PRUEBAS DE HABILIDADES CCNA

DIPLOMADO DE PROFUNDIZACIÓN CISCO

(DISEÑO E IMPLEMENTACIÓN DE SOLUCIONES INTEGRADAS LAN/WAN)

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DEDICATORIA

Agradezco primero a DIOS por la vida y por ser mi motivación diaria para culminar este diplomado y por darme fortaleza para continuar en los momentos que pensé en desistir. A mi familia por su apoyo incondicional y acompañamiento desinteresado para continuar el proceso de mi aprendizaje. A mis profesores por sus buenas enseñanzas, las cuales serán mis bases para implementarlas en mi profesión. Algunos de mis compañeros por su colaboración y ayuda en este proceso de aprendizaje. DIOS bendiga a todos los que hicieron posible que alcanzará otro triunfo y solo me queda manifestarle mi gratitud.

Contenido

Resumen

En este trabajo se hará la entrega de dos escenarios propuestos para el desarrollo de la fase final del diplomado en cisco, donde el primer escenario se debe desarrollar una red para una empresa que tiene varias sucursales, donde más adelante mostraremos el desarrollo completo de dicha red. Por otro lado, también se desarrolla una red con conexión a internet para una empresa donde se establecen unas reglas.

Abstract

This work will deliver two scenarios proposed for the development of the final phase of the diploma in Cisco, where the first scenario should develop a network for a company that has several branches, where later we will show the complete development of said network.
On the other hand, a network with internet connection is also developed for a company where rules are established.

Introducción

La "Prueba de habilidades prácticas", es el paso final en las actividades del Diplomado de Profundización CCNA, lo que identifica el alcance de competencia y habilidades obtenidas por el estudiante en el desarrollo del diplomado de profundización.

Dicho trabajo se realiza con el fin de demostrar y aplicar los conocimientos adquiridos al cursar el diplomado de CISCO, en el cual encontramos temas como la configuración en switches y routers, entre otros temas de gran importancia para afianzar nuestros conocimientos en networking

1. OBJETIVOS

1.1. Objetivo General:

Demostrar la capacidad de desarrollo de redes con diferentes especificaciones dadas por alguna empresa

1.2. Objetivos Específicos:

- Uso de la herramienta Cisco Packet Tracer.
- Elegir los dispositivos necesarios y adecuados para la topología de la red.
- Configurar el servidor DHCP.
- Configurar el direccionamiento IP acorde con la topología de red para cada dispositivo.
- Configurar las VLANs, puertos troncales y de acceso, parámetros de seguridad.
- Configurar seguridad de switches acorde con la topología de red.
- Comprobar la conectividad de los dispositivos de la red.
- Desarrollar el escenario 1 una red para una empresa que posee diferentes sucursales.
- Administrar una red, donde se configura todos los dispositivos propuestos en los escenarios
- Desarrollar el escenario 2 una red para una empresa con conexión a internet vía Ethernet.

2. ESCENARIO 1

Una empresa posee sucursales distribuidas en las ciudades de Bogotá, Medellín y Cali 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.

TOPOLOGIA

3 ROUTERS 2620Mx
3 SWITCHS 2960-24TT
1 SERVIDOR
5 COMPUTADORES

Topología de la red
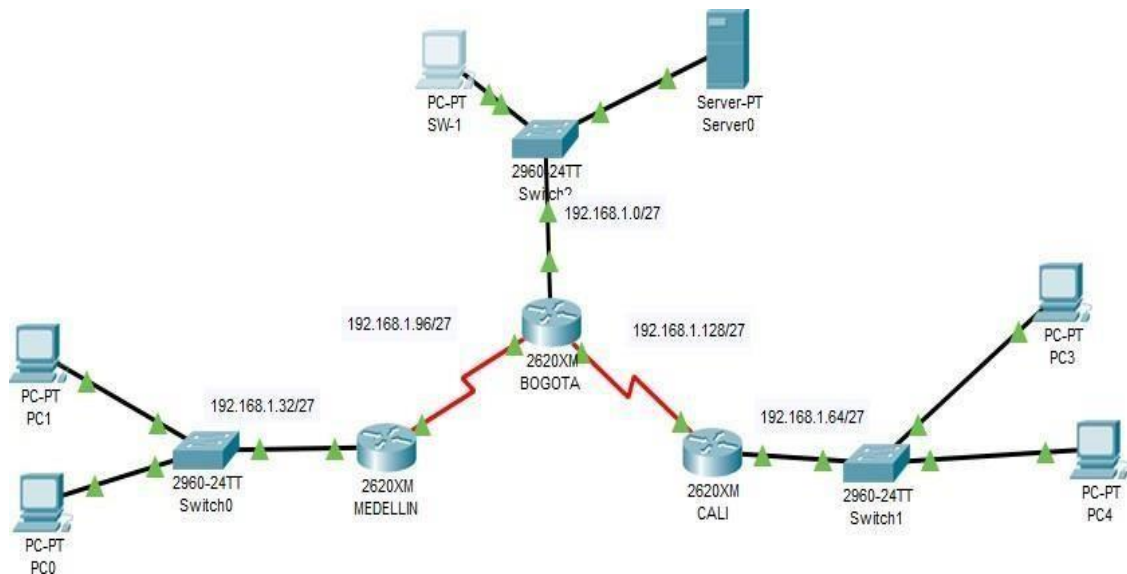
2.1.   Parte 1: Asignación de Direcciones IP Configuración Básica

Configuración de los routers con el comando ip route

BOGOTÁ
Router>ENABLE
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname
BOGOTA(config)#interface fastethernet 0/0
BOGOTA(config-if)#ip address 192.168.1.1 255.255.255.224
BOGOTA(config-if)#no shutdown
BOGOTA(config-if)#exit
BOGOTA(config)#interface serial 0/0
BOGOTA(config-if)#ip address 192.168.1.98 255.255.255.224
BOGOTA(config-if)#no shutdown
BOGOTA(config-if)#exit
BOGOTA(config)#interface serial0/1
BOGOTA(config-if)#ip address 192.168.1.130 255.255.255.224
BOGOTA(config-if)#no shutdown
%LINK-5-CHANGED: Interface Serial0/1, changed state to down
BOGOTA(config-if)#exit
BOGOTA(config)#end
BOGOTA#enable
BOGOTA#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#ip route 192.168.1.64 255.255.255.224 192.168.1.131
BOGOTA(config)#ip route 192.168.1.32 255.255.255.224 192.168.1.99
BOGOTA(config)#exit
BOGOTA#copy running-config startup-config Destination filename [startup-config]?
Building configuration...

MEDELLÍN
Router>enable
Router#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname
MEDELLIN(config)#interface fastethernet 0/0
MEDELLIN(config-if)#ip address 192.168.1.33 255.255.255.224
MEDELLIN(config-if)#no shutdown
MEDELLIN(config-if)#exit MEDELLIN(config)#interface s0/0
MEDELLIN(config-if)#ip address 192.168.1.99 255.255.255.224
MEDELLIN(config-if)#no shutdown
MEDELLIN(config-if)#
%LINK-5-CHANGED: Interface Serial0/0, changed state to up
MEDELLIN(config-if)#exit

MEDELLIN(config)#end

MEDELLIN#enable
MEDELLIN#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN(config)#ip route 192.168.1.0 255.255.255.224 192.168.1.97
MEDELLIN(config)#ip route 192.168.1.64 255.255.255.224 192.168.1.97
MEDELLIN(config)#exit
MEDELLIN#%SYS-5-CONFIG_I: Configured from console by console
MEDELLIN#copy running-config startup-config Destination filename [startup-config]?
Building configuration... [OK]
MEDELLIN#

CALI
Router>enable
Router#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname
CALI(config)#interface fastethernet0/0
CALI(config-if)#ip address 192.168.1.65 255.255.255.224
CALI(config-if)#no shutdown
CALI(config-if)#%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to
up
CALI(config-if)#exit
CALI(config)#interface s0/0
CALI(config-if)#ip address 192.168.1.131 255.255.255.224
CALI(config-if)#no shutdown
CALI(config-if)#
%LINK-5-CHANGED: Interface Serial0/0, changed state to up
CALI(config-if)#exit
CALI(config)#end
CALI#enable CALI#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
CALI(config)#ip route 192.168.1.0 255.255.255.224 192.168.1.129
CALI(config)#ip route 192.168.1.32 255.255.255.224 192.168.1.129
CALI(config)#exit
CALI#copy running-config startup-config Destination filename [startup-config]?
Building configuration... [OK]
CALI#

Asignación de direcciones IP Subneteo.

a. Se debe dividir (subnetear) la red creando una segmentación en ocho partes, para
   permitir crecimiento futuro de la red corporativa.

Tomo la red como se sugiere y la divido en 8 partes y cada parte en la red/27 con la
máscara de subred perteneciente a /27, que es 255.255.255.224:

192.168.1.0/27

192.168.1.32/27

192.168.1.64/27

192.168.1.96/27

192.168.1.128/27

192.168.1.160/27

192.168.1.192/27

192.168.1.224/27

b. Asignar una dirección IP a la red.

La dirección que se le da a la red es la siguiente: 192.168.1.0/24

Asignación de contraseñas en routers

```
BOGOTA>enable
BOGOTA#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#enable secret cisco
BOGOTA(config)#line consol 0
BOGOTA(config-line)#password luis
BOGOTA(config-line)#login
BOGOTA(config-line)#exit

MEDELLIN>enable
MEDELLIN#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN(config)#enable secret cisco
MEDELLIN(config)#line consol 0
MEDELLIN(config-line)#password luis
MEDELLIN(config-line)#login
MEDELLIN(config-line)#exit

CALI>enable
CALI#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
CALI(config)# enable secret cisco
CALI(config)#line consol 0
CALI(config-line)#password luis
CALI(config-line)#login
CALI(config-line)#exit
```

CONFIGURANDO LOS ROUTERS PARA EL LINE VTY 0 4

BOGOTA>enable Password:
BOGOTA#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#line vty 0 4
BOGOTA(config-line)#password cisco2
BOGOTA(config-line)#login
BOGOTA(config-line)#loggin synchronous
BOGOTA(config-line)#exit

MEDELLIN>enable Password:
MEDELLIN#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN(config)#line vty 0 4
MEDELLIN(config-line)#password cisco2
MEDELLIN(config-line)#login
MEDELLIN(config-line)#loggin synchronous
MEDELLIN(config-line)#exit

CALI>enable Password:
CALI#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
CALI(config)#line vty 0 4
CALI(config-line)#password cisco2
CALI(config-line)#login
CALI(config-line)#loggin synchrounous
CALI(config-line)#loggin synchronous
CALI(config-line)#exit

2.2. Parte 2: Configuración Básica.

a. Después de cargada la configuración en los dispositivos, verificar la tabla de enrutamiento en cada uno de los routers para comprobar las redes y sus rutas.

BOGOTA>enable Password:
BOGOTA#show ip route
Codes: C - connected, S - static, I - IGRP, 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 type2 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 192.168.1.0/27 is subnetted, 5 subnets
C 192.168.1.0 is directly connected, FastEthernet0/0
D 192.168.1.32 [90/2172416] via 192.168.1.99, 05:26:26, Serial0/0
D 192.168.1.64 [90/2172416] via 192.168.1.131, 05:26:23, Serial0/1

C 192.168.1.96 is directly connected, Serial0/0 C 192.168.1.128 is directly connected, Serial0/1

MEDELLIN>enable Password:
MEDELLIN#show ip route
Codes: C - connected, S - static, I - IGRP, 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 type2 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

192.168.1.0/27 is subnetted, 5 subnets
D 192.168.1.0 [90/2172416] via 192.168.1.98, 05:31:25, Serial0/0
C 192.168.1.32 is directly connected, FastEthernet0/0
D 192.168.1.64 [90/2684416] via 192.168.1.98, 05:31:22, Serial0/0
C 192.168.1.96 is directly connected, Serial0/0
D 192.168.1.128 [90/2681856] via 192.168.1.98, 05:31:25, Serial0/0

CALI>enable Password:
CALI#show ip route
Codes: C - connected, S - static, I - IGRP, 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 type2 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 192.168.1.0/27 is subnetted, 5 subnets
D 192.168.1.0 [90/2172416] via 192.168.1.130, 05:32:24, Serial0/0
D 192.168.1.32 [90/2684416] via 192.168.1.130, 05:32:24, Serial0/0
C 192.168.1.64 is directly connected, FastEthernet0/0
D 192.168.1.96 [90/2681856] via 192.168.1.130, 05:32:24, Serial0/0
C 192.168.1.128 is directly connected, Serial0/0

b. Verificar el balanceo de carga que presentan los routers.

MEDELLIN

MEDELLIN>enable Password:
MEDELLIN#show ip eigrp topology

IP-EIGRP Topology Table for AS 1/ID(192.168.1.99)

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply, r - Reply status

P 192.168.1.0/27, 1 successors, FD is 2172416 via 192.168.1.98 (2172416/28160), Serial0/0
P 192.168.1.32/27, 1 successors, FD is 28160 via Connected, FastEthernet0/0
P 192.168.1.64/27, 1 successors, FD is 2684416 via 192.168.1.98 (2684416/2172416), Serial0/0
P 192.168.1.96/27, 1 successors, FD is 2169856 via Connected, Serial0/0
P 192.168.1.128/27, 1 successors, FD is 2681856 via 192.168.1.98 (2681856/2169856), Serial0/0
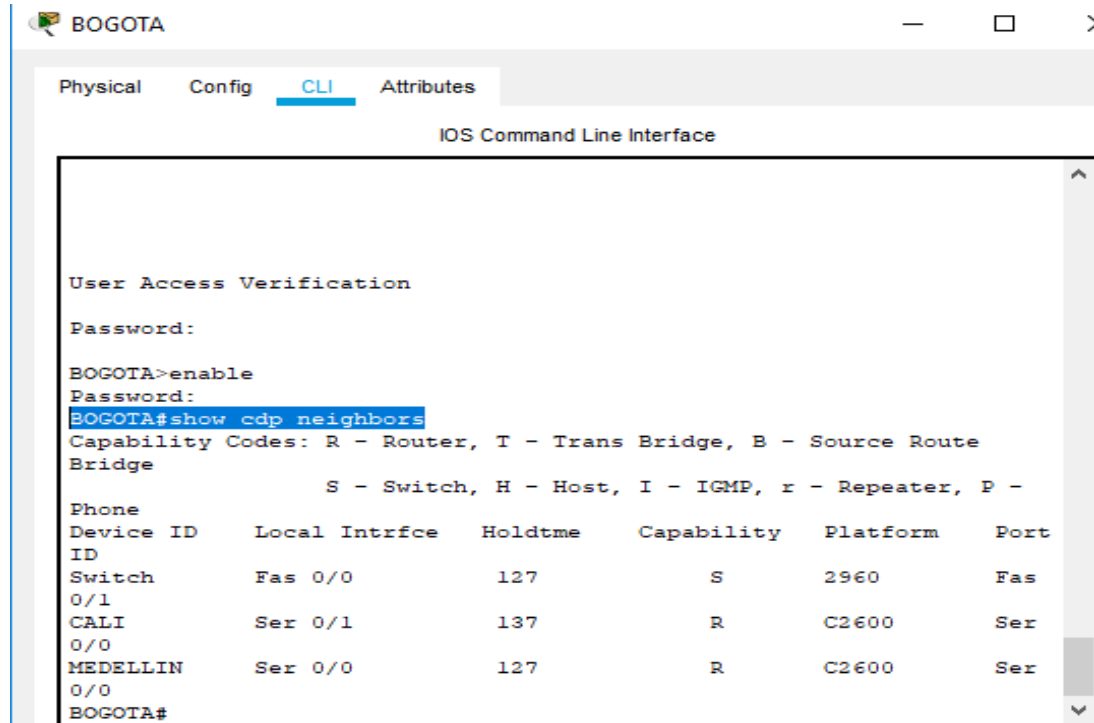

BOGOTA

BOGOTA>enable Password:
BOGOTA#show ip eigrp topology
IP-EIGRP Topology Table for AS 1/ID(192.168.1.130)
Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply, r - Reply status
P 192.168.1.0/27, 1 successors, FD is 28160 via Connected, FastEthernet0/0
P 192.168.1.32/27, 1 successors, FD is 2172416 via 192.168.1.99 (2172416/28160), Serial0/0
P 192.168.1.64/27, 1 successors, FD is 2172416 via 192.168.1.131 (2172416/28160), Serial0/1
P 192.168.1.96/27, 1 successors, FD is 2169856 via Connected, Serial0/0
P 192.168.1.128/27, 1 successors, FD is 2169856 via Connected, Serial0/1

CALI
CALI>enable Password:
CALI#show ip eigrp topology
IP-EIGRP Topology Table for AS 1/ID(192.168.1.131)
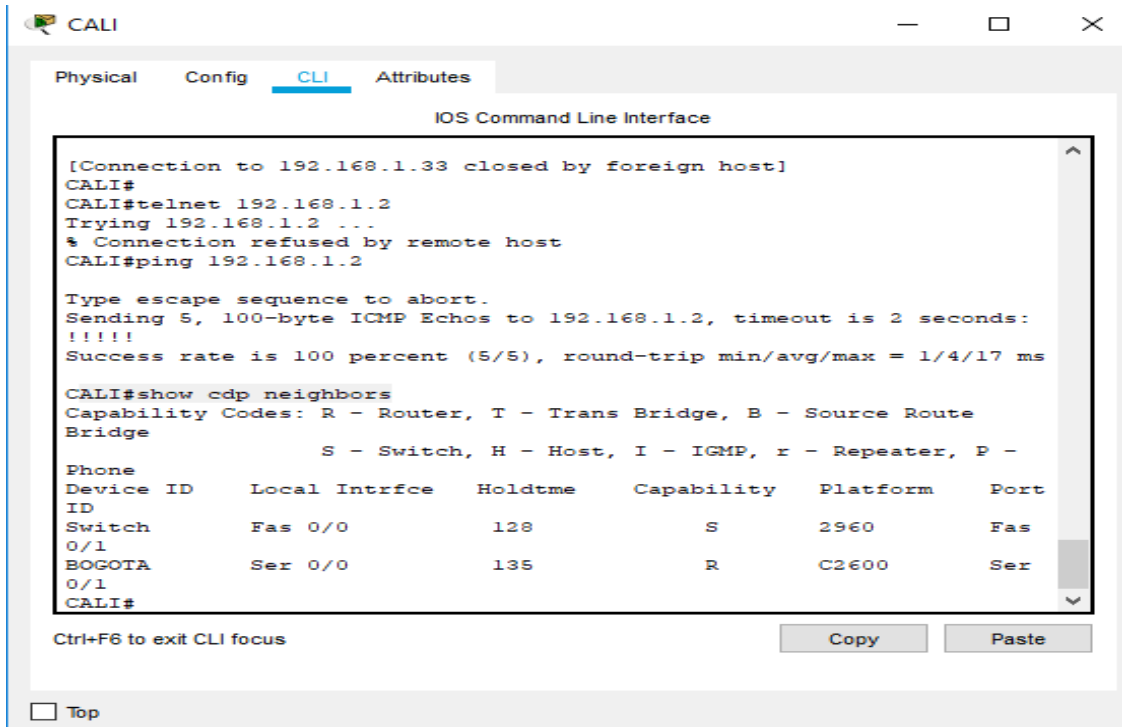Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply, r - Reply status
P 192.168.1.0/27, 1 successors, FD is 2172416 via 192.168.1.130 (2172416/28160), Serial0/0
P 192.168.1.32/27, 1 successors, FD is 2684416 via 192.168.1.130 (2684416/2172416), Serial0/0
P 192.168.1.64/27, 1 successors, FD is 28160 via Connected, FastEthernet0/0
P 192.168.1.96/27, 1 successors, FD is 2681856 via 192.168.1.130 (2681856/2169856), Serial0/0
P 192.168.1.128/27, 1 successors, FD is 2169856 via Connected, Serial0/0

c. Realizar un diagnóstico de vecinos usando el comando cdp.

d. Realizar una prueba de conectividad en cada tramo de la ruta usando Ping. ping de Cali a Bogotá.
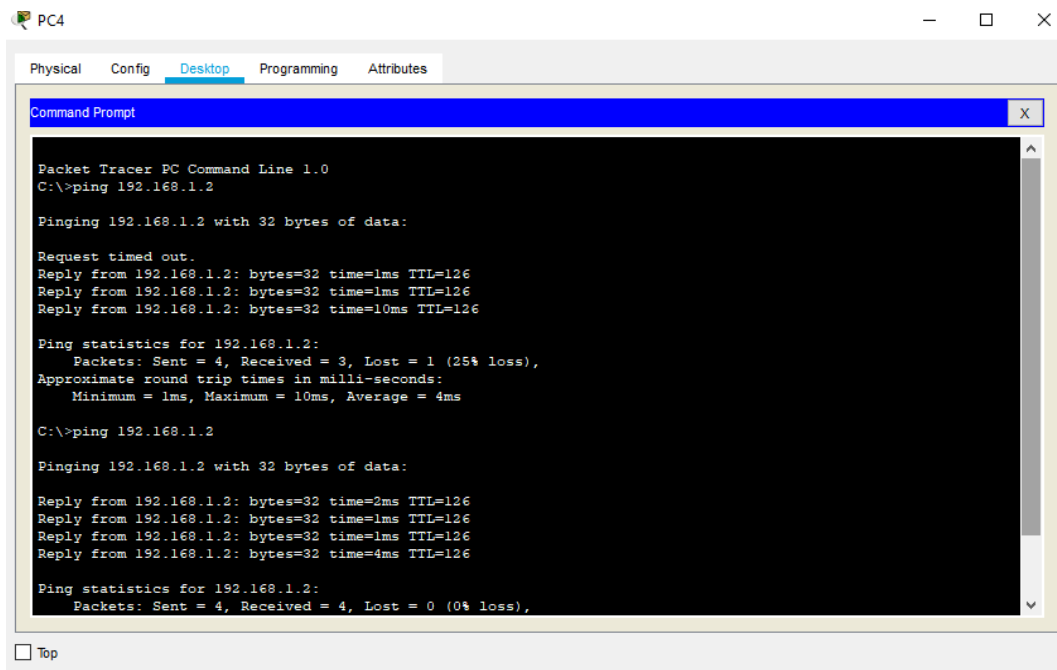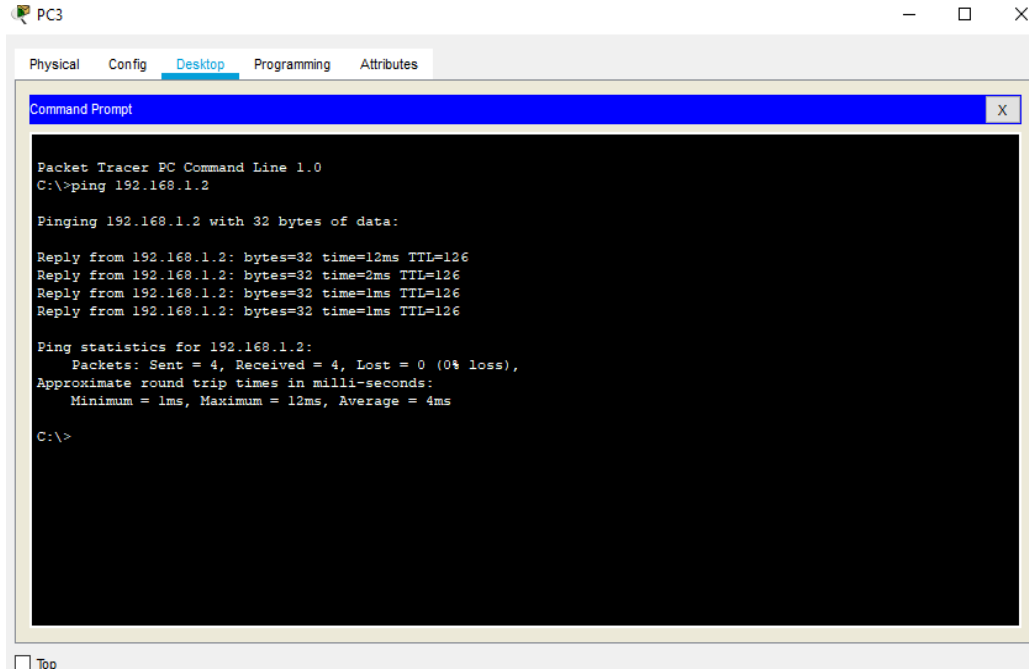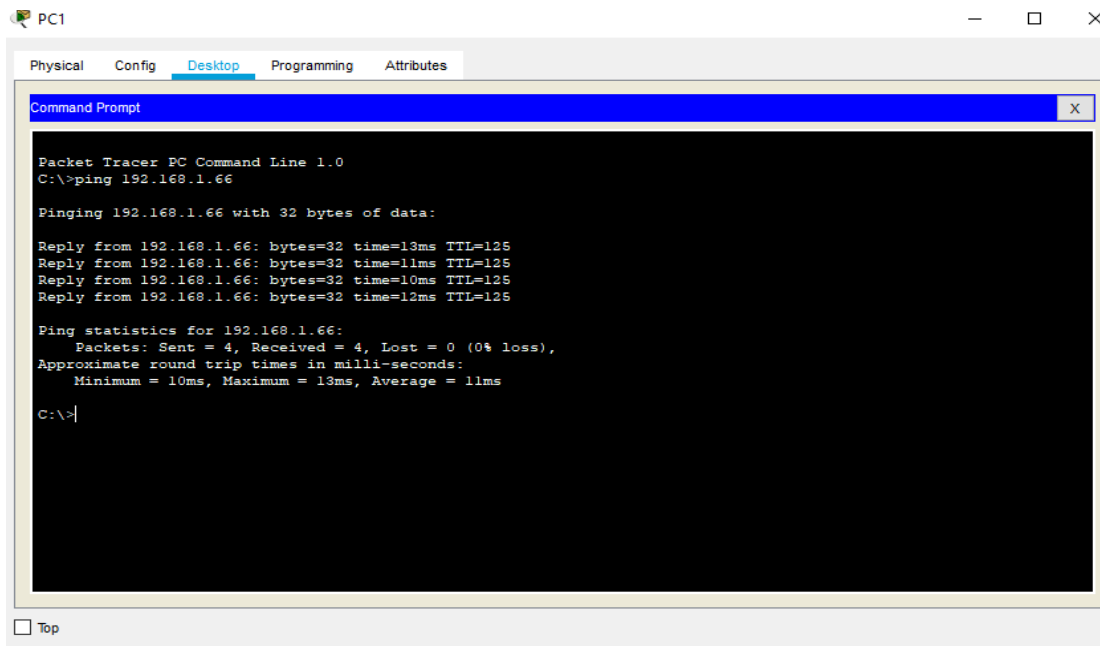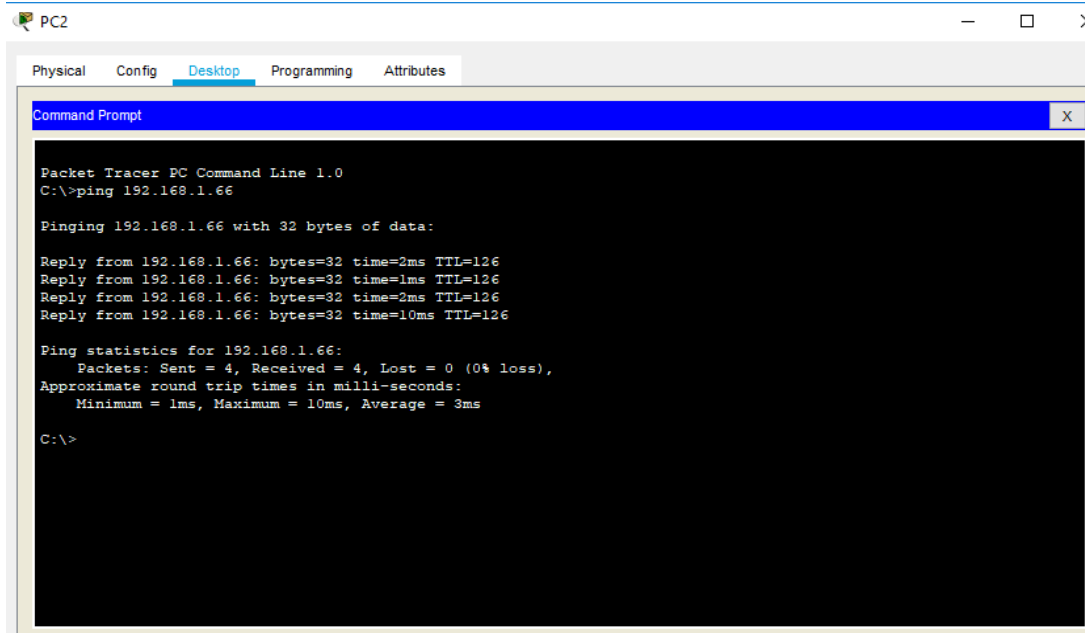
PC3 — □ ✕

Physical | Config | Desktop | Programming | Attributes

Command Prompt — X

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time=12ms TTL=126
Reply from 192.168.1.2: bytes=32 time=2ms TTL=126
Reply from 192.168.1.2: bytes=32 time=1ms TTL=126
Reply from 192.168.1.2: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 12ms, Average = 4ms

C:\>
```

☐ Top

Medellín a Cali

PC1 — □ ✕

Physical | Config | Desktop | Programming | Attributes

Command Prompt — X

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.66

Pinging 192.168.1.66 with 32 bytes of data:

Reply from 192.168.1.66: bytes=32 time=13ms TTL=125
Reply from 192.168.1.66: bytes=32 time=11ms TTL=125
Reply from 192.168.1.66: bytes=32 time=10ms TTL=125
Reply from 192.168.1.66: bytes=32 time=12ms TTL=125

Ping statistics for 192.168.1.66:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 10ms, Maximum = 13ms, Average = 11ms

C:\>
```

☐ Top

Medellín a Bogotá

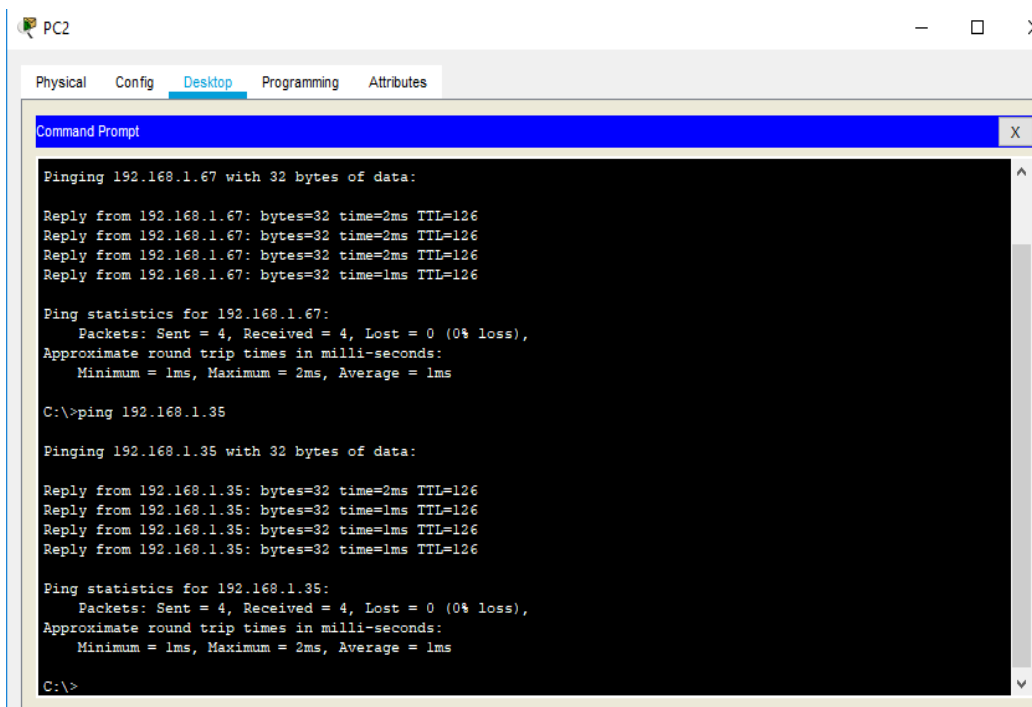Bogotá a Cali

Bogotá a Medellín

```
C:\>ping 192.168.1.35

Pinging 192.168.1.35 with 32 bytes of data:

Reply from 192.168.1.35: bytes=32 time=2ms TTL=126
Reply from 192.168.1.35: bytes=32 time=1ms TTL=126
Reply from 192.168.1.35: bytes=32 time=1ms TTL=126
Reply from 192.168.1.35: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.1.35:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\>
```

2.3.   Parte 3: Configuración de Enrutamiento.

Asignar el protocolo de enrutamiento EIGRP a los routers considerando el
direccionamiento diseñado.
BOGOTA>enable
BOGOTA#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#router eigrp 200
BOGOTA(config-router)#no auto-summary
BOGOTA(config-router)#network 192.168.1.96
BOGOTA(config-router)#network 192.168.1.0
BOGOTA(config-router)#network 192.168.1.128
BOGOTA(config-router)#end

MEDELLIN>ENABLE
MEDELLIN#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN(config)#router eigrp 200
MEDELLIN(config-router)#no auto-summary
MEDELLIN(config-router)#network 192.168.1.32
Router(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 192.168.1.98 (Serial0/0) is up: new
adjacency
MDELLIN(config-router)#network 192.168.1.32
MEDELLIN(config-router)#network 192.168.1.96
MEDELLIN(config-router)#end

CALI>enable
CALI#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
CALI(config)#router eigrp 200
CALI(config-router)#no auto-summary
CALI(config-router)#network 192.168.1.128
Router(config-router)#%DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 192.168.1.130
(Serial0/0) is up:

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new adjacency
CALI(config-router)#network 192.168.1.128
CALI(config-router)#network 192.168.1.64
CALI(config-router)#end
CALI#

a. Verificar si existe vecindad con los routers configurados con EIGRP.

MEDELLIN>enable Password:
MEDELLIN#show ip eigrp neighbors IP-EIGRP neighbors for process 200
H Address Interface Hold Uptime SRTT RTO Q Seq
(sec) (ms) Cnt Num
0 192.168.1.98 Se0/0 13 00:08:19 40 1000 0 8
CALI>enable Password:
CALI#show ip eigrp neighbors
IP-EIGRP neighbors for process 200
H Address Interface Hold Uptime SRTT RTO Q Seq (sec) (ms) Cnt Num
0 192.168.1.98 Se0/0 13 00:08:19 40 1000 0 8

BOGOTA>enable Password:
BOGOTA#show ip eigrp neighbors IP-EIGRP neighbors for process 200
H Address Interface Hold Uptime SRTT RTO Q Seq (sec) (ms) Cnt Num
0 192.168.1.131 Se0/1 13 00:06:44 40 1000 0 7
192.168.1.99   e0/0 10 00:06:43 40 1000 0 7

b. Realizar la comprobación de las tablas de enrutamiento en cada uno de los routers para verificar cada una de las rutas establecidas.
MEDELLIN>enable Password:
MEDELLIN>show ip route
Codes: C - connected, S - static, I - IGRP, 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 type2 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

192.168.1.0/27 is subnetted, 5 subnets
D 192.168.1.0 [90/2172416] via 192.168.1.98, 00:11:32, Serial0/0
C 192.168.1.32 is directly connected, FastEthernet0/0
D 192.168.1.64 [90/2684416] via 192.168.1.98, 00:11:32, Serial0/0
C 192.168.1.96 is directly connected, Serial0/0
D 192.168.1.128 [90/2681856] via 192.168.1.98, 00:11:32, Serial0/0

BOGOTA>enable
BOGOTA#show ip route
Codes: C - connected, S - static, I - IGRP, 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 type2 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 192.168.1.0/27 is subnetted, 5 subnets
C 192.168.1.0 is directly connected, FastEthernet0/0
D 192.168.1.32 [90/2172416] via 192.168.1.99, 00:13:26, Serial0/0
D 192.168.1.64 [90/2172416] via 192.168.1.131, 00:13:28, Serial0/1
C 192.168.1.96 is directly connected, Serial0/0 C 192.168.1.128 is directly connected, Serial0/1
CALI>enable Password:
CALI#show ip route
Codes: C - connected, S - static, I - IGRP, 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

192.168.1.0/27 is subnetted, 5 subnets
D 192.168.1.0 [90/2172416] via 192.168.1.130, 00:14:20, Serial0/0
D 192.168.1.32 [90/2684416] via 192.168.1.130, 00:14:18, Serial0/0
C 192.168.1.64 is directly connected, FastEthernet0/0
D 192.168.1.96 [90/2681856] via 192.168.1.130, 00:14:18, Serial0/0
C 192.168.1.128 is directly connected, Serial0/0

c. Realizar un diagnóstico para comprobar que cada uno de los puntos de la red se puedan ver y tengan conectividad entre sí. Realizar esta prueba desde un host de la red LAN del router CALI, primero a la red de MEDELLIN y luego al servidor.

PC4

Physical | Config | Desktop | Programming | Attributes

Command Prompt

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.34

Pinging 192.168.1.34 with 32 bytes of data:

Reply from 192.168.1.34: bytes=32 time=13ms TTL=125
Reply from 192.168.1.34: bytes=32 time=13ms TTL=125
Reply from 192.168.1.34: bytes=32 time=11ms TTL=125
Reply from 192.168.1.34: bytes=32 time=12ms TTL=125

Ping statistics for 192.168.1.34:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 11ms, Maximum = 13ms, Average = 12ms
```

```
C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

Reply from 192.168.1.3: bytes=32 time=2ms TTL=126
Reply from 192.168.1.3: bytes=32 time=1ms TTL=126
Reply from 192.168.1.3: bytes=32 time=10ms TTL=126
Reply from 192.168.1.3: bytes=32 time=10ms TTL=126

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 10ms, Average = 5ms
```

2.4. Parte 4: Configuración de las listas de Control de Acceso.

Configuración de las acl

Esto es para permitir solo acceso hacia el servidor
MEDELLIN>enable
Password:
MEDELLIN#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN(config)#ip access-list extended ServerPT
MEDELLIN(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.3 0.0.0.0
MEDELLIN(config-ext-nacl)#exit
MEDELLIN(config)#interface fa0/0

22

MEDELLIN(config-if)#ip access-group ServerPT in
MEDELLIN(config-if)#end

CALI>enable Password:
CALI#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
CALI(config)#ip access-list extended ServerPT
CALI(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.3 0.0.0.0
CALI(config-ext-nacl)#exit
CALI(config)#int fa0/0
CALI(config-if)#ip access-group ServerPT in
CALI(config-if)#end

BOGOTA>enable Password:

BOGOTA#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#ip access-list extended ServerPT
BOGOTA(config-ext-nacl)#permit ip 192.168.1.3 0.0.0.0 0.0.0.0 255.255.255.255
BOGOTA(config-ext-nacl)#exit
BOGOTA(config)#interface fa0/0
BOGOTA(config-if)#ip access-group ServerPT in
BOGOTA(config-if)#end

MEDELLIN>enable Password:
MEDELLIN#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN(config)#ip access-list extended ServerPT
MEDELLIN(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.33 0.0.0.0
MEDELLIN(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.98 0.0.0.0
MEDELLIN(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255   192.168.1.131 0.0.0.0
MEDELLIN(config-ext-nacl)#end

BOGOTA

BOGOTA#config terminal
Enter configuration commands, one per line. End with CNTL/Z. BOGOTA(config)#ip
access-list extended ServerPT
BOGOTA(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.99 0.0.0.0
BOGOTA(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.1 0.0.0.0
BOGOTA(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.131 0.0.0.0
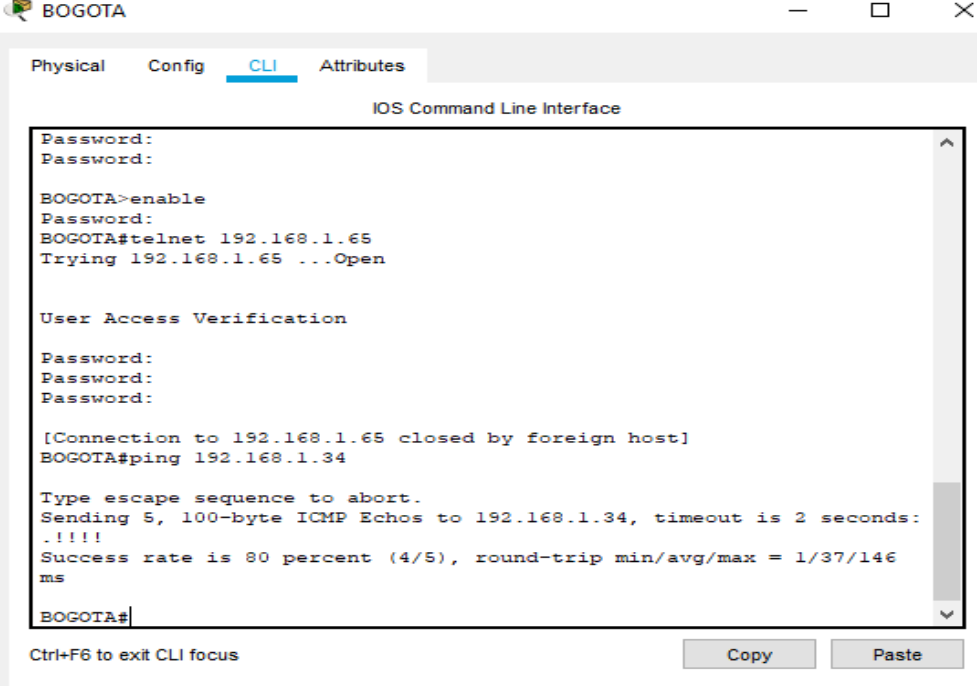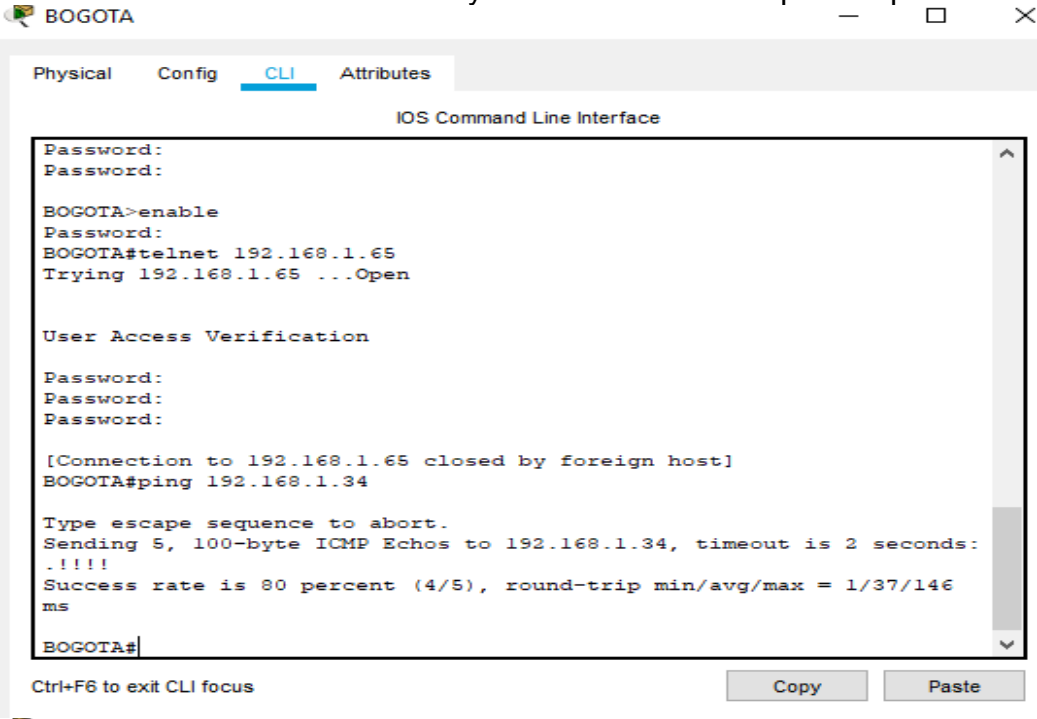BOGOTA(config-ext-nacl)#end

CALI>enable Password:
Password:
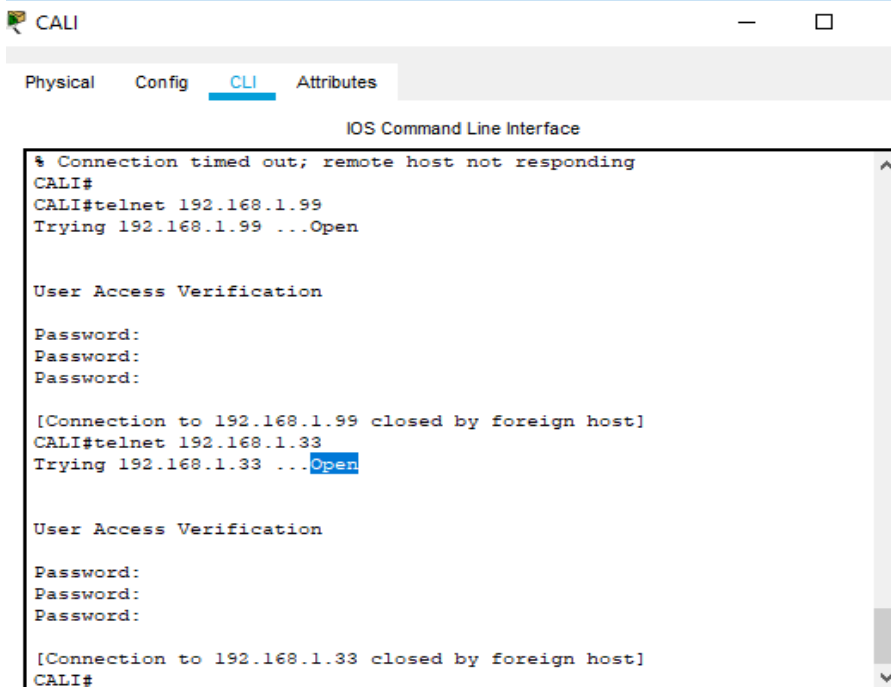CALI#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
CALI(config)#ip access-list extended ServerPT
CALI(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.99 0.0.0.0
CALI(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.1 0.0.0.0

CALI(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.65 0.0.0.0
CALI(config-ext-nacl)#end Cada router debe estar habilitado para establecer conexiones
Telnet con los demás routers y tener acceso a cualquier dispositivo en la red.

BOGOTA — □ ×

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
Password:
Password:

BOGOTA>enable
Password:
BOGOTA#telnet 192.168.1.65
Trying 192.168.1.65 ...Open


User Access Verification

Password:
Password:
Password:

[Connection to 192.168.1.65 closed by foreign host]
BOGOTA#ping 192.168.1.34

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.34, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 1/37/146
ms

BOGOTA#
```

Ctrl+F6 to exit CLI focus   Copy   Paste

BOGOTA — □ ×

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
Password:
Password:

BOGOTA>enable
Password:
BOGOTA#telnet 192.168.1.65
Trying 192.168.1.65 ...Open


User Access Verification

Password:
Password:
Password:

[Connection to 192.168.1.65 closed by foreign host]
BOGOTA#ping 192.168.1.34

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.34, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 1/37/146
ms

BOGOTA#
```

Ctrl+F6 to exit CLI focus   Copy   Paste

BOGOTA — □ ✕

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
[Connection to 192.168.1.65 closed by foreign host]
BOGOTA#
BOGOTA#telnet 192.168.1.65
Trying 192.168.1.65 ...Open

User Access Verification

Password:
Password:
Password:

[Connection to 192.168.1.65 closed by foreign host]
BOGOTA#telnet 192.168.1.33
Trying 192.168.1.33 ...Open

User Access Verification

Password:
Password:
Password:

[Connection to 192.168.1.33 closed by foreign host]
BOGOTA#
```

Ctrl+F6 to exit CLI focus   Copy   Paste

☐ Top

CALI — □ ✕

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
% Connection timed out; remote host not responding
CALI#
CALI#telnet 192.168.1.99
Trying 192.168.1.99 ...Open

User Access Verification

Password:
Password:
Password:

[Connection to 192.168.1.99 closed by foreign host]
CALI#telnet 192.168.1.33
Trying 192.168.1.33 ...Open

User Access Verification

Password:
Password:
Password:

[Connection to 192.168.1.33 closed by foreign host]
CALI#
```

a. El equipo WS1 y el servidor se encuentran en la subred de administración. Solo el servidor de la subred de administración debe tener acceso a cualquier otro dispositivo en cualquier parte de la red.

MEDELLIN>enable Password:
MEDELLIN#config terminal
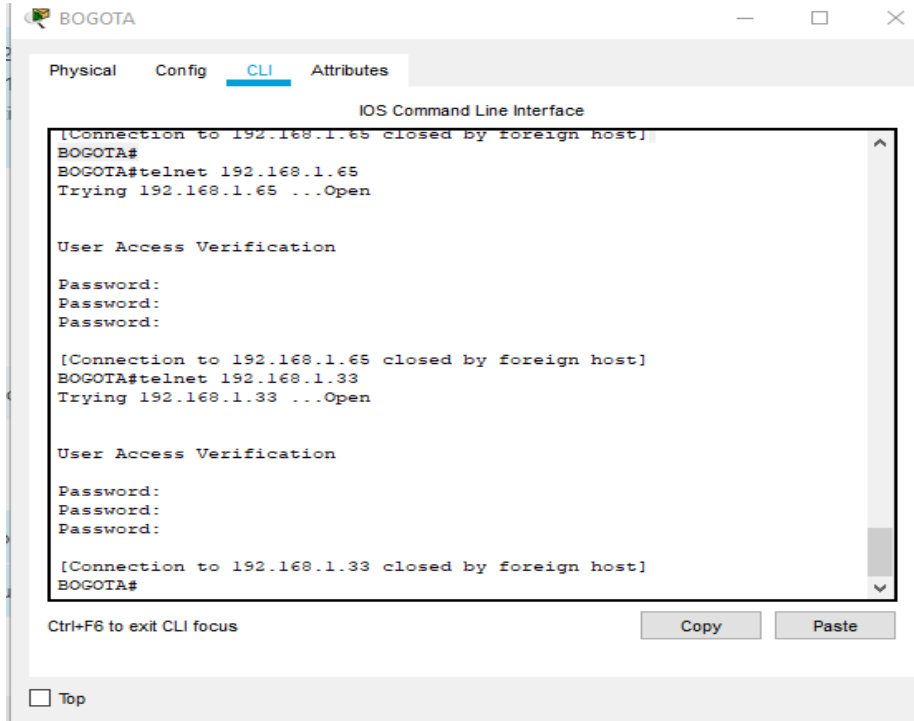Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN(config)#ip access-list extended ServerPT
MEDELLIN(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.33 0.0.0.0
MEDELLIN(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.98 0.0.0.0
MEDELLIN(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.131 0.0.0.0
MEDELLIN(config-ext-nacl)#end

BOGOTA#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#ip access-list extended ServerPT
BOGOTA(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.99 0.0.0.0
BOGOTA(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.1 0.0.0.0

BOGOTA(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.131 0.0.0.0
BOGOTA(config-ext-nacl)#end

CALI>enable Password:
Password:
CALI#config terminal
Enter configuration commands, one per line. End with CNTL/Z. CALI(config)#ip access-list extended ServerPT
CALI(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.99 0.0.0.0
CALI(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.1 0.0.0.0
CALI(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.65 0.0.0.0
CALI(config-ext-nacl)#end

b. Las estaciones de trabajo en las LAN de MEDELLÍN y CALI no deben tener acceso a ningún dispositivo fuera de su subred, excepto para interconectar con el servidor.

MEDELLIN>enable Password:
MEDELLIN#config terminal
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN(config)#ip access-list extended ServerPT
MEDELLIN(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.3 0.0.0.0
MEDELLIN(config-ext-nacl)#exit MEDELLIN(config)#int f0/0
MEDELLIN(config-if)#ip access-group ServerPT in MEDELLIN(config-if)#end

CALI>enable Password:
CALI#config t
Enter configuration commands, one per line. End with CNTL/Z.
CALI(config)#ip access-list extended ServerPT
CALI(config-ext-nacl)#permit ip 0.0.0.0 255.255.255.255 192.168.1.3 0.0.0.0

CALI(config-ext-nacl)#exit
CALI(config)#int f0/0
CALI(config-if)#ip access-group ServerPT in
CALI(config-if)#end

2.5.   Parte 5: Comprobación de la red instalada.

a. Se debe probar que la configuración de las listas de acceso fue exitosa.

MEDELLIN#
MEDELLIN#show Access-list Extended IP access list ServerPT 10 permit ip any host
192.168.1.3
20 permit ip any host 192.168.1.33
30 permit ip any host 192.168.1.98
40 permit ip any host 192.168.1.131

BOGOTA>enable Password: BOGOTA#show access-list
Extended IP access list ServerPT 10 permit ip host 192.168.1.3 any
20 permit ip any host 192.168.1.99
30 permit ip any host 192.168.1.1
40 permit ip any host 192.168.1.131

CALI>enable Password:
CALI#show access-list
Extended IP access list ServerPT 10 permit ip any host 192.168.1.3
20 permit ip any host 192.168.1.99
30 permit ip any host 192.168.1.1
40 permit ip any host 192.168.1.65

a. Comprobar y Completar la siguiente tabla de condiciones de prueba para confirmar el óptimo funcionamiento de la red.

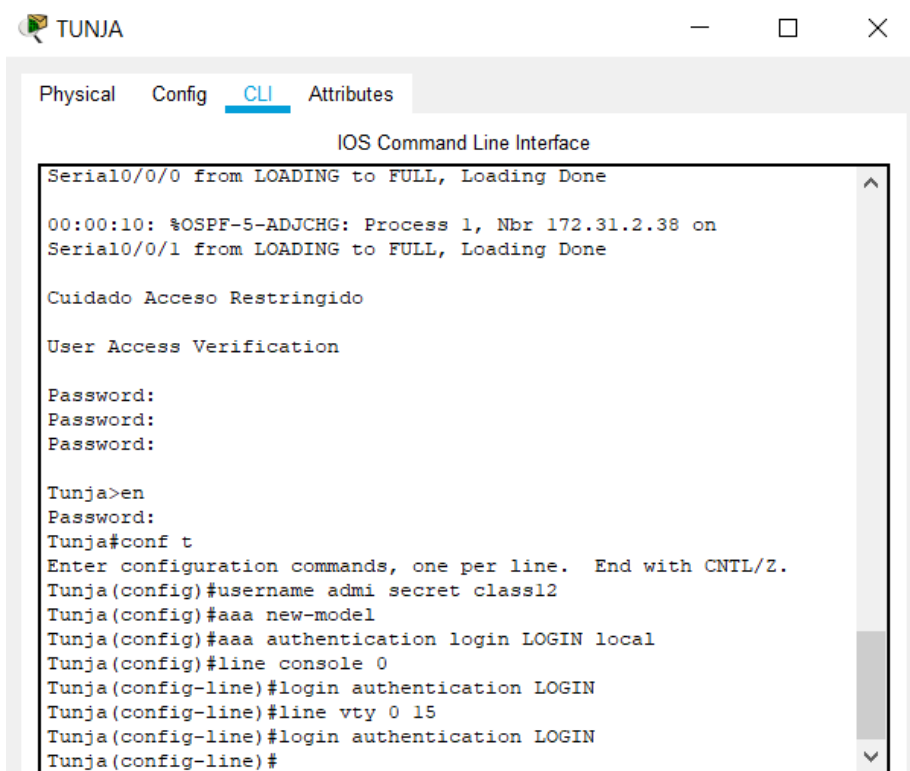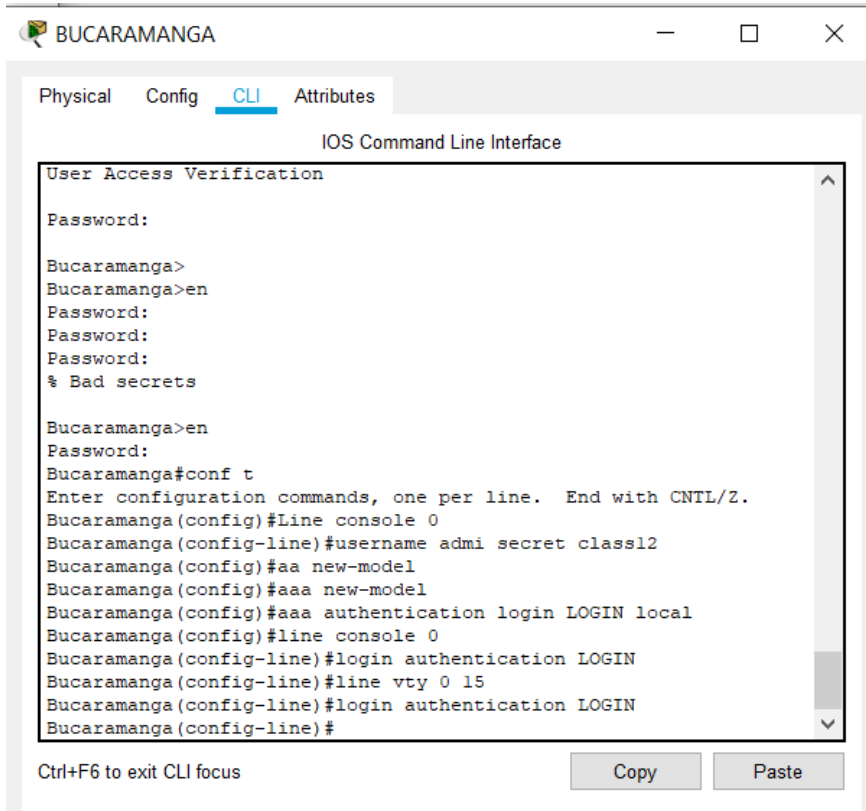|	ORIGEN	DESTINO	RESULTADO
TELNET	**Router MEDELLIN**	**Router CALI**	ok
	WS_1	**Router BOGOTA**	ok
	Servidor	**Router CALI**	ok
	Servidor	**Router MEDELLIN**	ok
TELNET	**LAN del Router MEDELLIN**	**Router CALI**	falla
	LAN del Router CALI	**Router CALI**	ok
	LAN del Router MEDELLIN	**Router MEDELLIN**	ok
	LAN del Router CALI	**Router MEDELLIN**	falla
PING	**LAN del Router CALI**	**WS_1**	falla
	LAN del Router MEDELLIN	**WS_1**	falla
	LAN del Router MEDELLIN	**LAN del Router CALI**	falla
PING	**LAN del Router CALI**	**Servidor**	ok
	LAN del Router MEDELLIN	**Servidor**	ok
	Servidor	**LAN del Router MEDELLIN**	ok
	Servidor	**LAN del Router CALI**	ok
	Router CALI	**LAN del Router MEDELLIN**	ok
	Router MEDELLIN	**LAN del Router CALI**	ok

3. ESCENARIO 2

Una empresa tiene la conexión a internet en una red Ethernet, lo cual deben adaptarlo para facilitar que sus routers y las redes que incluyen puedan, por esa vía, conectarse a internet, pero empleando las direcciones de la red LAN original.
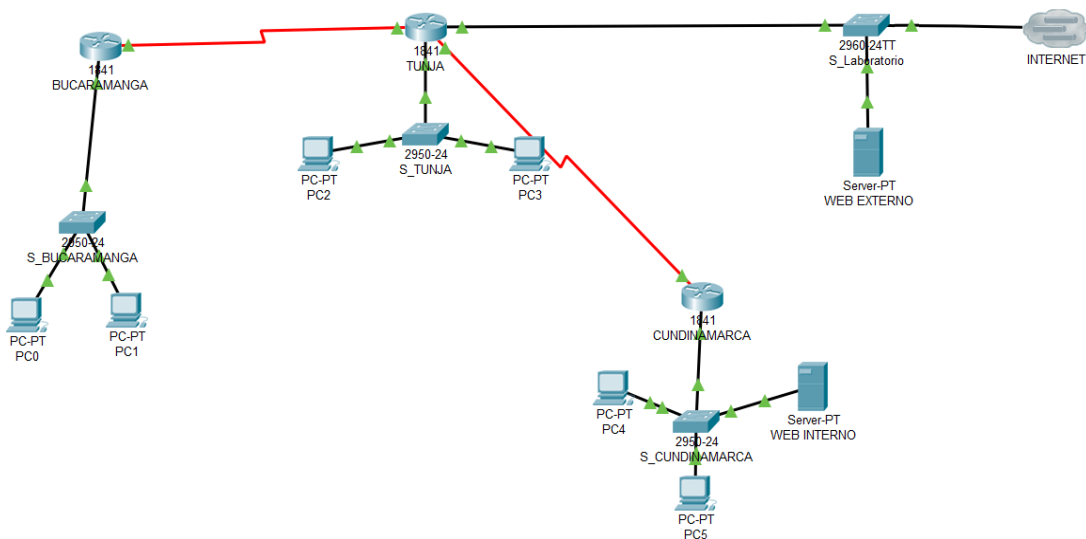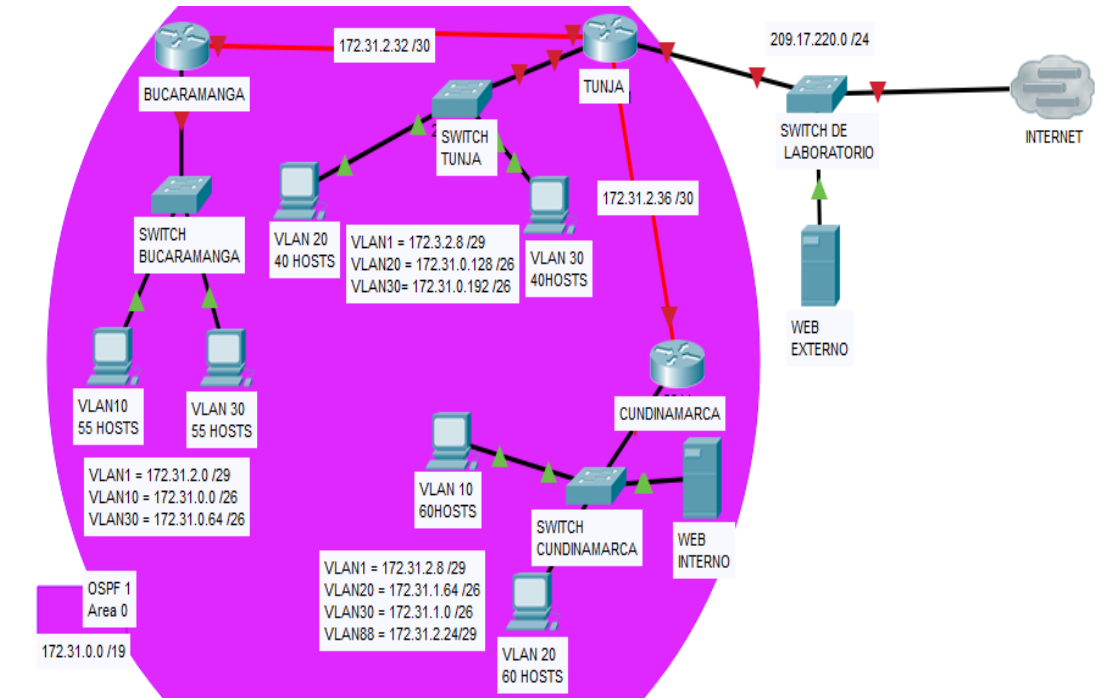
Desarrollo

Los siguientes son los requerimientos necesarios:

1. Todos los routers deberán tener los siguiente:
   - Configuración básica.
   - Autenticación local con AAA.

BUCARAMANGA — IOS Command Line Interface

```
User Access Verification

Password:

Bucaramanga>
Bucaramanga>en
Password:
Password:
Password:
% Bad secrets

Bucaramanga>en
Password:
Bucaramanga#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Bucaramanga(config)#Line console 0
Bucaramanga(config-line)#username admi secret class12
Bucaramanga(config)#aa new-model
Bucaramanga(config)#aaa new-model
Bucaramanga(config)#aaa authentication login LOGIN local
Bucaramanga(config)#line console 0
Bucaramanga(config-line)#login authentication LOGIN
Bucaramanga(config-line)#line vty 0 15
Bucaramanga(config-line)#login authentication LOGIN
Bucaramanga(config-line)#
```

Ctrl+F6 to exit CLI focus   Copy   Paste

TUNJA — IOS Command Line Interface

```
Serial0/0/0 from LOADING to FULL, Loading Done

00:00:10: %OSPF-5-ADJCHG: Process 1, Nbr 172.31.2.38 on
Serial0/0/1 from LOADING to FULL, Loading Done

Cuidado Acceso Restringido

User Access Verification

Password:
Password:
Password:

Tunja>en
Password:
Tunja#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Tunja(config)#username admi secret class12
Tunja(config)#aaa new-model
Tunja(config)#aaa authentication login LOGIN local
Tunja(config)#line console 0
Tunja(config-line)#login authentication LOGIN
Tunja(config-line)#line vty 0 15
Tunja(config-line)#login authentication LOGIN
Tunja(config-line)#
```

CUNDINAMARCA — □ ✕

Physical　Config　CLI　Attributes

IOS Command Line Interface

```
00:00:10: %OSPF-5-ADJCHG: Process 1, Nbr 209.165.220.1 on
Serial0/0/0 from LOADING to FULL, Loading Done

Cuidado Acceso Restringido

User Access Verification

Password:

Cundinamarca>en
Password:
Password:
Password:
Cundinamarca#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Cundinamarca(config)#username admi secret class12
Cundinamarca(config)#aaa new-model
Cundinamarca(config)#aaa authentication login LOGIN local
Cundinamarca(config)#line console 0
Cundinamarca(config-line)#login authentication LOGIN
Cundinamarca(config-line)#line vty 0 15
Cundinamarca(config-line)#login authentication LOGIN
Cundinamarca(config-line)#
```
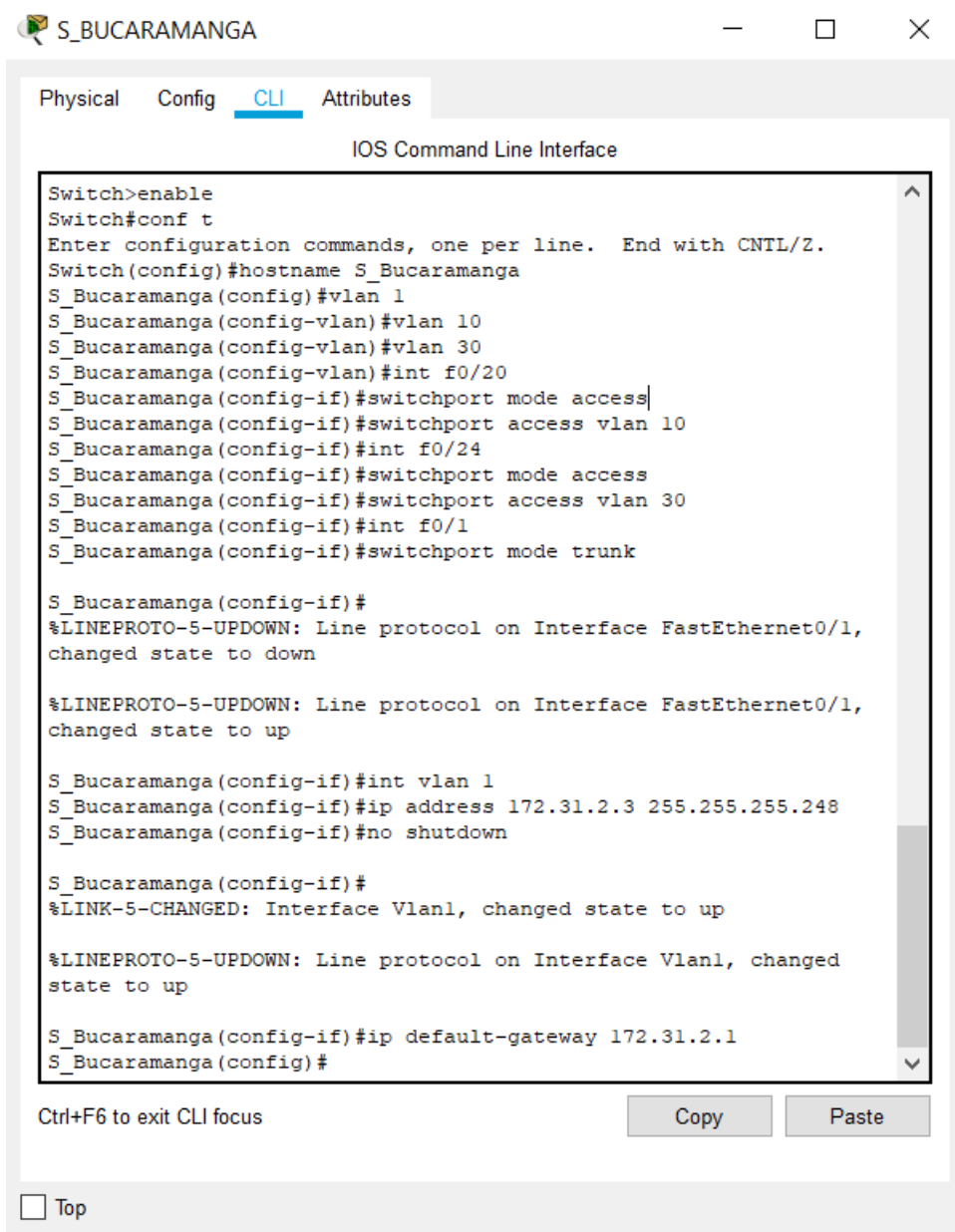
Switch Cundinamarca

S_BUCARAMANGA   —   □   ×

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
Switch>enable
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname S_Bucaramanga
S_Bucaramanga(config)#vlan 1
S_Bucaramanga(config-vlan)#vlan 10
S_Bucaramanga(config-vlan)#vlan 30
S_Bucaramanga(config-vlan)#int f0/20
S_Bucaramanga(config-if)#switchport mode access
S_Bucaramanga(config-if)#switchport access vlan 10
S_Bucaramanga(config-if)#int f0/24
S_Bucaramanga(config-if)#switchport mode access
S_Bucaramanga(config-if)#switchport access vlan 30
S_Bucaramanga(config-if)#int f0/1
S_Bucaramanga(config-if)#switchport mode trunk

S_Bucaramanga(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1,
changed state to down

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

S_Bucaramanga(config-if)#int vlan 1
S_Bucaramanga(config-if)#ip address 172.31.2.3 255.255.255.248
S_Bucaramanga(config-if)#no shutdown

S_Bucaramanga(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed
state to up

S_Bucaramanga(config-if)#ip default-gateway 172.31.2.1
S_Bucaramanga(config)#
```
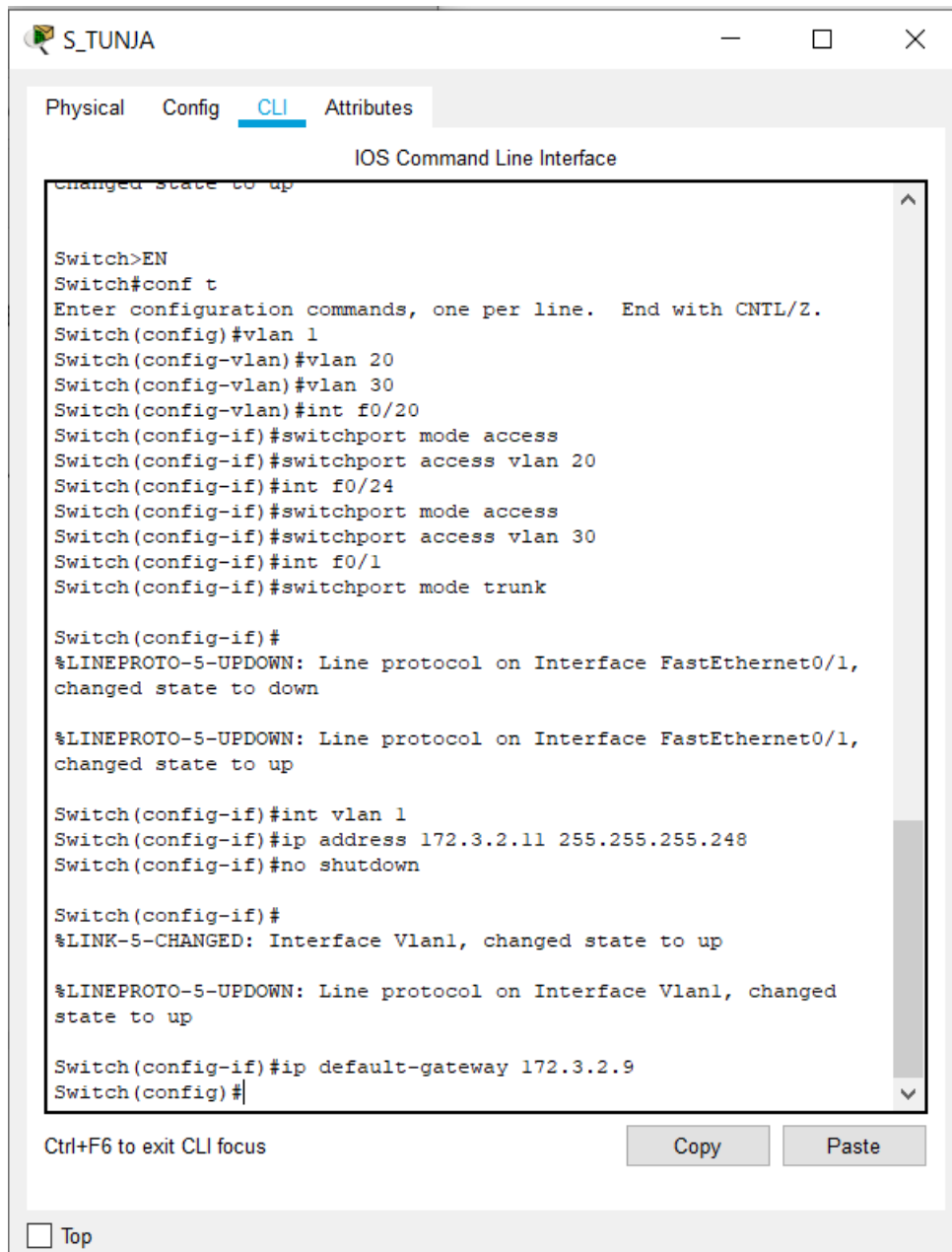
Ctrl+F6 to exit CLI focus   Copy   Paste

☐ Top

Switch>enable
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname S_Bucaramanga
S_Bucaramanga(config)#vlan 1
S_Bucaramanga(config-vlan)#vlan 10
S_Bucaramanga(config-vlan)#vlan 30
S_Bucaramanga(config-vlan)#int f0/20
S_Bucaramanga(config-if)#switchport mode access
S_Bucaramanga(config-if)#switchport access vlan 10
S_Bucaramanga(config-if)#int f0/24
S_Bucaramanga(config-if)#switchport mode access
S_Bucaramanga(config-if)#switchport access vlan 30
S_Bucaramanga(config-if)#int f0/1

S_Bucaramanga(config-if)#switchport mode trunk

S_Bucaramanga(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down

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

S_Bucaramanga(config-if)#int vlan 1
S_Bucaramanga(config-if)#ip address 172.31.2.3 255.255.255.248
S_Bucaramanga(config-if)#no shutdown

S_Bucaramanga(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

S_Bucaramanga(config-if)#ip default-gateway 172.31.2.1
S_Bucaramanga(config)#

Switch Tunja

Switch>EN
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 1
Switch(config-vlan)#vlan 20
Switch(config-vlan)#vlan 30
Switch(config-vlan)#int f0/20
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 20
Switch(config-if)#int f0/24
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 30

Switch(config-if)#int f0/1
Switch(config-if)#switchport mode trunk

Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
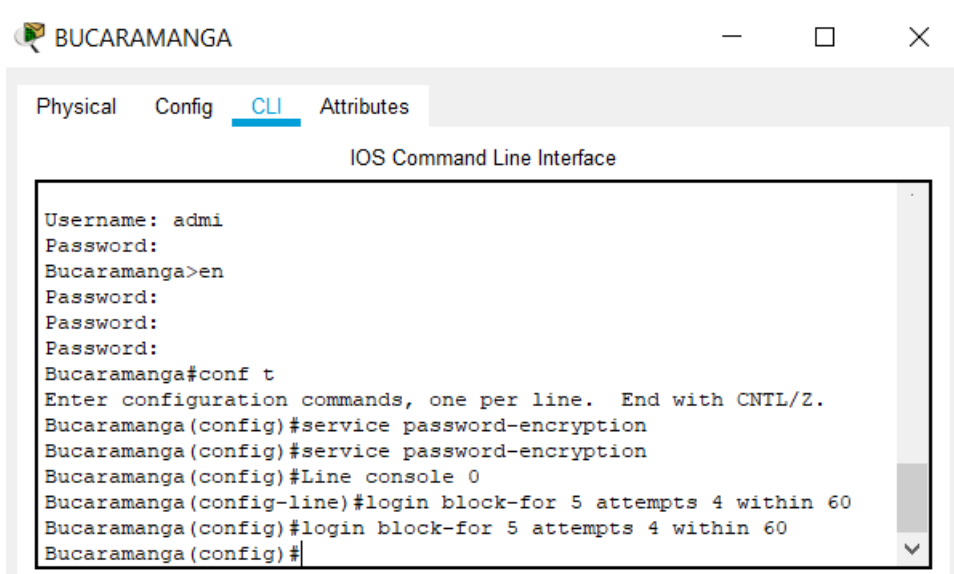
Switch(config-if)#int vlan 1
Switch(config-if)#ip address 172.3.2.11 255.255.255.248
Switch(config-if)#no shutdown
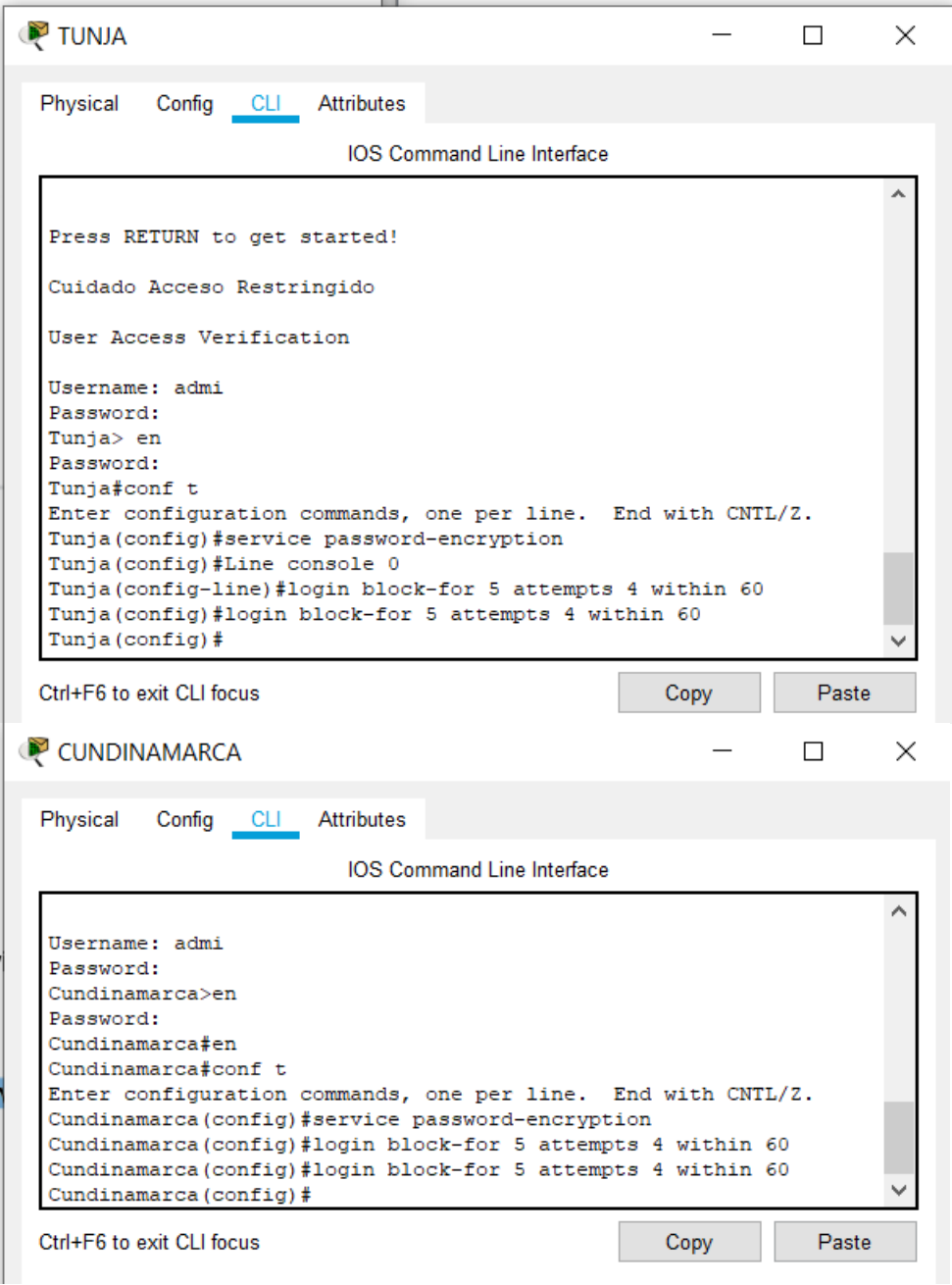
Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

Switch(config-if)#ip default-gateway 172.3.2.9
Switch(config)#

- Cifrado de contraseñas.
- Un máximo de internos para acceder al router.
- Máximo tiempo de acceso al detectar ataques.
- Establezca un servidor TFTP y almacene todos los archivos necesarios de los routers.

BUCARAMANGA   — □ ✕

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
Username: admi
Password:
Bucaramanga>en
Password:
Password:
Password:
Bucaramanga#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Bucaramanga(config)#service password-encryption
Bucaramanga(config)#service password-encryption
Bucaramanga(config)#Line console 0
Bucaramanga(config-line)#login block-for 5 attempts 4 within 60
Bucaramanga(config)#login block-for 5 attempts 4 within 60
Bucaramanga(config)#
```

TUNJA — IOS Command Line Interface

```
Press RETURN to get started!

Cuidado Acceso Restringido

User Access Verification

Username: admi
Password:
Tunja> en
Password:
Tunja#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Tunja(config)#service password-encryption
Tunja(config)#Line console 0
Tunja(config-line)#login block-for 5 attempts 4 within 60
Tunja(config)#login block-for 5 attempts 4 within 60
Tunja(config)#
```

Ctrl+F6 to exit CLI focus

CUNDINAMARCA — IOS Command Line Interface

```
Username: admi
Password:
Cundinamarca>en
Password:
Cundinamarca#en
Cundinamarca#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Cundinamarca(config)#service password-encryption
Cundinamarca(config)#login block-for 5 attempts 4 within 60
Cundinamarca(config)#login block-for 5 attempts 4 within 60
Cundinamarca(config)#
```

Ctrl+F6 to exit CLI focus

Servidor TFTP

WEB EXTERNO

Physical   Config   Services   Desktop   Programming   Attributes

SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP

TFTP

Service	◉ On	◯ Off

File

asa842-k8.bin
asa923-k8.bin
c1841-advipservicesk9-mz.124-15.T1.bin
c1841-ipbase-mz.123-14.T7.bin
c1841-ipbasek9-mz.124-12.bin
c1900-universalk9-mz.SPA.155-3.M4a.bin
c2600-advipservicesk9-mz.124-15.T1.bin
c2600-i-mz.122-28.bin
c2600-ipbasek9-mz.124-8.bin
c2800nm-advipservicesk9-mz.124-15.T1.bin
c2800nm-advipservicesk9-mz.151-4.M4.bin
c2800nm-ipbase-mz.123-14.T7.bin
c2800nm-ipbasek9-mz.124-8.bin
c2900-universalk9-mz.SPA.155-3.M4a.bin
c2950-i6q4l2-mz.121-22.EA4.bin
c2950-i6q4l2-mz.121-22.EA8.bin
c2960-lanbase-mz.122-25.FX.bin
c2960-lanbase-mz.122-25.SEE1.bin

Remove File

Router Bucaramanga

Router>EN
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#Hostname Bucaramanga
Bucaramanga(config)#no ip domain-lookup
Bucaramanga(config)#banner motd #Cuidado Acceso Restringido#
Bucaramanga(config)#enable secret class123
Bucaramanga(config)#line console 0

Bucaramanga(config-line)#password cisco123
Bucaramanga(config-line)#login
Bucaramanga(config-line)#logging synchronous
Bucaramanga(config-line)#line vty 0 15
Bucaramanga(config-line)#password cisco123
Bucaramanga(config-line)#login
Bucaramanga(config-line)#logging synchronous
Bucaramanga(config-line)#int f0/0.1
Bucaramanga(config-subif)#encapsulation dot1q 1
Bucaramanga(config-subif)#ip address 172.31.2.1 255.255.255.248
Bucaramanga(config-subif)#int f0/0.10
Bucaramanga(config-subif)#encapsulation dot1q 10
Bucaramanga(config-subif)#ip address 172.31.0.1 255.255.255.192
Bucaramanga(config-subif)#int f0/0.30
Bucaramanga(config-subif)#encapsulation dot1q 30
Bucaramanga(config-subif)#ip address 172.31.0.65 255.255.255.192
Bucaramanga(config-subif)#int f0/0
Bucaramanga(config-if)#no shutdown

Bucaramanga(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0.1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.1, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0.10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.10, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0.30, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.30, changed state to up

Bucaramanga(config-if)#int s0/0/0
Bucaramanga(config-if)#ip address 172.31.2.34 255.255.255.252
Bucaramanga(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
Bucaramanga(config-if)#router ospf 1
Bucaramanga(config-router)#network 172.31.0.0 0.0.0.63 area 0
Bucaramanga(config-router)#network 172.31.0.64 0.0.0.63 area 0
Bucaramanga(config-router)#network 172.31.2.0 0.0.0.7 area 0
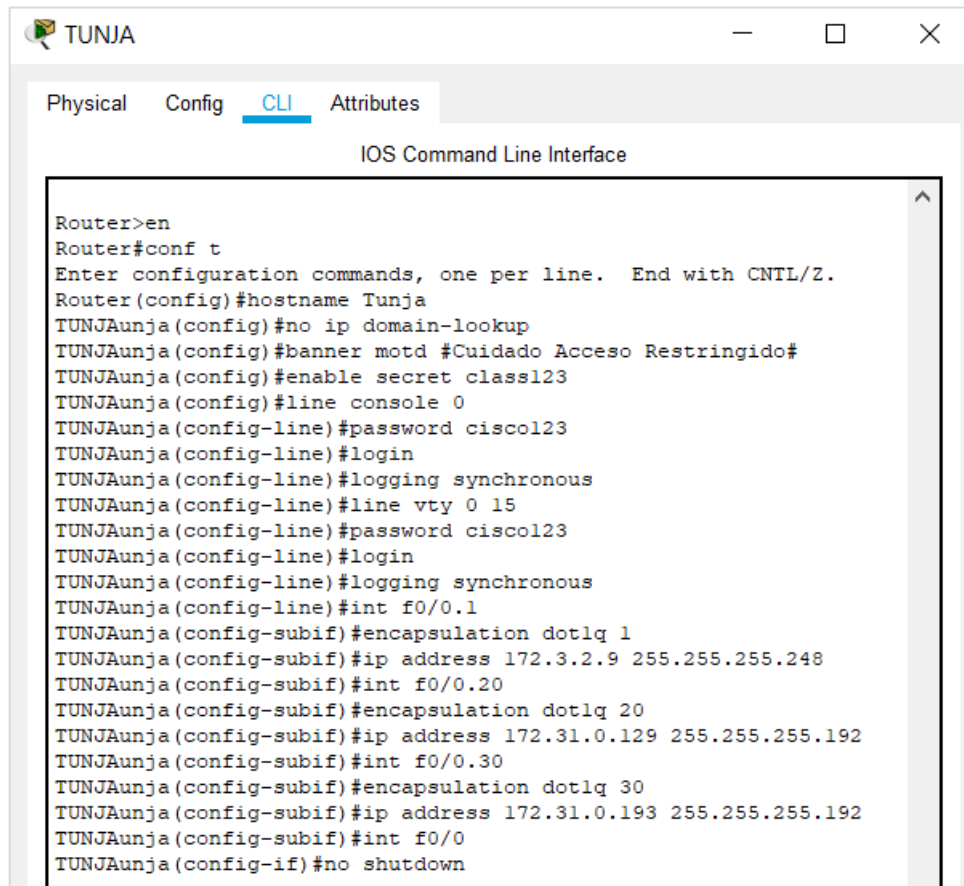Bucaramanga(config-router)#network 172.31.2.32 0.0.0.3 area 0
Bucaramanga(config-router)#end

Bucaramanga#
%SYS-5-CONFIG_I: Configured from console by console

Bucaramanga#

Router Tunja

```
TUNJAunja(config-if)#int s0/0/0
TUNJAunja(config-if)#ip address 172.31.2.33 255.255.255.252
TUNJAunja(config-if)#no shutdown

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

TUNJAunja(config-if)#int s0/0/1
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0,
changed state to up

TUNJAunja(config-if)#int s0/0/1
TUNJAunja(config-if)#ip address 172.31.2.37 255.255.255.252
TUNJAunja(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
TUNJAunja(config-if)#int f0/1
TUNJAunja(config-if)#ip address 209.165.220.1 255.255.255.0
TUNJAunja(config-if)#no shutdown

TUNJAunja(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

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

TUNJAunja(config-if)#router ospf 1
TUNJAunja(config-router)#network 172.3.2.8 0.0.0.7 area 0
TUNJAunja(config-router)#network 172.31.0.128 0.0.0.63 area 0
TUNJAunja(config-router)#network 172.31.0.192 0.0.0.63 area 0
TUNJAunja(config-router)#network 172.31.2.32 0.0.0.3 area 0
TUNJAunja(config-router)#network 172.31.2.36 0.0.0.3 area 0
TUNJAunja(config-router)#
00:05:52: %OSPF-5-ADJCHG: Process 1, Nbr 172.31.2.34 on
Serial0/0/0 from LOADING to FULL, Loading Done

TUNJAunja(config-router)#end
TUNJAunja#
%SYS-5-CONFIG_I: Configured from console by console

TUNJAunja#
```

Ctrl+F6 to exit CLI focus   Copy   Paste

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname TUNJA
TUNJA(config)#no ip domain-lookup
TUNJA(config)#banner motd #Cuidado Acceso Restringido#
TUNJA(config)#enable secret class123
TUNJA(config)#line console 0
TUNJA(config-line)#password cisco123
TUNJA(config-line)#login
TUNJA(config-line)#logging synchronous
TUNJA(config-line)#line vty 0 15
TUNJA(config-line)#password cisco123
TUNJA(config-line)#login
TUNJA(config-line)#logging synchronous
TUNJA(config-line)#int f0/0.1
TUNJA(config-subif)#encapsulation dot1q 1

41

TUNJA(config-subif)#ip address 172.3.2.9 255.255.255.248
TUNJA(config-subif)#int f0/0.20
TUNJA(config-subif)#encapsulation dot1q 20
TUNJA(config-subif)#ip address 172.31.0.129 255.255.255.192
TUNJA(config-subif)#int f0/0.30
TUNJA(config-subif)#encapsulation dot1q 30
TUNJA(config-subif)#ip address 172.31.0.193 255.255.255.192
TUNJA(config-subif)#int f0/0
TUNJA(config-if)#no shutdown

TUNJA(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0.1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.1, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0.20, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.20, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0.30, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.30, changed state to up

TUNJA(config-if)#int s0/0/0
TUNJA(config-if)#ip address 172.31.2.33 255.255.255.252
TUNJA(config-if)#no shutdown

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

TUNJA(config-if)#int s0/0/1
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

TUNJA(config-if)#int s0/0/1
TUNJA(config-if)#ip address 172.31.2.37 255.255.255.252
TUNJA(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
TUNJA(config-if)#int f0/1
TUNJA(config-if)#ip address 209.165.220.1 255.255.255.0
TUNJA(config-if)#no shutdown

TUNJA(config-if)#

%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

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

TUNJA(config-if)#router ospf 1
TUNJA(config-router)#network 172.3.2.8 0.0.0.7 area 0
TUNJA(config-router)#network 172.31.0.128 0.0.0.63 area 0
TUNJA(config-router)#network 172.31.0.192 0.0.0.63 area 0
TUNJA(config-router)#network 172.31.2.32 0.0.0.3 area 0
TUNJA(config-router)#network 172.31.2.36 0.0.0.3 area 0
TUNJA(config-router)#
00:05:52: %OSPF-5-ADJCHG: Process 1, Nbr 172.31.2.34 on Serial0/0/0 from LOADING to FULL, Loading Done

TUNJA(config-router)#end
TUNJA#
%SYS-5-CONFIG_I: Configured from console by console

TUNJA#
TUNJA#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
TUNJA(config)#hostname Tunja
Tunja(config)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up

Router Cundinamarca

```
CUNDINAMARCA                                    —    □    ×

Physical    Config    CLI    Attributes

                    IOS Command Line Interface

Router>EN
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname Cundinamarca
Cundinamarca(config)#no ip domain-lookup
Cundinamarca(config)#banner motd #Cuidado Acceso Restringido#
Cundinamarca(config)#enable secret class123
Cundinamarca(config)#line console 0
Cundinamarca(config-line)#password cisco12
Cundinamarca(config-line)#login
Cundinamarca(config-line)#logging synchronous
Cundinamarca(config-line)#line vty 0 15
Cundinamarca(config-line)#password cisco12
Cundinamarca(config-line)#login
Cundinamarca(config-line)#logging synchronous
Cundinamarca(config-line)#int f0/0.1
Cundinamarca(config-subif)#encapsulation dotlq 1
Cundinamarca(config-subif)#ip address 172.31.2.9 255.255.255.248
Cundinamarca(config-subif)#int f0/0.20
Cundinamarca(config-subif)#encapsulation dotlq 20
Cundinamarca(config-subif)#ip address 172.31.1.65 255.255.255.192
Cundinamarca(config-subif)#int f0/0.30
Cundinamarca(config-subif)#encapsulation dotlq 30
Cundinamarca(config-subif)#ip address 172.31.1.1 255.255.255.192
Cundinamarca(config-subif)#int f0/0.88
Cundinamarca(config-subif)#encapsulation dotlq 88
Cundinamarca(config-subif)#ip address 172.31.2.25 255.255.255.248
Cundinamarca(config-subif)#int f0/0
Cundinamarca(config-if)#no shutdown

Cundinamarca(config-if)#

Cundinamarca(config-router)#network 172.31.1.0 0.0.0.63 area 0
Cundinamarca(config-router)#network 172.31.1.64 0.0.0.63 area 0
Cundinamarca(config-router)#network 172.31.2.8 0.0.0.7 area 0
Cundinamarca(config-router)#network 172.31.2.24 0.0.0.7 area 0
Cundinamarca(config-router)#network 172.31.2.36 0.0.0.3 area 0
Cundinamarca(config-router)#end
00:04:32: %OSPF-5-ADJCHG: Process 1, Nbr 209.165.220.1 on
Serial0/0/0 from LOADING to FULL, Loading Done

Cundinamarca(config-router)#end
Cundinamarca#
%SYS-5-CONFIG_I: Configured from console by console

Cundinamarca#
```

Router>EN
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname Cundinamarca
Cundinamarca(config)#no ip domain-lookup
Cundinamarca(config)#banner motd #Cuidado Acceso Restringido#
Cundinamarca(config)#enable secret class123

Cundinamarca(config)#line console 0
Cundinamarca(config-line)#password cisco12
Cundinamarca(config-line)#login
Cundinamarca(config-line)#logging synchronous
Cundinamarca(config-line)#line vty 0 15
Cundinamarca(config-line)#password cisco12
Cundinamarca(config-line)#login
Cundinamarca(config-line)#logging synchronous
Cundinamarca(config-line)#int f0/0.1
Cundinamarca(config-subif)#encapsulation dot1q 1
Cundinamarca(config-subif)#ip address 172.31.2.9 255.255.255.248
Cundinamarca(config-subif)#int f0/0.20
Cundinamarca(config-subif)#encapsulation dot1q 20
Cundinamarca(config-subif)#ip address 172.31.1.65 255.255.255.192
Cundinamarca(config-subif)#int f0/0.30
Cundinamarca(config-subif)#encapsulation dot1q 30
Cundinamarca(config-subif)#ip address 172.31.1.1 255.255.255.192
Cundinamarca(config-subif)#int f0/0.88
Cundinamarca(config-subif)#encapsulation dot1q 88
Cundinamarca(config-subif)#ip address 172.31.2.25 255.255.255.248
Cundinamarca(config-subif)#int f0/0
Cundinamarca(config-if)#no shutdown

Cundinamarca(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0.1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.1, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0.20, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.20, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0.30, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.30, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0.88, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.88, changed state to up

Cundinamarca(config-if)#int s0/0/0
Cundinamarca(config-if)#ip address 172.31.2.38 255.255.255.252

Cundinamarca(config-if)#no shutdown

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

Cundinamarca(config-if)#router ospf 1
Cundinamarca(config-router)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

Cundinamarca(config-router)#network 172.31.1.0 0.0.0.63 area 0
Cundinamarca(config-router)#network 172.31.1.64 0.0.0.63 area 0
Cundinamarca(config-router)#network 172.31.2.8 0.0.0.7 area 0
Cundinamarca(config-router)#network 172.31.2.24 0.0.0.7 area 0
Cundinamarca(config-router)#network 172.31.2.36 0.0.0.3 area 0
Cundinamarca(config-router)#end
00:04:32: %OSPF-5-ADJCHG: Process 1, Nbr 209.165.220.1 on Serial0/0/0 from LOADING to FULL, Loading Done
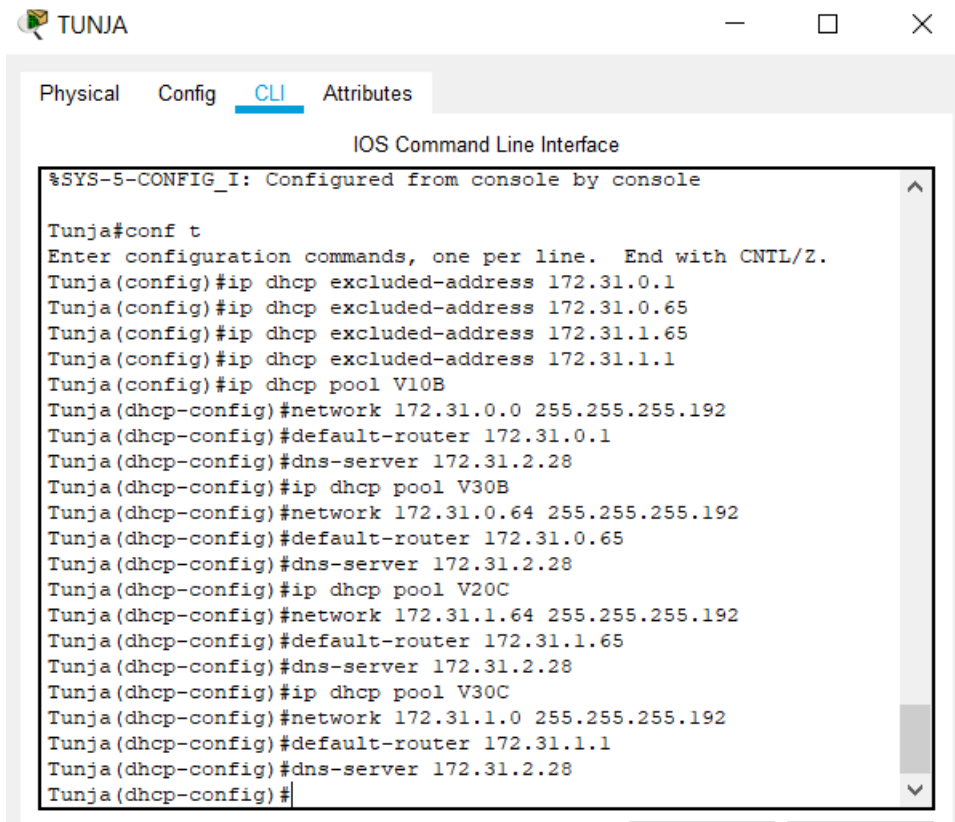
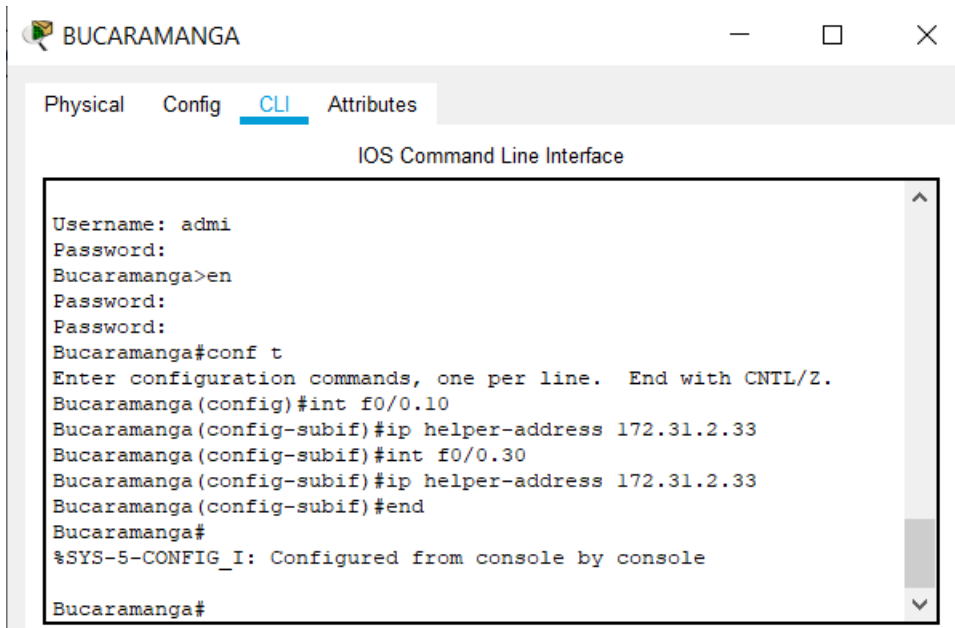Cundinamarca(config-router)#end
Cundinamarca#
%SYS-5-CONFIG_I: Configured from console by console

Cundinamarca#

2. El DHCP deberá proporcionar solo direcciones a los hosts de Bucaramanga y Cundinamarca

```
TUNJA                                          —    □    ✕

Physical    Config    CLI    Attributes
                        IOS Command Line Interface

%SYS-5-CONFIG_I: Configured from console by console

Tunja#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Tunja(config)#ip dhcp excluded-address 172.31.0.1
Tunja(config)#ip dhcp excluded-address 172.31.0.65
Tunja(config)#ip dhcp excluded-address 172.31.1.65
Tunja(config)#ip dhcp excluded-address 172.31.1.1
Tunja(config)#ip dhcp pool V10B
Tunja(dhcp-config)#network 172.31.0.0 255.255.255.192
Tunja(dhcp-config)#default-router 172.31.0.1
Tunja(dhcp-config)#dns-server 172.31.2.28
Tunja(dhcp-config)#ip dhcp pool V30B
Tunja(dhcp-config)#network 172.31.0.64 255.255.255.192
Tunja(dhcp-config)#default-router 172.31.0.65
Tunja(dhcp-config)#dns-server 172.31.2.28
Tunja(dhcp-config)#ip dhcp pool V20C
Tunja(dhcp-config)#network 172.31.1.64 255.255.255.192
Tunja(dhcp-config)#default-router 172.31.1.65
Tunja(dhcp-config)#dns-server 172.31.2.28
Tunja(dhcp-config)#ip dhcp pool V30C
Tunja(dhcp-config)#network 172.31.1.0 255.255.255.192
Tunja(dhcp-config)#default-router 172.31.1.1
Tunja(dhcp-config)#dns-server 172.31.2.28
Tunja(dhcp-config)#
```

```
BUCARAMANGA                                    —    □    ✕

Physical    Config    CLI    Attributes
                        IOS Command Line Interface

Username: admi
Password:
Bucaramanga>en
Password:
Password:
Bucaramanga#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Bucaramanga(config)#int f0/0.10
Bucaramanga(config-subif)#ip helper-address 172.31.2.33
Bucaramanga(config-subif)#int f0/0.30
Bucaramanga(config-subif)#ip helper-address 172.31.2.33
Bucaramanga(config-subif)#end
Bucaramanga#
%SYS-5-CONFIG_I: Configured from console by console

Bucaramanga#
```

```
CUNDINAMARCA                                    —    □    ✕

Physical    Config    CLI    Attributes
                    IOS Command Line Interface

Username: admi
Password:
Cundinamarca>en
Password:
Password:
Cundinamarca#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Cundinamarca(config)#int f0/0.20
Cundinamarca(config-subif)#ip helper-address 172.31.2.37
Cundinamarca(config-subif)#int f0/0.30
Cundinamarca(config-subif)#ip helper-address 172.31.2.37
Cundinamarca(config-subif)#end
Cundinamarca#
%SYS-5-CONFIG_I: Configured from console by console

Cundinamarca#

Ctrl+F6 to exit CLI focus                 Copy          Paste


□ Top
```
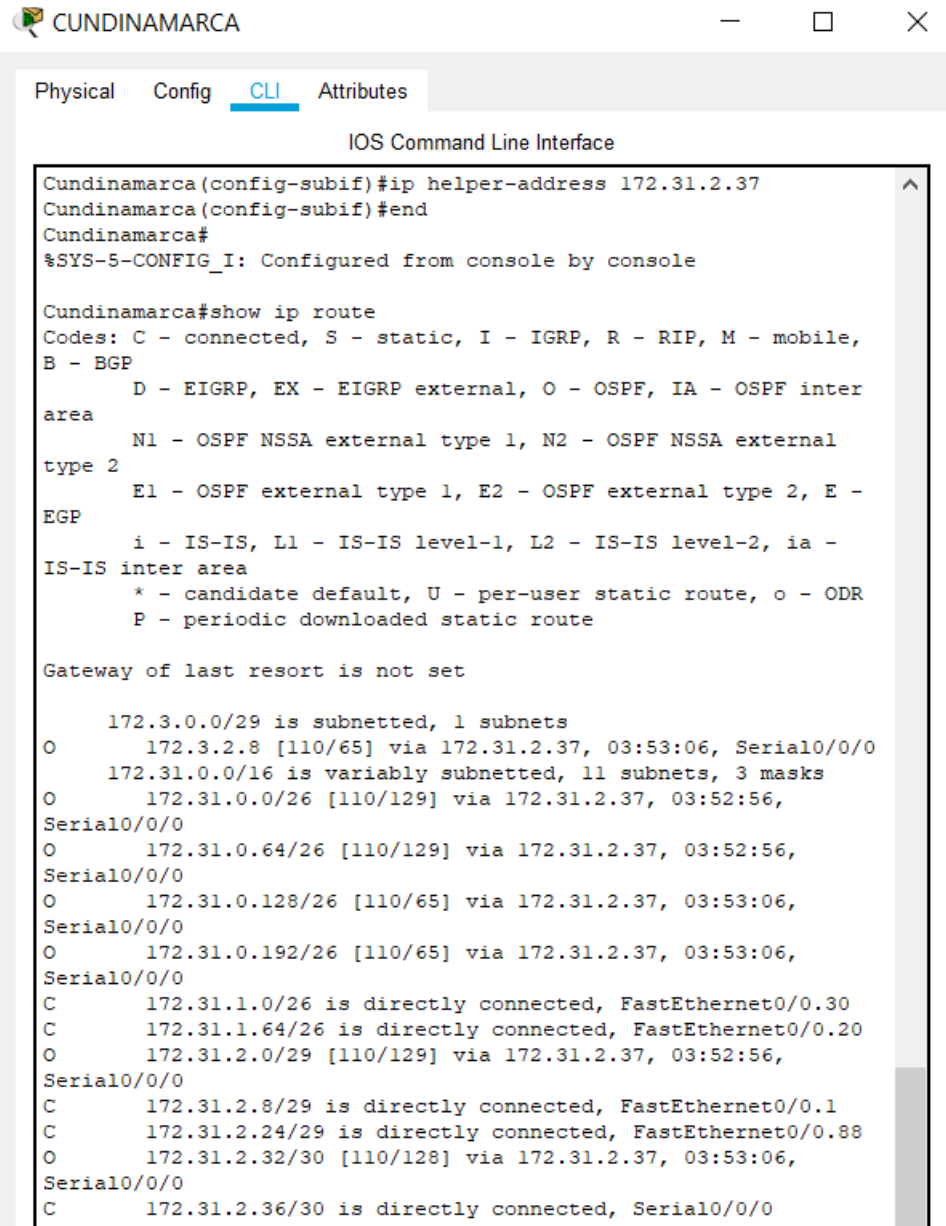
3. El web server deberá tener NAT estático y el resto de los equipos de la topología emplearan NAT de sobrecarga (PAT).

CUNDINAMARCA — □ ✕

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
Cundinamarca(config-subif)#ip helper-address 172.31.2.37
Cundinamarca(config-subif)#end
Cundinamarca#
%SYS-5-CONFIG_I: Configured from console by console

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

Gateway of last resort is not set

     172.3.0.0/29 is subnetted, 1 subnets
O       172.3.2.8 [110/65] via 172.31.2.37, 03:53:06, Serial0/0/0
     172.31.0.0/16 is variably subnetted, 11 subnets, 3 masks
O       172.31.0.0/26 [110/129] via 172.31.2.37, 03:52:56,
Serial0/0/0
O       172.31.0.64/26 [110/129] via 172.31.2.37, 03:52:56,
Serial0/0/0
O       172.31.0.128/26 [110/65] via 172.31.2.37, 03:53:06,
Serial0/0/0
O       172.31.0.192/26 [110/65] via 172.31.2.37, 03:53:06,
Serial0/0/0
C       172.31.1.0/26 is directly connected, FastEthernet0/0.30
C       172.31.1.64/26 is directly connected, FastEthernet0/0.20
O       172.31.2.0/29 [110/129] via 172.31.2.37, 03:52:56,
Serial0/0/0
C       172.31.2.8/29 is directly connected, FastEthernet0/0.1
C       172.31.2.24/29 is directly connected, FastEthernet0/0.88
O       172.31.2.32/30 [110/128] via 172.31.2.37, 03:53:06,
Serial0/0/0
C       172.31.2.36/30 is directly connected, Serial0/0/0
```
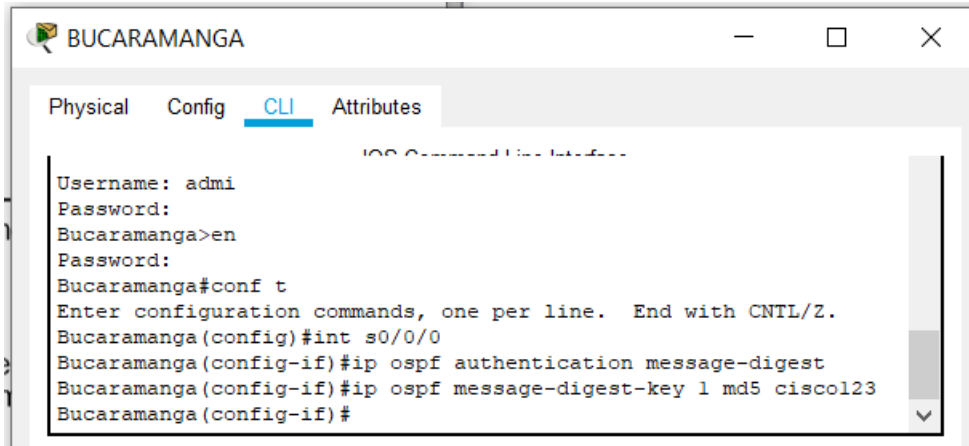
TUNJA

Physical Config CLI Attributes

IOS Command Line Interface

```
Tunja#show ip route
Codes: C - connected, S - static, I - IGRP, 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 209.165.220.3 to network 0.0.0.0

     172.3.0.0/29 is subnetted, 1 subnets
C       172.3.2.8 is directly connected, FastEthernet0/0.1
     172.31.0.0/16 is variably subnetted, 11 subnets, 3 masks
O       172.31.0.0/26 [110/65] via 172.31.2.34, 03:59:41,
Serial0/0/0
O       172.31.0.64/26 [110/65] via 172.31.2.34, 03:59:41,
Serial0/0/0
C       172.31.0.128/26 is directly connected, FastEthernet0/0.20
C       172.31.0.192/26 is directly connected, FastEthernet0/0.30
O       172.31.1.0/26 [110/65] via 172.31.2.38, 03:59:41,
Serial0/0/1
O       172.31.1.64/26 [110/65] via 172.31.2.38, 03:59:41,
Serial0/0/1
O       172.31.2.0/29 [110/65] via 172.31.2.34, 03:59:41,
Serial0/0/0
O       172.31.2.8/29 [110/65] via 172.31.2.38, 03:59:41,
Serial0/0/1
O       172.31.2.24/29 [110/65] via 172.31.2.38, 03:59:41,
Serial0/0/1
 --More--
```
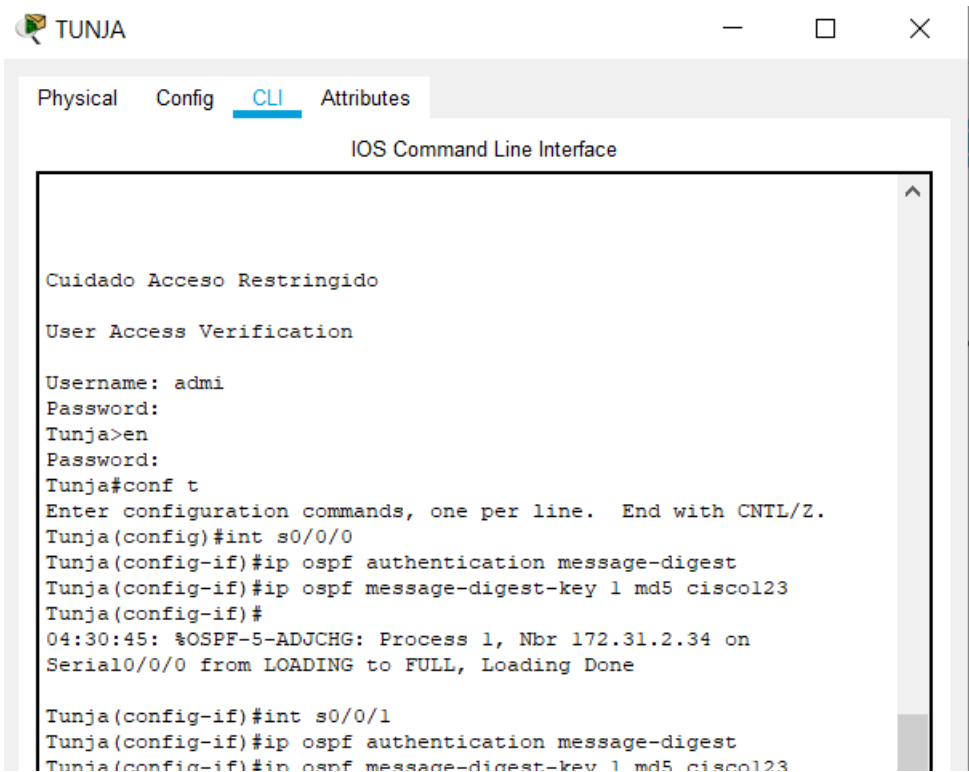
CUNDINAMARCA

Physical Config CLI Attributes

IOS Command Line Interface

```
Cundinamarca(config)#int s0/0/0
Cundinamarca(config-if)#ip ospf authentication message-digest
Cundinamarca(config-if)#ip ospf message-digest-key 1 md5 cisco123
Cundinamarca(config-if)#
```

4. El enrutamiento deberá tener autenticación.

BUCARAMANGA   —   □   ✕

Physical   Config   CLI   Attributes

                        IOS Command Line Interface

```
Username: admi
Password:
Bucaramanga>en
Password:
Bucaramanga#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Bucaramanga(config)#int s0/0/0
Bucaramanga(config-if)#ip ospf authentication message-digest
Bucaramanga(config-if)#ip ospf message-digest-key 1 md5 cisco123
Bucaramanga(config-if)#
```


TUNJA   —   □   ✕

Physical   Config   CLI   Attributes

                        IOS Command Line Interface

```
Cuidado Acceso Restringido

User Access Verification

Username: admi
Password:
Tunja>en
Password:
Tunja#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Tunja(config)#int s0/0/0
Tunja(config-if)#ip ospf authentication message-digest
Tunja(config-if)#ip ospf message-digest-key 1 md5 cisco123
Tunja(config-if)#
04:30:45: %OSPF-5-ADJCHG: Process 1, Nbr 172.31.2.34 on
Serial0/0/0 from LOADING to FULL, Loading Done

Tunja(config-if)#int s0/0/1
Tunja(config-if)#ip ospf authentication message-digest
Tunja(config-if)#ip ospf message-digest-key 1 md5 cisco123
```
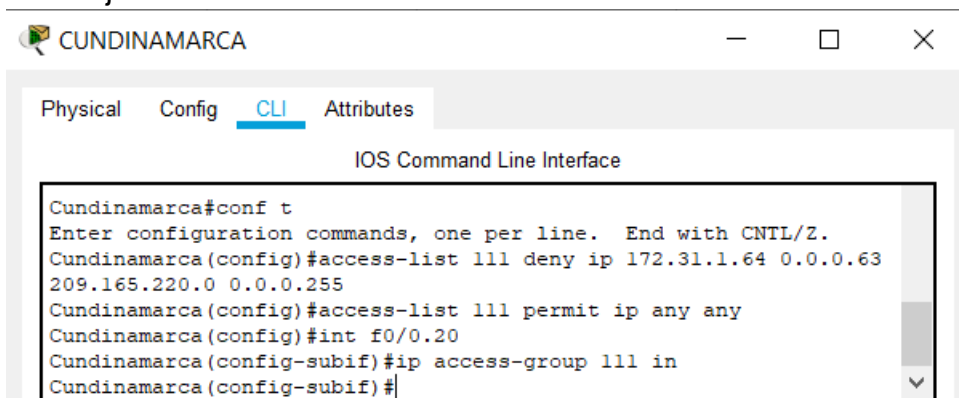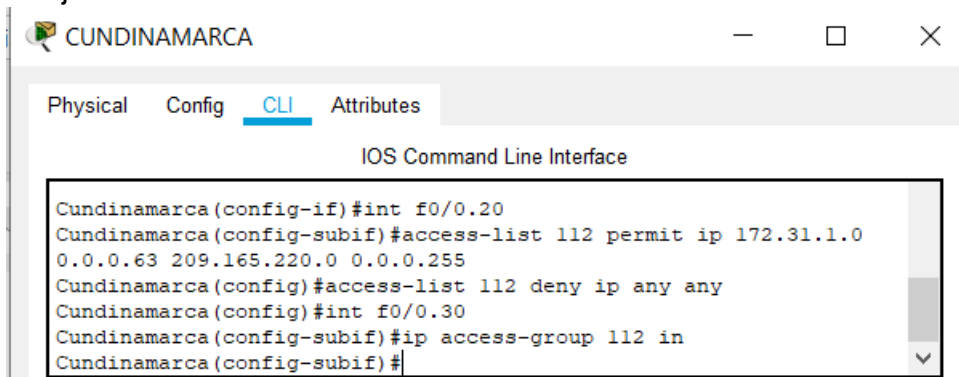
5. Listas de control de acceso:
- Los hosts de VLAN 20 en Cundinamarca no acceden a internet, solo a la red interna de Tunja.
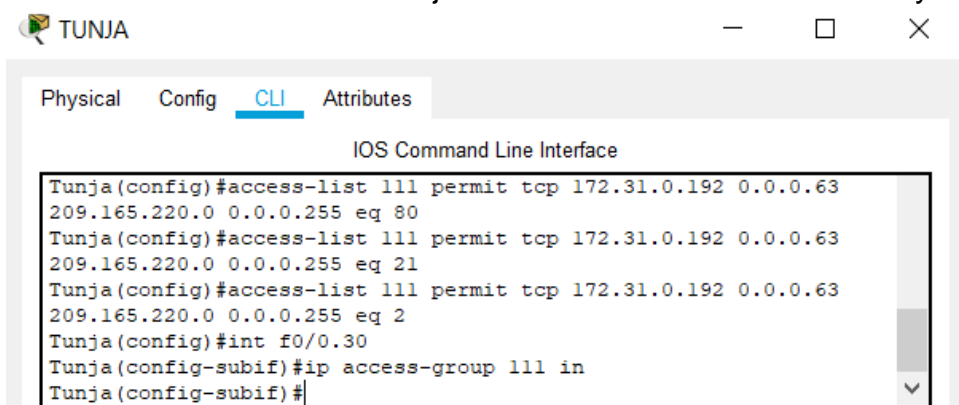
```
CUNDINAMARCA                                    —    □    ×

Physical   Config   CLI   Attributes

                    IOS Command Line Interface

Cundinamarca#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Cundinamarca(config)#access-list 111 deny ip 172.31.1.64 0.0.0.63
209.165.220.0 0.0.0.255
Cundinamarca(config)#access-list 111 permit ip any any
Cundinamarca(config)#int f0/0.20
Cundinamarca(config-subif)#ip access-group 111 in
Cundinamarca(config-subif)#
```

- Los hosts de VLAN 10 en Cundinamarca si acceden a internet y no a la red interna de Tunja.

```
CUNDINAMARCA                                    —    □    ×

Physical   Config   CLI   Attributes

                    IOS Command Line Interface

Cundinamarca(config-if)#int f0/0.20
Cundinamarca(config-subif)#access-list 112 permit ip 172.31.1.0
0.0.0.63 209.165.220.0 0.0.0.255
Cundinamarca(config)#access-list 112 deny ip any any
Cundinamarca(config)#int f0/0.30
Cundinamarca(config-subif)#ip access-group 112 in
Cundinamarca(config-subif)#
```

- Los hosts de VLAN 30 en Tunja solo acceden a servidores web y ftp de internet.

```
TUNJA                                           —    □    ×

Physical   Config   CLI   Attributes

                    IOS Command Line Interface

Tunja(config)#access-list 111 permit tcp 172.31.0.192 0.0.0.63
209.165.220.0 0.0.0.255 eq 80
Tunja(config)#access-list 111 permit tcp 172.31.0.192 0.0.0.63
209.165.220.0 0.0.0.255 eq 21
Tunja(config)#access-list 111 permit tcp 172.31.0.192 0.0.0.63
209.165.220.0 0.0.0.255 eq 2
Tunja(config)#int f0/0.30
Tunja(config-subif)#ip access-group 111 in
Tunja(config-subif)#
```

- Los hosts de VLAN 20 en Tunja solo acceden a la VLAN 20 de Cundinamarca y VLAN 10 de Bucaramanga.

Tunja(config)#access-list 112 permit ip 172.31.0.128 0.0.0.63
172.31.0.0 0.0.0.63
Tunja(config)#int f0/0.20
Tunja(config-subif)#ip access-group 112 in
Tunja(config-subif)#exit

- Los hosts de VLAN 30 de Bucaramanga acceden a internet y a cualquier equipo de VLAN 10.

Bucaramanga(config-if)#exit
Bucaramanga(config)#access-list 111 permit ip 172.31.0.64
0.0.0.63 209.165.220.0 0.0.0.255
Bucaramanga(config)#int f0/0.30
Bucaramanga(config-subif)#ip access-group 111 in
Bucaramanga(config-subif)#

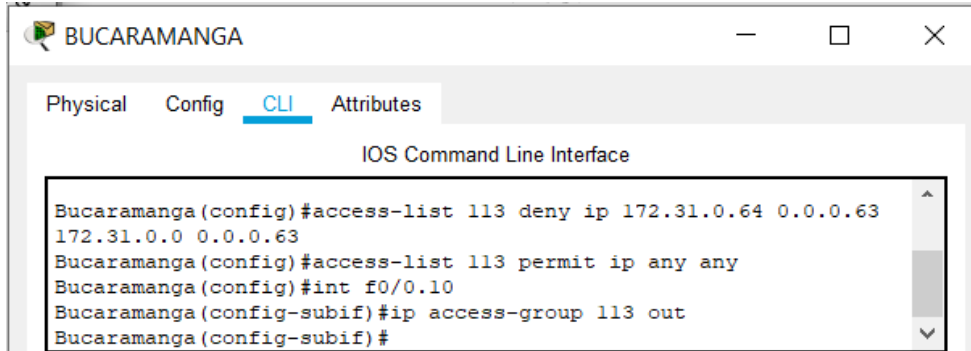- Los hosts de VLAN 10 en Bucaramanga acceden a la red de Cundinamarca (VLAN 20) y Tunja (VLAN 20), no internet.

Bucaramanga(config-subif)#ip access-group 111 in
Bucaramanga(config-subif)#access-list 112 permit ip 172.31.0.0
0.0.0.63 172.31.1.64 0.0.0.63
Bucaramanga(config)#access-list 112 permit ip 172.31.0.0 0.0.0.63
Bucaramanga(config)#access-list 112 permit ip 172.31.0.0 0.0.0.63
172.31.0.128 0.0.0.63
Bucaramanga(config)#int f0/0.10
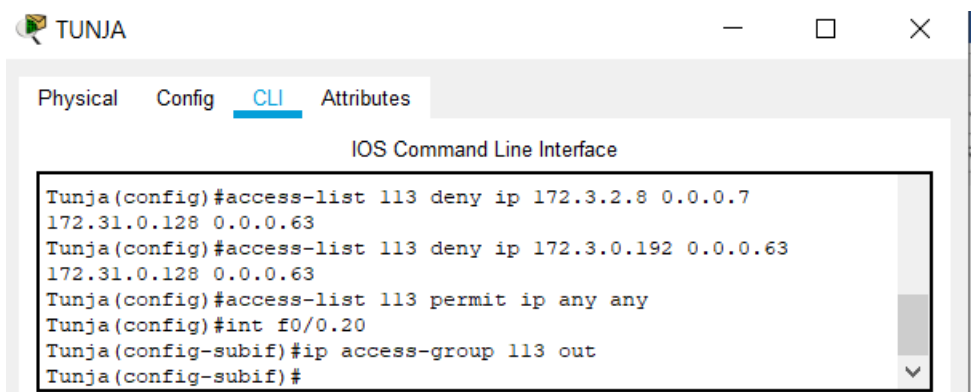Bucaramanga(config-subif)#ip access-group 112 in
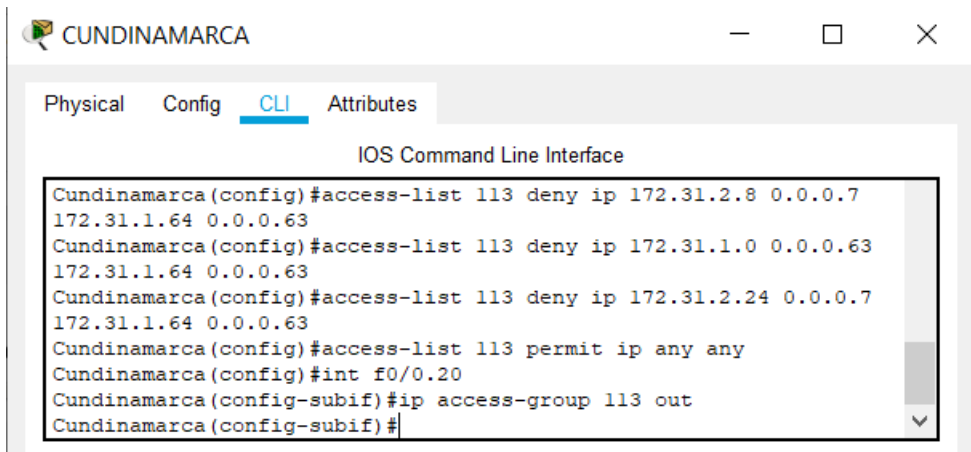Bucaramanga(config-subif)#

Ctrl+F6 to exit CLI focus

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- Los hosts de una VLAN no pueden acceder a los de otra VLAN en una ciudad.

BUCARAMANGA — □ ×

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
Bucaramanga(config)#access-list 113 deny ip 172.31.0.64 0.0.0.63
172.31.0.0 0.0.0.63
Bucaramanga(config)#access-list 113 permit ip any any
Bucaramanga(config)#int f0/0.10
Bucaramanga(config-subif)#ip access-group 113 out
Bucaramanga(config-subif)#
```

TUNJA — □ ×

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
Tunja(config)#access-list 113 deny ip 172.3.2.8 0.0.0.7
172.31.0.128 0.0.0.63
Tunja(config)#access-list 113 deny ip 172.3.0.192 0.0.0.63
172.31.0.128 0.0.0.63
Tunja(config)#access-list 113 permit ip any any
Tunja(config)#int f0/0.20
Tunja(config-subif)#ip access-group 113 out
Tunja(config-subif)#
```

CUNDINAMARCA — □ ×

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
Cundinamarca(config)#access-list 113 deny ip 172.31.2.8 0.0.0.7
172.31.1.64 0.0.0.63
Cundinamarca(config)#access-list 113 deny ip 172.31.1.0 0.0.0.63
172.31.1.64 0.0.0.63
Cundinamarca(config)#access-list 113 deny ip 172.31.2.24 0.0.0.7
172.31.1.64 0.0.0.63
Cundinamarca(config)#access-list 113 permit ip any any
Cundinamarca(config)#int f0/0.20
Cundinamarca(config-subif)#ip access-group 113 out
Cundinamarca(config-subif)#
```

- Solo los hosts de las VLAN administrativas y de la VLAN de servidores tienen accedo a los routers e internet.

BUCARAMANGA

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
Bucaramanga(config-subif)#access-list 3 permit 172.31.2.0 0.0.0.7
Bucaramanga(config)#access-list 3 permit 172.3.2.8 0.0.0.7
Bucaramanga(config)#access-list 3 permit 172.31.2.8 0.0.0.7
Bucaramanga(config)#line vty 0 15
Bucaramanga(config-line)#access-class 3 in
Bucaramanga(config-line)#
```


TUNJA

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
Tunja(config-subif)#access-list 3 permit 172.31.2.0 0.0.0.7
Tunja(config)#access-list 3 permit 172.3.2.8 0.0.0.7
Tunja(config)#access-list 3 permit 172.31.2.8 0.0.0.7
Tunja(config)#line vty 0 15
Tunja(config-line)#access-class 3 in
Tunja(config-line)#
```


CUNDINAMARCA

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
Cundinamarca(config)#access-list 3 permit 172.3.2.8 0.0.0.7
Cundinamarca(config)#access-list 3 permit 172.31.2.8 0.0.0.7
Cundinamarca(config)#line vty 0 15
Cundinamarca(config-line)#access-class 3 in
Cundinamarca(config-line)#
```

Ctrl+F6 to exit CLI focus   Copy   Paste

Conclusión

Las NAT consiste en transportar los paquetes de información a través del router sin importar la clase, se consideran el único mecanismo utilizado para intercomunicar redes.

Los usuarios al usar DHCP, este agiliza y enseña toda la información que necesita para funcionar incluso dirección IP, el servidor de inicio y la información de configuración de red. Ya que las solicitudes DHCP pueden enviar por subredes, se podría contrarrestar el uso de servidores de inicio en la red cuando se utiliza el inicio de red DHCP.

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