ping desde R1 hacia la 172.31.21.1 que es la serial 0/0/0



R1

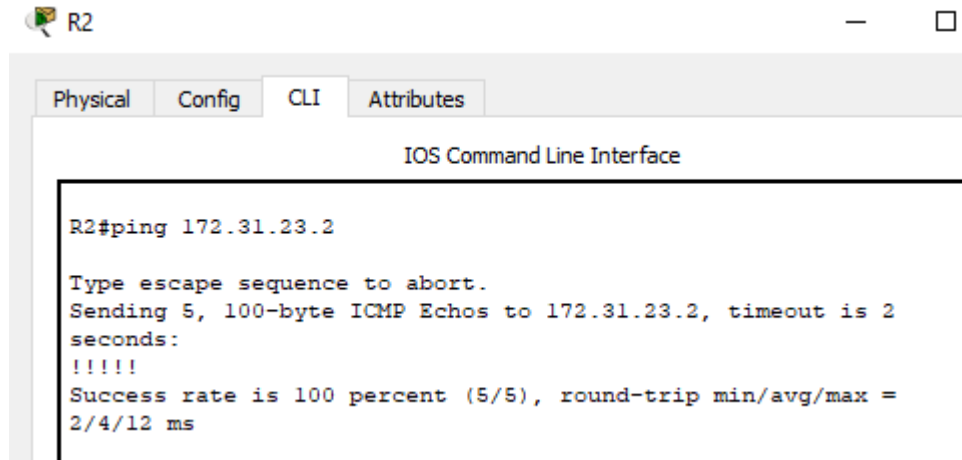
Physical Config CLI Attributes

IOS Command Line Interface

```
R1>en
Password:
R1#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 =
2/4/12 ms
```

- Se realiza ping desde R2 hacia la 172.31.23.2 que es la serial 0/0/0



R2

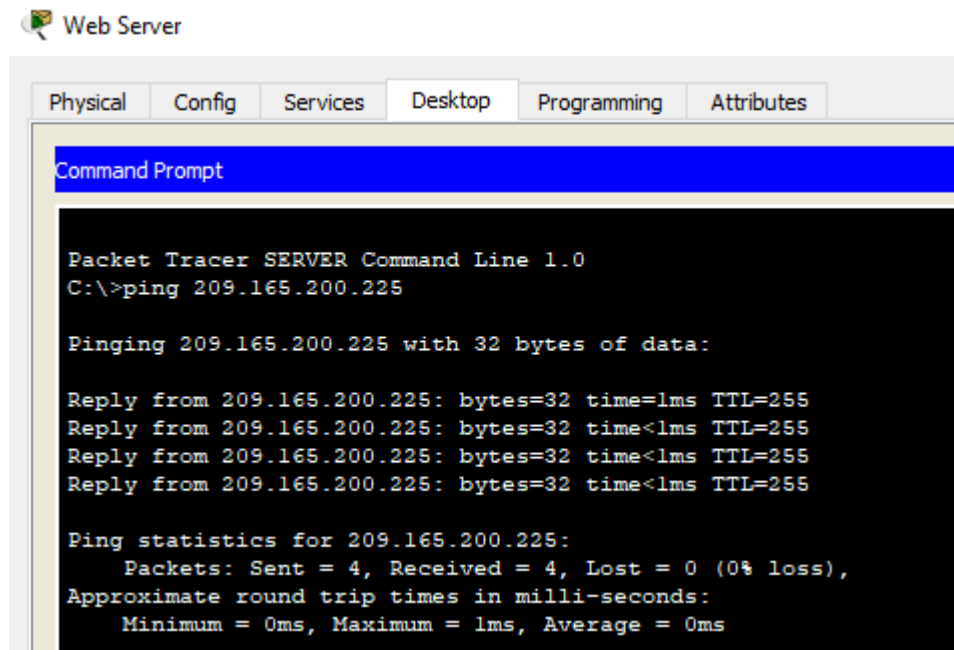
Physical Config CLI Attributes

IOS Command Line Interface

```
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 =
2/4/12 ms
```

- Se realiza ping desde el Web Server a la g0/0 209.165.200.225



Web Server

Physical Config Services Desktop Programming Attributes

Command Prompt

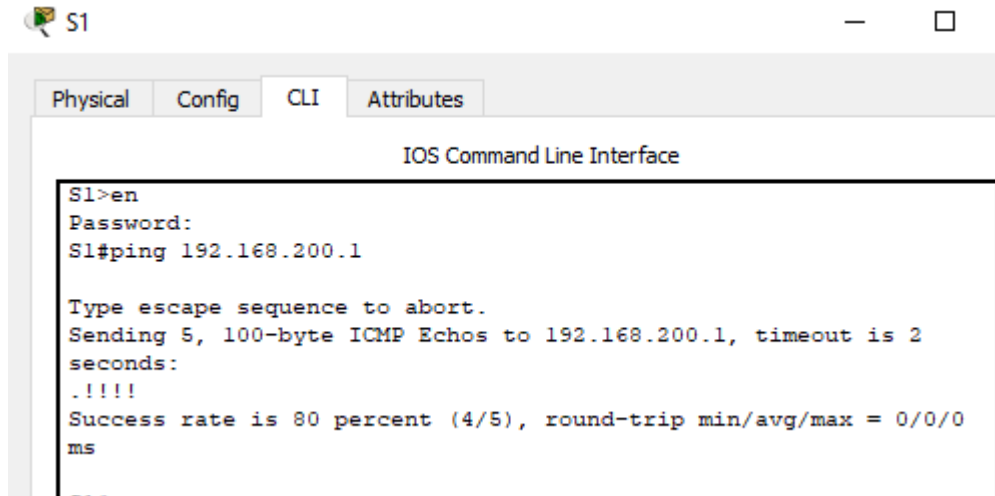
```
Packet Tracer SERVER Command Line 1.0
C:\>ping 209.165.200.225

Pinging 209.165.200.225 with 32 bytes of data:

Reply from 209.165.200.225: bytes=32 time=1ms TTL=255
Reply from 209.165.200.225: bytes=32 time<1ms TTL=255
Reply from 209.165.200.225: bytes=32 time<1ms TTL=255
Reply from 209.165.200.225: bytes=32 time<1ms TTL=255

Ping statistics for 209.165.200.225:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

- Ser prueba la conectividad desde los Switch se hace ping desde S1 hacia la 192.168.200.1 que es la interface g0/1.200

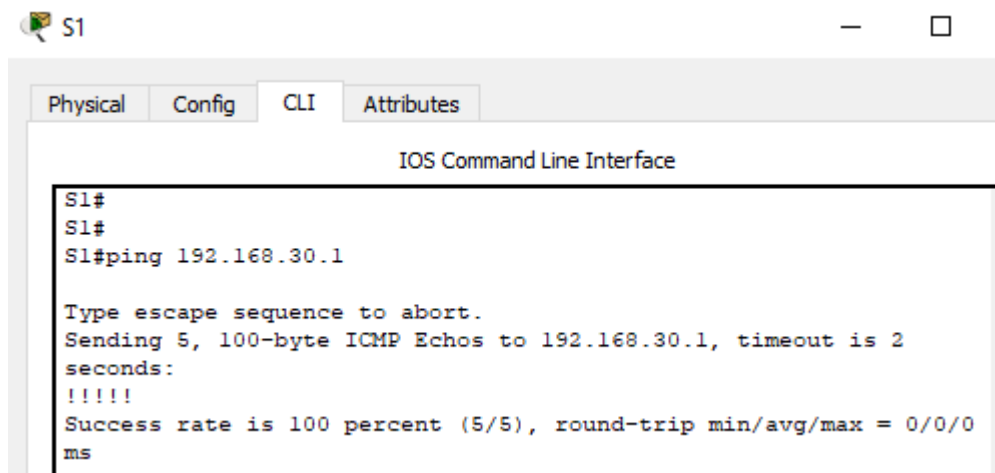


The screenshot shows the CLI of a switch named S1. The user has entered 'en' to enter enable mode, provided a password, and then executed the command 'ping 192.168.200.1'. The output indicates that 5 ICMP Echoes were sent, 4 were received, and the success rate is 80 percent. The round-trip times are all 0 ms.

```
S1>en
Password:
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 80 percent (4/5), round-trip min/avg/max = 0/0/0
ms
```

- Se hace ping desde S1 hacia 192.168.30.1 que es la interface g0/1.30

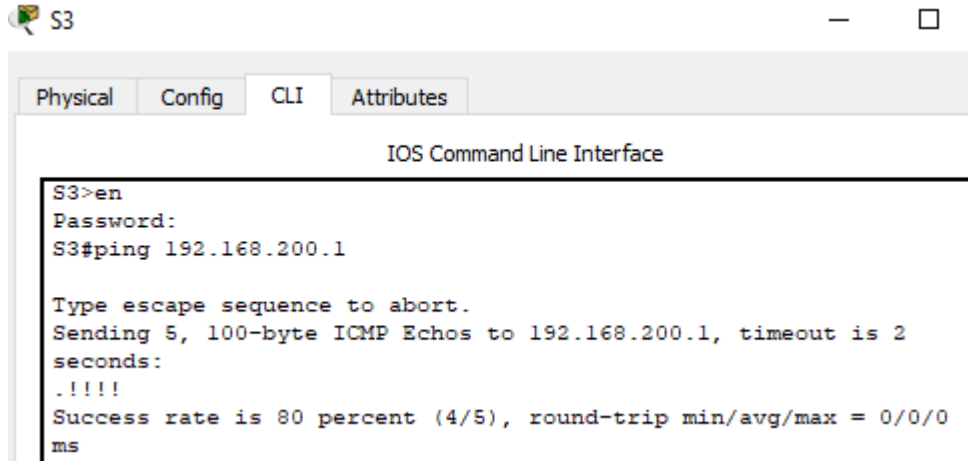


The screenshot shows the CLI of a switch named S1. The user has entered 'en' to enter enable mode, provided a password, and then executed the command 'ping 192.168.30.1'. The output indicates that 5 ICMP Echoes were sent, 5 were received, and the success rate is 100 percent. The round-trip times are all 0 ms.

```
S1#
S1#
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
```

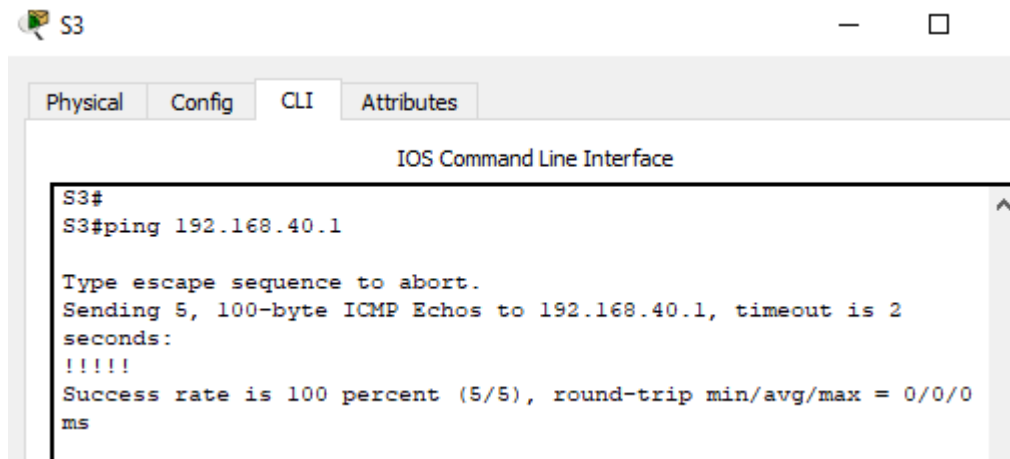
- Se hace ping desde S3 hacia 192.168.200.1 que es la interface g0/1.200



```
S3>en
Password:
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 80 percent (4/5), round-trip min/avg/max = 0/0/0
ms
```

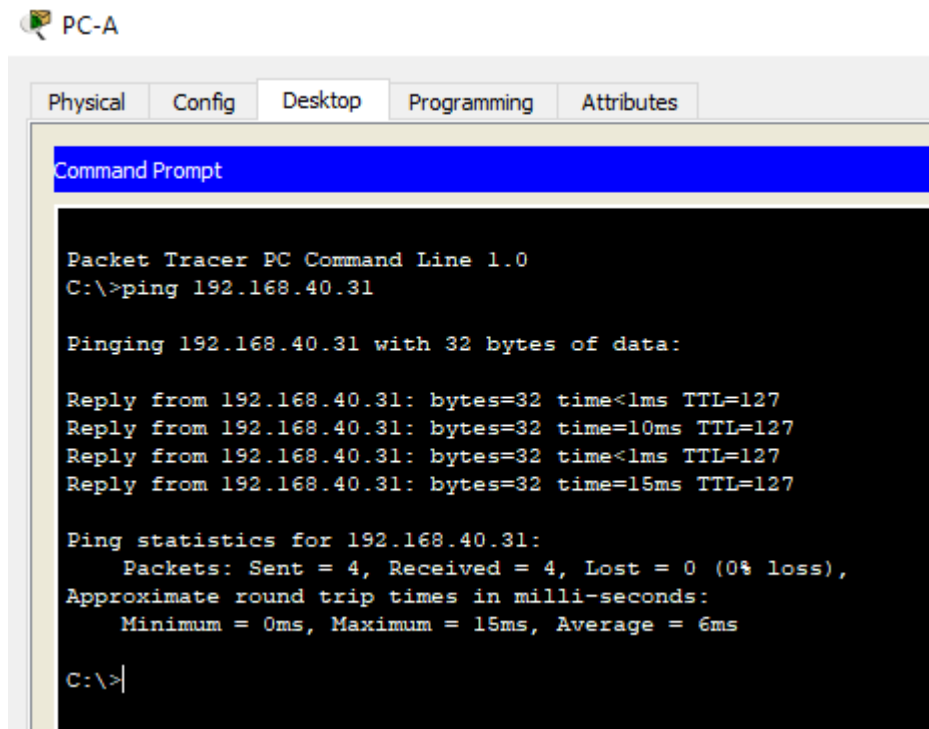
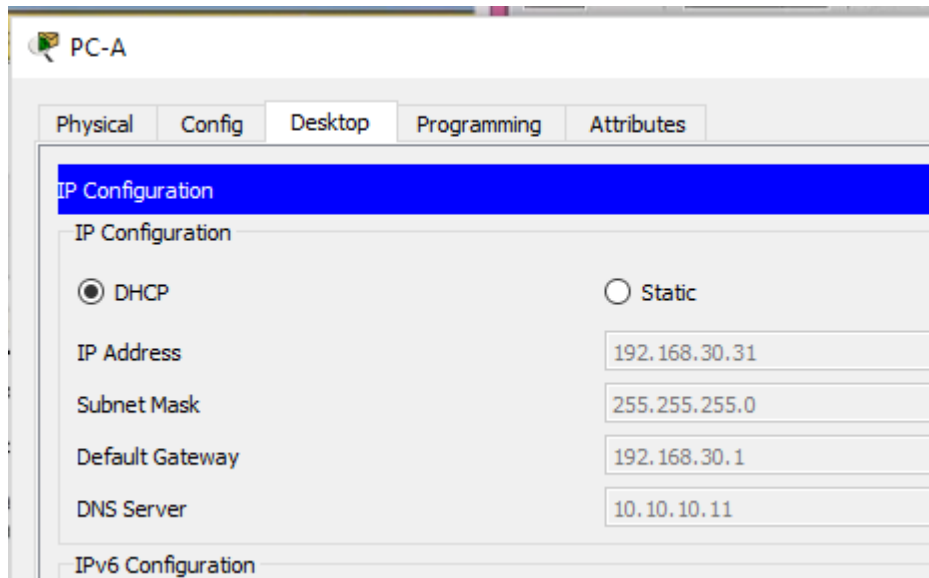
- Se hace ping desde S3 hacia 192.168.40.1 que es la interface g0/1.40



```
S3#
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 = 0/0/0
ms
```

Verificación de los hosts con DHCP



PC-C

Physical Config Desktop Programming Attributes

IP Configuration

IP Configuration

DHCP Static

IP Address 192.168.40.31

Subnet Mask 255.255.255.0

Default Gateway 192.168.40.1

DNS Server 10.10.10.11

IPv6 Configuration

PC-C

Physical Config Desktop Programming Attributes

Command Prompt

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.30.31

Pinging 192.168.30.31 with 32 bytes of data:

Request timed out.
Reply from 192.168.30.31: bytes=32 time=11ms TTL=127
Reply from 192.168.30.31: bytes=32 time<1ms TTL=127
Reply from 192.168.30.31: bytes=32 time=10ms TTL=127

Ping statistics for 192.168.30.31:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 11ms, Average = 7ms

C:\>|
```

Physical Config Desktop Programming Attributes

Web Browser

< > URL Go

Cisco Packet Tracer

Welcome to Cisco Packet Tracer. Opening doors to new opportunities. Mind Wide Open.

Quick Links:

- [A small page](#)
- [Copyrights](#)
- [Image page](#)
- [Image](#)

```
R1#telnet 172.31.21.1
Trying 172.31.21.1 ...OpenACCESO PROHIBIDO!

User Access Verification

Password:
R1>en
R1>enable
Password:
R1#
```

Ctrl+F6 to exit CLI focus Copy

R1

```
Physical Config CLI Attributes
IOS Command Line Interface
administratively down down
GigabitEthernet0/1/0 unassigned YES NVRAM
administratively down down
Vlan1 unassigned YES NVRAM
administratively down down
R1#telnet 172.31.21.1
Trying 172.31.21.1 ...OpenACCESO PROHIBIDO!

User Access Verification

Password:
R1>en
R1>enable
Password:
R1#telnet 172.31.21.2
Trying 172.31.21.2 ...OpenACCESO NO AUTORIZADO!

User Access Verification

Password:
R2>en
Password:
R2#
```

Ctrl+F6 to exit CLI focus Copy

- Se prueban las listas de acceso desde R1 hacia la PC de internet

```
R1#ping 209.165.200.230
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.165.200.230, timeout is 2
seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max =
1/3/12 ms
R1#
```

Ctrl+F6 to exit CLI focus Copy Paste

- Verificamos la conectividad desde PC1 hacia la PC de internet

PC-A

```
Physical  Config  Desktop  Programming  Attributes

Command Prompt

Pinging 209.165.200.230 with 32 bytes of data:

Reply from 209.165.200.230: bytes=32 time=3ms TTL=126
Reply from 209.165.200.230: bytes=32 time=1ms TTL=126
Reply from 209.165.200.230: bytes=32 time=1ms 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 = 3ms, Average = 1ms
```


Conclusiones

- Damos paso final a lo que concierne a nuestro diplomado de profundización donde logramos aprender cómo trabajan las redes de datos, su configuración y administración, un diplomado que marco nuestra carrera como ingenieros ya que en algún momento nos veremos involucrados de una u otra forma en la redes de datos.
- Se logró configurar una red básica para Pymes con protocolos de acceso, enrutamiento y niveles de seguridad en la red evitando algunos incidentes informáticos que se puedan presentar.
- Igualmente damos fin nuestro estudio en lo que fue esta gran y hermosa, sacrificada experiencia de estudiar en la universidad a distancia como fue la UNAD, y lograr ya el ultimo pasa más satisfactorio y hermoso la obtención de nuestro título de ingenieros.

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