Cisco Networking Academy®

DIPLOMADO DE PROFUNDIZACIÓN CISCO ¨(DISEÑO E IMPLEMENTACIÓN DE SOLUCIONES INTEGRADAS LAN / WAN¨)

Tarea 9

CLAUDIA YAMILE PINILLA GÓMEZ

UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA – UNAD
ESCUELA DE CIENCIAS BÁSICAS, TECNOLOGÍA E INGENIERÍA - ECBTI
INGENIERIA DE SISTEMAS
BOGOTA
2019

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Tarea 9

CLAUDIA YAMILE PINILLA GÓMEZ

INFORME

Efraín Alejandro Pérez

UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA – UNAD
ESCUELA DE CIENCIAS BÁSICAS, TECNOLOGÍA E INGENIERÍA - ECBTI
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CONTENIDO

1. RESUMEN

Con el desarrollo de esta actividad podemos realizar las actividades correspondientes para resolver los casos de estudio para el curso CCNA nivel 1 denominado Introduction to Networks y para el curso CCNA nivel 2 denominado Routing and Switching Essentials. Con el desarrollo de estos escenarios se fortalecerá nuestra comprensión de aprendizaje de las temáticas con el fin de apropiarse del conocimiento de tan importante área de formación como lo son las redes de computadores y las telecomunicaciones que convive con nosotros en el día a día.

2. ABSTRAC

With the development of this activity we can carry out the corresponding activities to solve the case studies for the CCNA level 1 course called Introduction to networks and for the CCNA level 2 course called Routing and Switching Essentials. With the development of these developments, our understanding of learning topics will be strengthened in order to appropriate the knowledge of such an important area of training such as computer networks and telecommunications that lives with us on a day-to-day basis.

3. INTRODUCCIÓN

La tecnología ha influido hoy en día en cada una de las áreas de desarrollo del ser humano y el internet se ha convertido en el medio de comunicación más grande del mundo es por esto que las redes son una necesidad básica para el desarrollo de cada entorno para realizar comunicaciones en tiempo real independientemente del sitio, lo que ha permitido la globalización de la información y el aumento del conocimiento requerido para entender el funcionamiento de estos sistemas.

En el siguiente documento se realiza una prueba práctica de configuración apoyándose en el material el cual se ha desarrollado durante este diplomado en cisco logrando la implementación de los conocimientos adquiridos.

4. OBJETIVOS

Al realizar el desarrollo de los distintos ejercicios de las unidades vistas en este diplomado y con el desarrollo de esta actividad final se busca fundamentar y aplicar los conocimientos vistos, realizando la prueba de habilidades prácticas para el diseño e implementación de soluciones integradas LAN / WAN en para conocer los beneficios de los Router en los enrutamientos dinámicos del tráfico. Desarrollar habilidades para configuras adecuadamente los dispositivos Router y Switch para optimizar las métricas.

5. DESARROLLO DE LOS DOS ESCENARIOS

5.1 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.

Topología de red

Los requerimientos solicitados son los siguientes:

Parte 1: Para el direccionamiento IP debe definirse una dirección de acuerdo con el número de hosts requeridos.

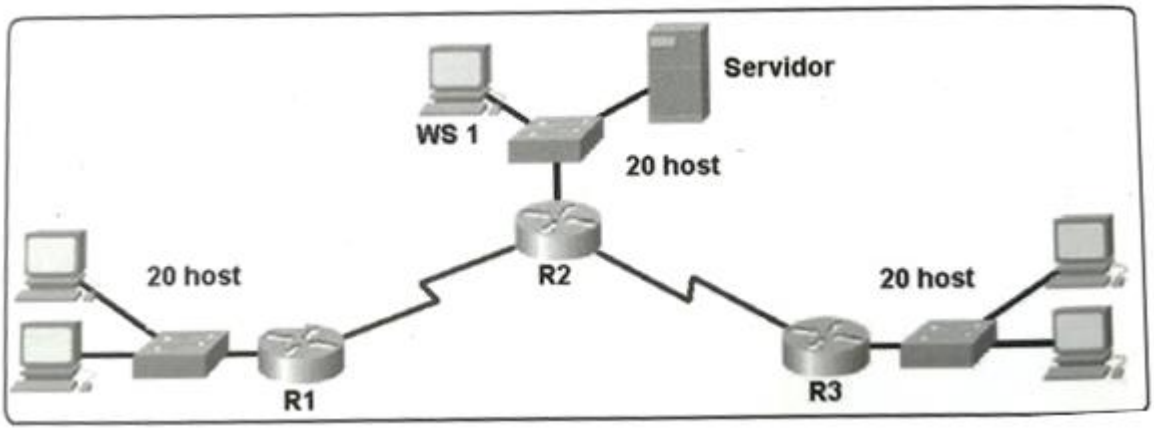
Parte 2: Considerar la asignación de los parámetros básicos y la detección de vecinos directamente conectados.

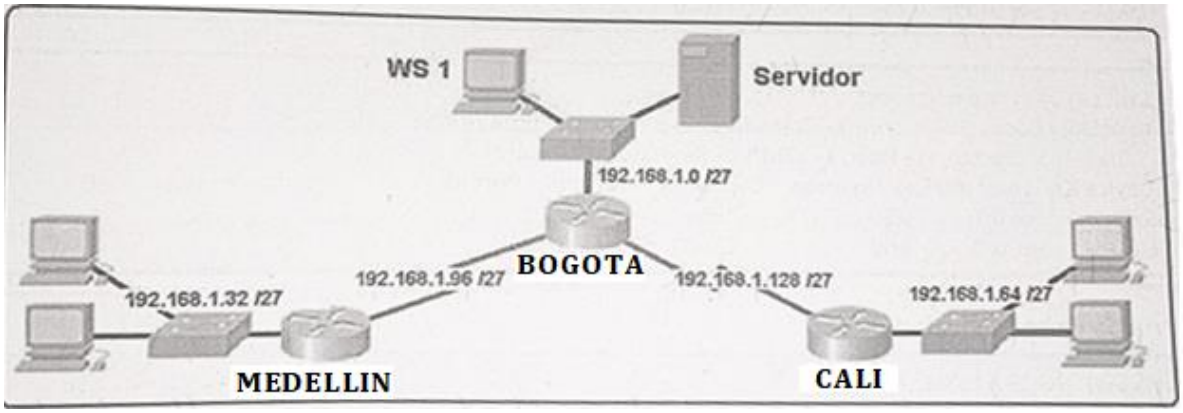
Parte 3: La red y subred establecidas deberán tener una interconexión total, todos los hosts deberán ser visibles y poder comunicarse entre ellos sin restricciones.

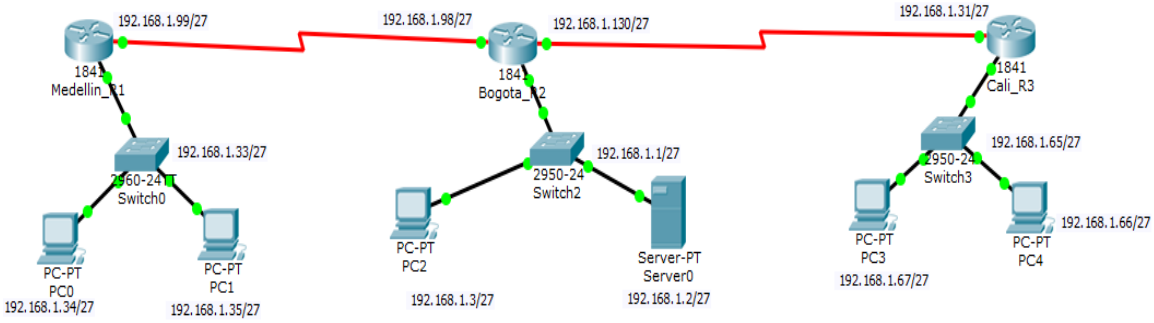
Parte 4: Implementar la seguridad en la red, se debe restringir el acceso y comunicación entre hosts de acuerdo con los requerimientos del administrador de red.

Parte 5: Comprobación total de los dispositivos y su funcionamiento en la red.

Parte 6: Configuración final.







Desarrollo

Como trabajo inicial se debe realizar lo siguiente.

- Realizar las rutinas de diagnóstico y dejar los equipos listos para su configuración (asignar nombres de equipos, asignar claves de seguridad, etc).
- Realizar la conexión fisica de los equipos con base en la topología de red

Configurar la topología de red, de acuerdo con las siguientes especificaciones.

Parte 1: Asignación de direcciones IP:

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

Solucion de las subredes ipv4

Teniendo la red 192.168.1.0/27

192.168.1.0 sabemos que pertenece a una red clase C con mascara 255.255.255.224, podemos tener un total de 8 subredes y 30 host , en la siguiente tabla se describe como puede quedar configurado.

El diseño de esta topologia

Dir	Host	BoadCast
192.168.1.0/27	192.168.1.1-192.168.130	192.168.1.31
192.168.1.32/27	192.168.1.33-192.168.1.62	192.168.1.63
192.168.1.64/27	192.168.1.65-192.168.1.94	192.168.1.95
192.168.1.96/27	192.168.1.97-192.168.1.126	192.168.1.127
192.168.1.128/27	192.168.1.129-192.168.1.158	192.168.1.159
192.168.1.160/27	192.168.1.161-192.168.1.190	192.168.1.191
192.168.1.192/27	192.168.1.193-192.168.1.222	192.168.1.223
192.168.1.224/27	192.168.1.225-192.168.1.254	192.168.1.255

Parte 2: Configuración Básica.

Completar la siguiente tabla con la configuración básica de los routers, teniendo en cuenta las subredes diseñadas.

	R1	R2	R3
Nombre de Host	**MEDELLIN**	**BOGOTA**	**CALI**
Dirección de Ip en interfaz Serial 0/0	192.168.1.99	192.168.1.98	192.168.1.131
Dirección de Ip en interfaz Serial 0/1		192.168.1.130	
Dirección de Ip en interfaz FA 0/0	192.168.1.33	192.168.1.1	192.168.1.65
Protocolo de enrutamiento	**Eigrp**	**Eigrp**	**Eigrp**
Sistema Autónomo	200	200	200
Afirmaciones de red	192.168.1.0	192.168.1.0	192.168.1.0

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.

Router: MEDELLIN

```
Router>enable
Password:
Router#show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone
Device ID    Local Intrfce   Holdtme    Capability   Platform    Port ID
Router       Ser 0/0/0        140             R       C1841       Ser 0/0/0
SW_Medellin  Fas 0/0          140             S       2960        Fas 0/1
Router#exit
```

```
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#line vty 0 4
Router(config-line)#password 123
Router(config-line)#login
Router(config-line)#exit
Router(config)#enable secret
% Incomplete command.
Router(config)#enable secret 123
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#exit
```

```
Router>enable
Password:
Router#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 192.168.1.98, 02:49:37, Serial0/0/0
C       192.168.1.32 is directly connected, FastEthernet0/0
D       192.168.1.64 [90/2684416] via 192.168.1.98, 02:49:37, Serial0/0/0
C       192.168.1.96 is directly connected, Serial0/0/0
D       192.168.1.128 [90/2681856] via 192.168.1.98, 02:49:37, Serial0/0/0
Router#exit
```

Router: BOGOTA

```
Router>enable
Password:
Router#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
C       192.168.1.0 is directly connected, FastEthernet0/0
D       192.168.1.32 [90/2172416] via 192.168.1.99, 02:46:37, Serial0/0/0
D       192.168.1.64 [90/2172416] via 192.168.1.131, 02:46:37, Serial0/1/0
C       192.168.1.96 is directly connected, Serial0/0/0
C       192.168.1.128 is directly connected, Serial0/1/0
Router#exit
```

Router: CALI

```
Router>enable
Password:
Router#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, 02:42:26, Serial0/1/0
D       192.168.1.32 [90/2684416] via 192.168.1.130, 02:42:26, Serial0/1/0
C       192.168.1.64 is directly connected, FastEthernet0/0
D       192.168.1.96 [90/2681856] via 192.168.1.130, 02:42:26, Serial0/1/0
C       192.168.1.128 is directly connected, Serial0/1/0
Router#exit
```

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

Router : Medellín

```
Router#
Router#show ip route 192.168.1.96
Routing entry for 192.168.1.96/27
Known via "connected", distance 0, metric 0 (connected, via interface)
  Redistributing via eigrp 123
  Routing Descriptor Blocks:
  * directly connected, via Serial0/0/0
      Route metric is 0, traffic share count is 1
Router#show ip route 192.168.1.32
Routing entry for 192.168.1.32/27
Known via "connected", distance 0, metric 0 (connected, via interface)
  Redistributing via eigrp 123
  Routing Descriptor Blocks:
  * directly connected, via FastEthernet0/0
      Route metric is 0, traffic share count is 1
Router#
```

Router: Bogotá

```
Router>enable
Password:
Router#show ip route 192.168.1.96
Routing entry for 192.168.1.96/27
Known via "connected", distance 0, metric 0 (connected, via interface)
  Redistributing via eigrp 123
  Routing Descriptor Blocks:
  * directly connected, via Serial0/0/0
      Route metric is 0, traffic share count is 1
Router#show ip route 192.168.1.0
Routing entry for 192.168.1.0/27, 5 known subnets
  Attached (3 connections)
  Redistributing via eigrp 123, eigrp 123, eigrp 123, eigrp 123, eigrp 123
C       192.168.1.0 is directly connected, FastEthernet0/0
D       192.168.1.32 [90/2172416] via 192.168.1.99, 03:03:28, Serial0/0/0
D       192.168.1.64 [90/2172416] via 192.168.1.131, 03:03:28, Serial0/1/0
C       192.168.1.96 is directly connected, Serial0/0/0
C       192.168.1.128 is directly connected, Serial0/1/0
Router#show ip route 192.168.1.128
Routing entry for 192.168.1.128/27
Known via "connected", distance 0, metric 0 (connected, via interface)
  Redistributing via eigrp 123
  Routing Descriptor Blocks:
  * directly connected, via Serial0/1/0
      Route metric is 0, traffic share count is 1
Router#
```

Router: Cali

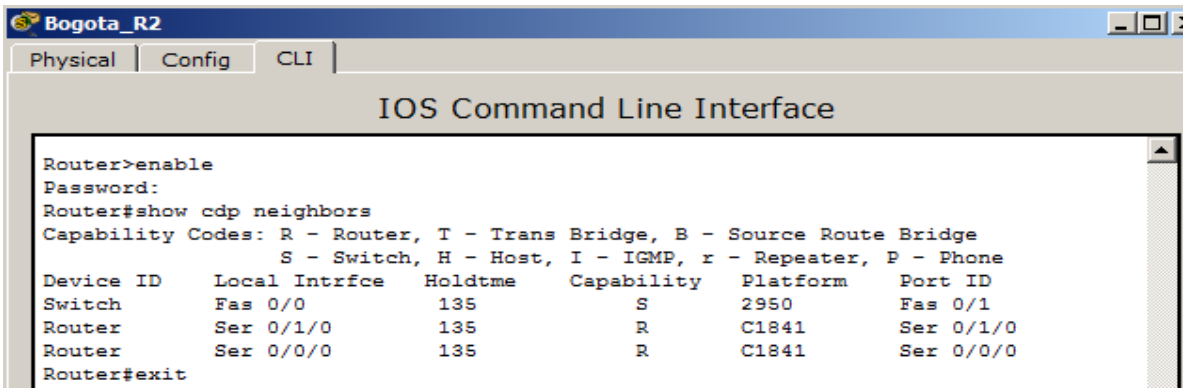
```
Router>enable
Password:
Router#show ip route 192.168.1.64
Routing entry for 192.168.1.64/27
Known via "connected", distance 0, metric 0 (connected, via interface)
  Redistributing via eigrp 123
  Routing Descriptor Blocks:
  * directly connected, via FastEthernet0/0
      Route metric is 0, traffic share count is 1
Router#show ip route 192.168.1.65
Routing entry for 192.168.1.64/27
Known via "connected", distance 0, metric 0 (connected, via interface)
  Redistributing via eigrp 123
  Routing Descriptor Blocks:
  * directly connected, via FastEthernet0/0
      Route metric is 0, traffic share count is 1
Router#show ip route 192.168.1.128
Routing entry for 192.168.1.128/27
Known via "connected", distance 0, metric 0 (connected, via interface)
  Redistributing via eigrp 123
  Routing Descriptor Blocks:
  * directly connected, via Serial0/1/0
      Route metric is 0, traffic share count is 1
Router#
```

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

Router Medellín

```
Router>enable
Router#show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone
Device ID    Local Intrfce   Holdtme    Capability   Platform    Port ID
Router       Ser 0/0/0        126           R       C1841       Ser 0/0/0
SW_Medellin  Fas 0/0          126           S       2960        Fas 0/1
Router#
```

Router Bogotá



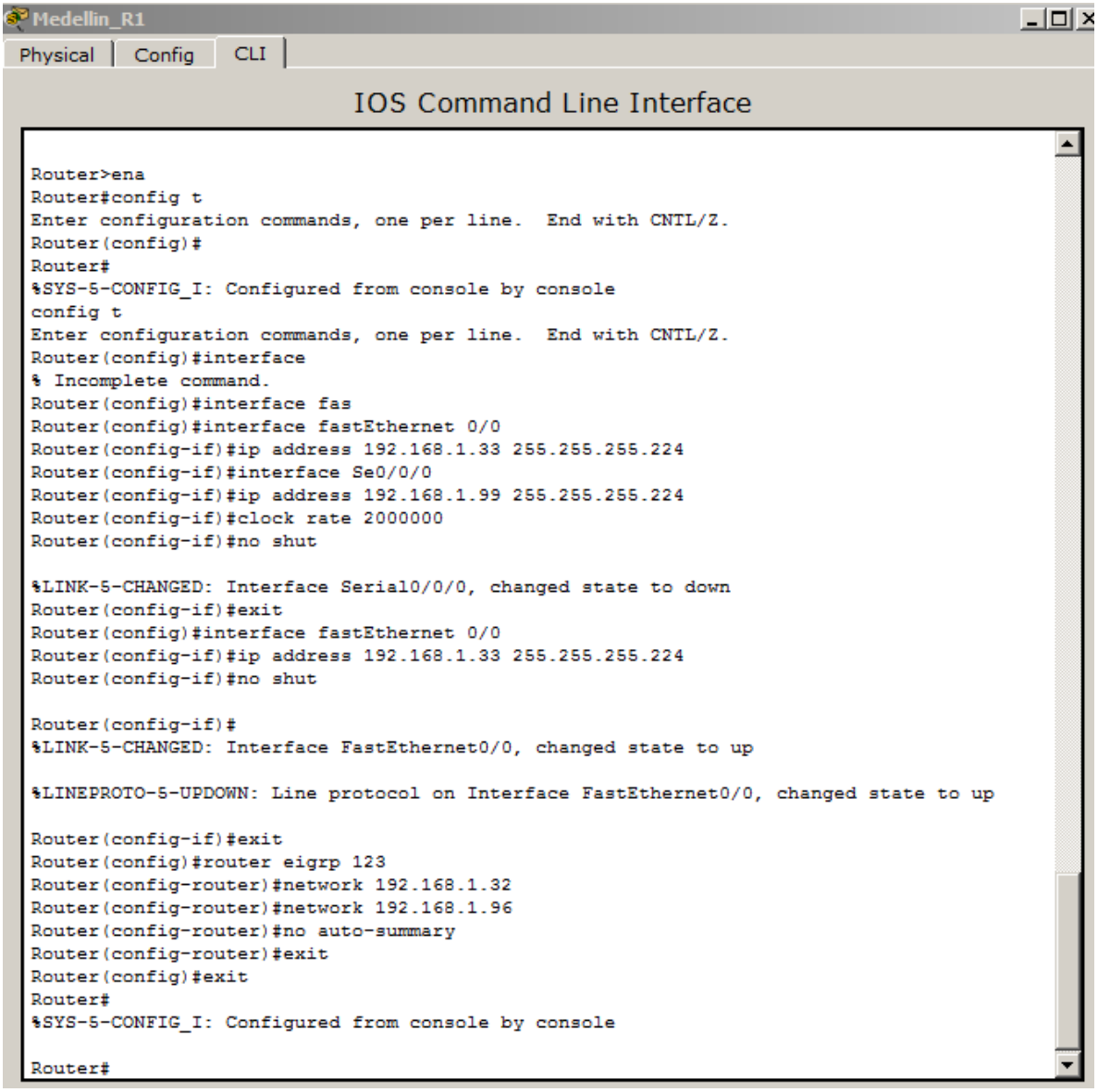
Router Cali

```
Router>enable
Password:
Router#show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone
Device ID    Local Intrfce   Holdtme    Capability   Platform    Port ID
Switch       Fas 0/0          168            S       2950        Fas 0/1
Router       Ser 0/1/0        169            R       C1841       Ser 0/1/0
Router#exit
```

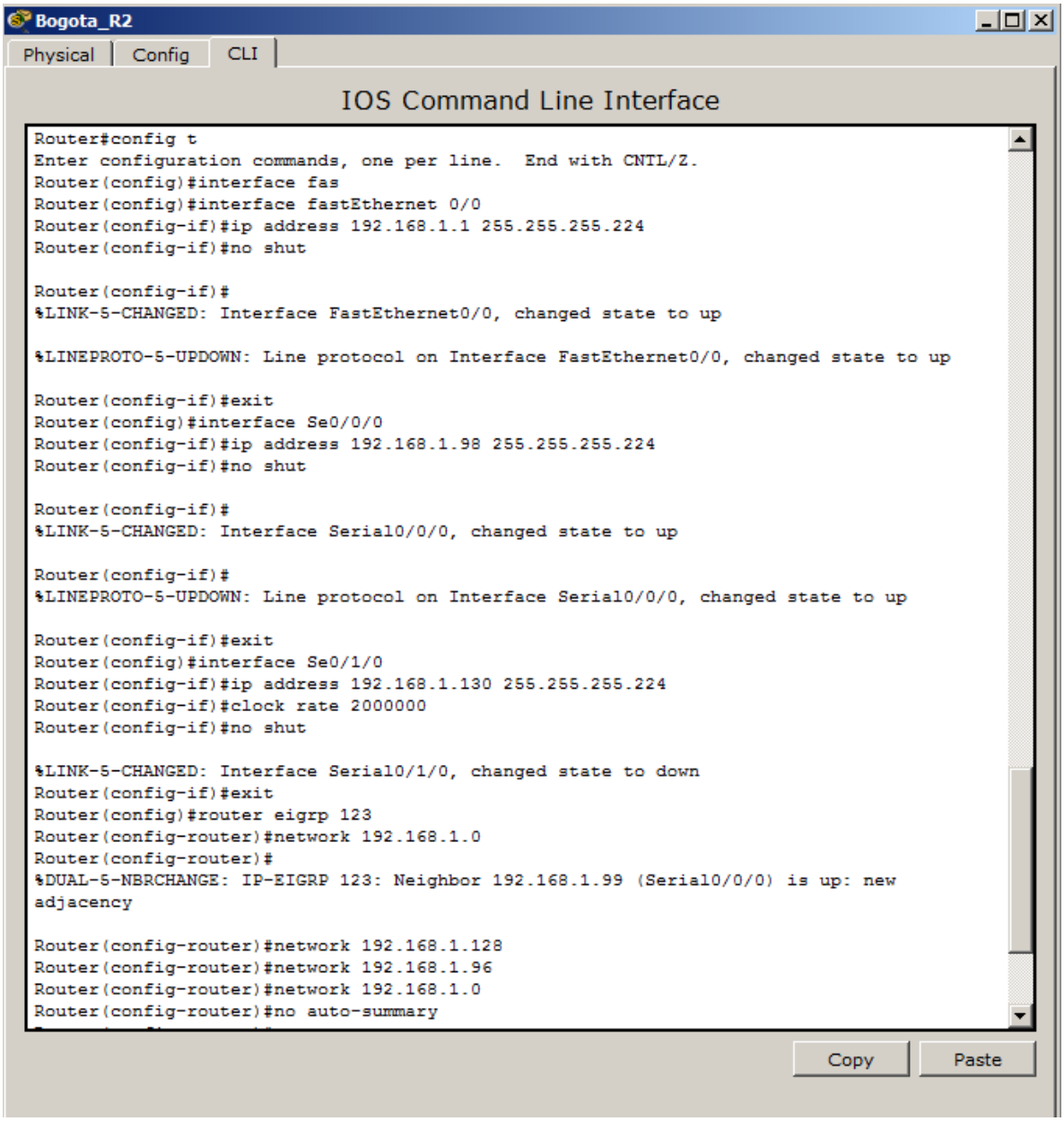
d. Realizar una prueba de conectividad en cada tramo de la ruta usando Ping.

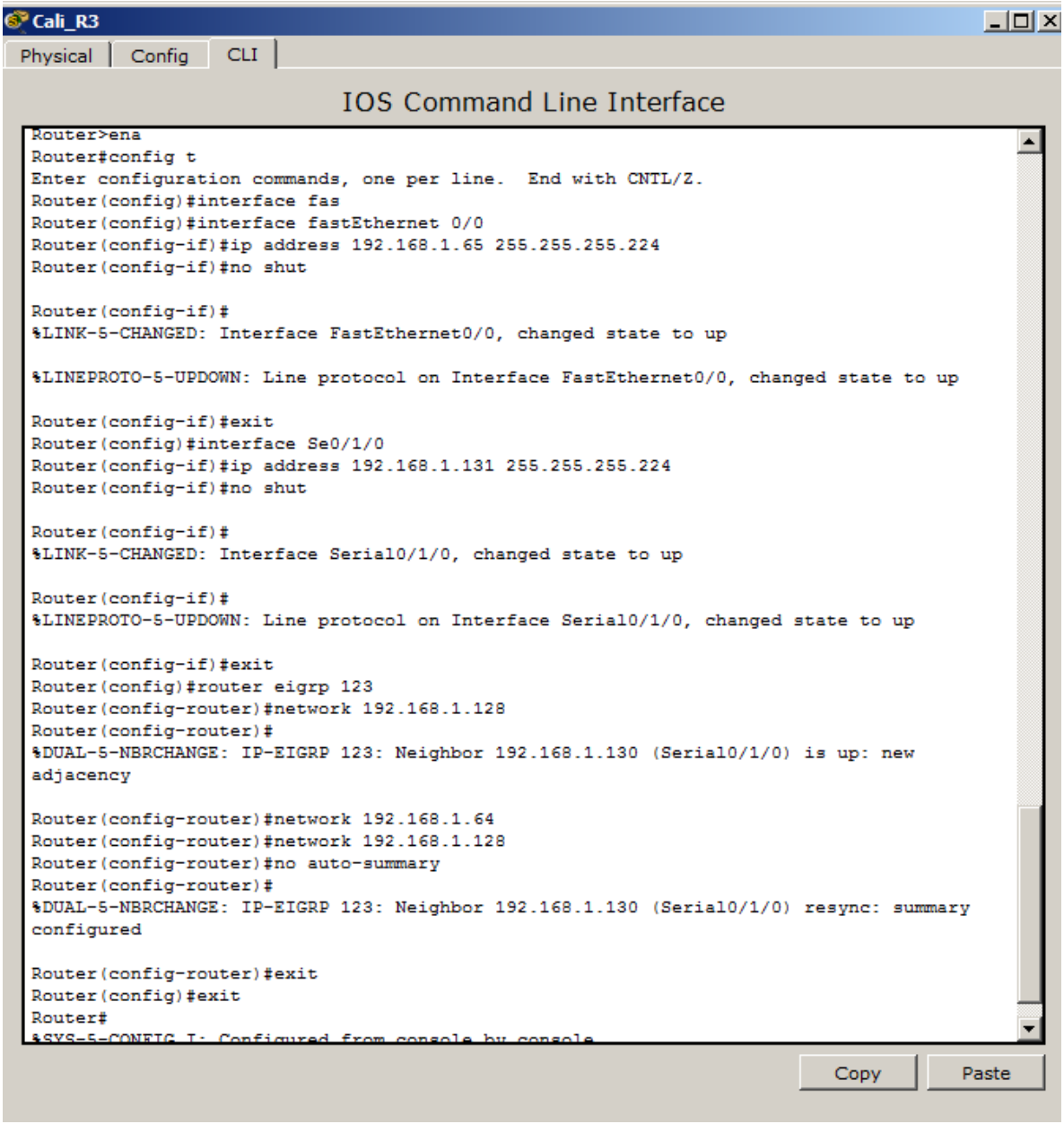
Parte 3: Configuración de Enrutamiento.

a. Asignar el protocolo de enrutamiento EIGRP a los routers considerando el direccionamiento diseñado.
b. Verificar si existe vecindad con los routers configurados con EIGRP.
c. Realizar la comprobación de las tablas de enrutamiento en cada uno de los routers para verificar cada una de las rutas establecidas.
d. 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.




```
Router>ena
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#
Router#
%SYS-5-CONFIG_I: Configured from console by console
config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface
% Incomplete command.
Router(config)#interface fas
Router(config)#interface fastEthernet 0/0
Router(config-if)#ip address 192.168.1.33 255.255.255.224
Router(config-if)#interface Se0/0/0
Router(config-if)#ip address 192.168.1.99 255.255.255.224
Router(config-if)#clock rate 2000000
Router(config-if)#no shut

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
Router(config-if)#exit
Router(config)#interface fastEthernet 0/0
Router(config-if)#ip address 192.168.1.33 255.255.255.224
Router(config-if)#no shut

Router(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

Router(config-if)#exit
Router(config)#router eigrp 123
Router(config-router)#network 192.168.1.32
Router(config-router)#network 192.168.1.96
Router(config-router)#no auto-summary
Router(config-router)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#
```


Bogota_R2
Physical
Config
CLI
IOS Command Line Interface
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fas
Router(config)#interface fastEthernet 0/0
Router(config-if)#ip address 192.168.1.1 255.255.255.224
Router(config-if)#no shut
Router(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
Router(config-if)#exit
Router(config)#interface Se0/0/0
Router(config-if)#ip address 192.168.1.98 255.255.255.224
Router(config-if)#no shut
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
Router(config-if)#exit
Router(config)#interface Se0/1/0
Router(config-if)#ip address 192.168.1.130 255.255.255.224
Router(config-if)#clock rate 2000000
Router(config-if)#no shut
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
Router(config-if)#exit
Router(config)#router eigrp 123
Router(config-router)#network 192.168.1.0
Router(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 123: Neighbor 192.168.1.99 (Serial0/0/0) is up: new
adjacency
Router(config-router)#network 192.168.1.128
Router(config-router)#network 192.168.1.96
Router(config-router)#network 192.168.1.0
Router(config-router)#no auto-summary
Copy
Paste

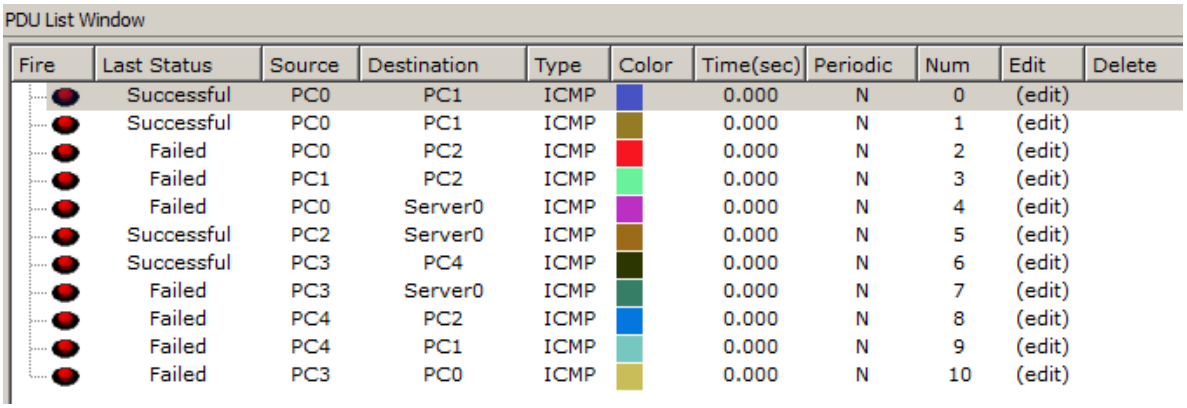


Parte 4: Configuración de las listas de Control de Acceso.

En este momento cualquier usuario de la red tiene acceso a todos sus dispositivos y estaciones de trabajo. El jefe de redes le solicita implementar seguridad en la red. Para esta labor se decide configurar listas de control de acceso (ACL) a los routers.

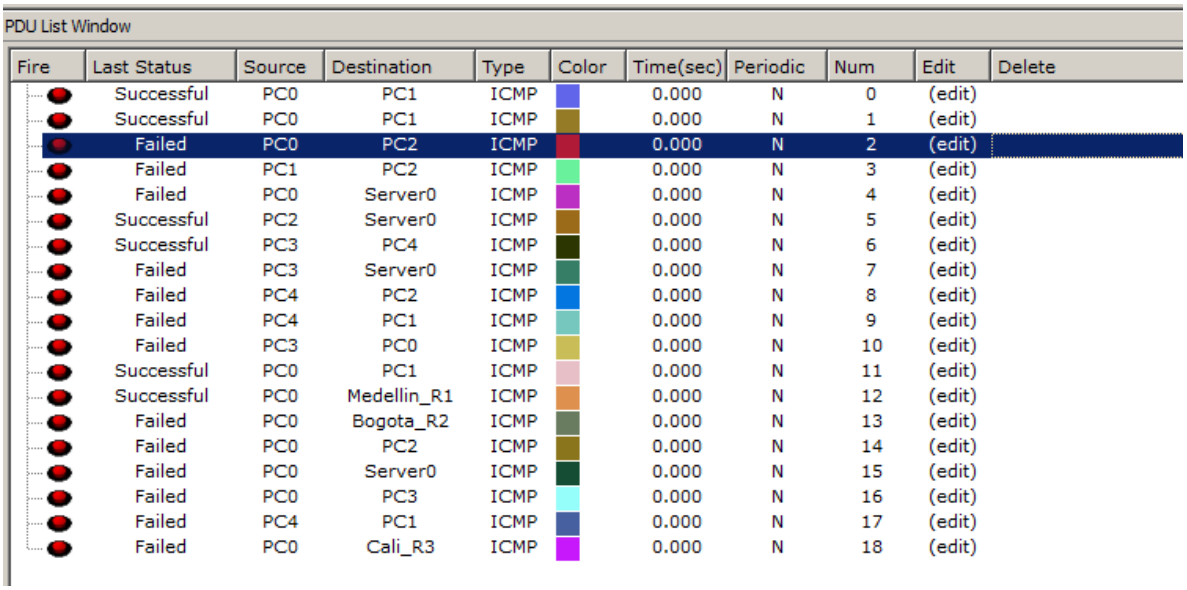
Las condiciones para crear las ACL son las siguientes:

Cada router debe estar habilitado para establecer conexiones Telnet con los demás routers y tener acceso a cualquier dispositivo en la red.



PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC0	PC1	ICMP		0.000	N	0	(edit)	
	Successful	PC0	PC1	ICMP		0.000	N	1	(edit)	
	Failed	PC0	PC2	ICMP		0.000	N	2	(edit)	
	Failed	PC1	PC2	ICMP		0.000	N	3	(edit)	
	Failed	PC0	Server0	ICMP		0.000	N	4	(edit)	
	Successful	PC2	Server0	ICMP		0.000	N	5	(edit)	
	Successful	PC3	PC4	ICMP		0.000	N	6	(edit)	
	Failed	PC3	Server0	ICMP		0.000	N	7	(edit)	
	Failed	PC4	PC2	ICMP		0.000	N	8	(edit)	
	Failed	PC4	PC1	ICMP		0.000	N	9	(edit)	
	Failed	PC3	PC0	ICMP		0.000	N	10	(edit)	



PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC0	PC1	ICMP		0.000	N	0	(edit)	
	Successful	PC0	PC1	ICMP		0.000	N	1	(edit)	
	Failed	PC0	PC2	ICMP		0.000	N	2	(edit)	
	Failed	PC1	PC2	ICMP		0.000	N	3	(edit)	
	Failed	PC0	Server0	ICMP		0.000	N	4	(edit)	
	Successful	PC2	Server0	ICMP		0.000	N	5	(edit)	
	Successful	PC3	PC4	ICMP		0.000	N	6	(edit)	
	Failed	PC3	Server0	ICMP		0.000	N	7	(edit)	
	Failed	PC4	PC2	ICMP		0.000	N	8	(edit)	
	Failed	PC4	PC1	ICMP		0.000	N	9	(edit)	
	Failed	PC3	PC0	ICMP		0.000	N	10	(edit)	
	Successful	PC0	PC1	ICMP		0.000	N	11	(edit)	
	Successful	PC0	Medellin_R1	ICMP		0.000	N	12	(edit)	
	Failed	PC0	Bogota_R2	ICMP		0.000	N	13	(edit)	
	Failed	PC0	PC2	ICMP		0.000	N	14	(edit)	
	Failed	PC0	Server0	ICMP		0.000	N	15	(edit)	
	Failed	PC0	PC3	ICMP		0.000	N	16	(edit)	
	Failed	PC4	PC1	ICMP		0.000	N	17	(edit)	
	Failed	PC0	Cali_R3	ICMP		0.000	N	18	(edit)	

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

Router medellin

```
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#line vty 0 4
Router(config-line)#password 123
Router(config-line)#login
Router(config-line)#exit
Router(config)#enable secret
% Incomplete command.
Router(config)#enable secret 123
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#exit
```

SW_R medellin

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname SW_Medellin
SW_Medellin(config)#exit
SW_Medellin#
%SYS-5-CONFIG_I: Configured from console by console

SW_Medellin#write
Building configuration...
[OK]
SW_Medellin#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
SW_Medellin(config)#enable password 123
SW_Medellin(config)#line VTY 0 4
SW_Medellin(config-line)#login
% Login disabled on line 1, until 'password' is set
% Login disabled on line 2, until 'password' is set
% Login disabled on line 3, until 'password' is set
% Login disabled on line 4, until 'password' is set
% Login disabled on line 5, until 'password' is set
SW_Medellin(config-line)#password 123
SW_Medellin(config-line)#exit
SW_Medellin(config)#
```

Router Bogota

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#line vty 0 4
Router(config-line)#password 123
Router(config-line)#login
Router(config-line)#exit
Router(config)#enable secret 123
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#exit
```

SW_R Bogota

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname SW1_Bogota
SW1_Bogota(config)#exit
SW1_Bogota#
%SYS-5-CONFIG_I: Configured from console by console

SW1_Bogota#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
SW1_Bogota(config)#enable password 123
SW1_Bogota(config)#line vty 0 4
SW1_Bogota(config-line)#login
% Login disabled on line 1, until 'password' is set
% Login disabled on line 2, until 'password' is set
% Login disabled on line 3, until 'password' is set
% Login disabled on line 4, until 'password' is set
% Login disabled on line 5, until 'password' is set
SW1_Bogota(config-line)#password 123
SW1_Bogota(config-line)#exit
SW1_Bogota(config)#exit
SW1_Bogota#
%SYS-5-CONFIG_I: Configured from console by console

SW1_Bogota#enable
SW1_Bogota#exit
```

Router Cali

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#line vty 0 4
Router(config-line)#password 123
Router(config-line)#login
Router(config-line)#exit
Router(config)#enable secret 123
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#exit
```

SW_R Cali

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname SW_Cali
SW_Cali(config)#exit
SW_Cali#
%SYS-5-CONFIG_I: Configured from console by console

SW_Cali#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
SW_Cali(config)#enable password 123
SW_Cali(config)#line vty 0 4
SW_Cali(config-line)#login
% Login disabled on line 1, until 'password' is set
% Login disabled on line 2, until 'password' is set
% Login disabled on line 3, until 'password' is set
% Login disabled on line 4, until 'password' is set
% Login disabled on line 5, until 'password' is set
SW_Cali(config-line)#password 123
SW_Cali(config-line)#exit
SW_Cali(config)#exit
SW_Cali#
%SYS-5-CONFIG_I: Configured from console by console

SW_Cali#exit









SW_Cali con0 is now available
```

Parte 5: Comprobación de la red instalada.

a. Se debe probar que la configuración de las listas de acceso fue exitosa.
b. Comprobar y Completar la siguiente tabla de condiciones de prueba para confirmar el óptimo funcionamiento de la red e.

	ORIGEN	DESTINO	RESULTADO
TELNET	Router MEDELLIN	Router CALI	
	WS_1	Router BOGOTA	
	Servidor	Router CALI	
	Servidor	Router MEDELLIN	
TELNET	LAN del Router MEDELLIN	Router CALI	
	LAN del Router CALI	Router CALI	
	LAN del Router MEDELLIN	Router MEDELLIN	
	LAN del Router CALI	Router MEDELLIN	
PING	LAN del Router CALI	WS_1	
	LAN del Router MEDELLIN	WS_1	
	LAN del Router MEDELLIN	LAN del Router CALI	
PING	LAN del Router CALI	Servidor	
	LAN del Router MEDELLIN	Servidor	
	Servidor	LAN del Router MEDELLIN	
	Servidor	LAN del Router CALI	
	Router CALI	LAN del Router MEDELLIN	
	Router MEDELLIN	LAN del Router CALI	

```
SW_Medellin>enable
Password:
SW_Medellin#exit



SW_Medellin con0 is now available



Press RETURN to get started.
```

```
SW1_Bogota>enable
Password:
SW1_Bogota#exit



SW1_Bogota con0 is now available



Press RETURN to get started.
```

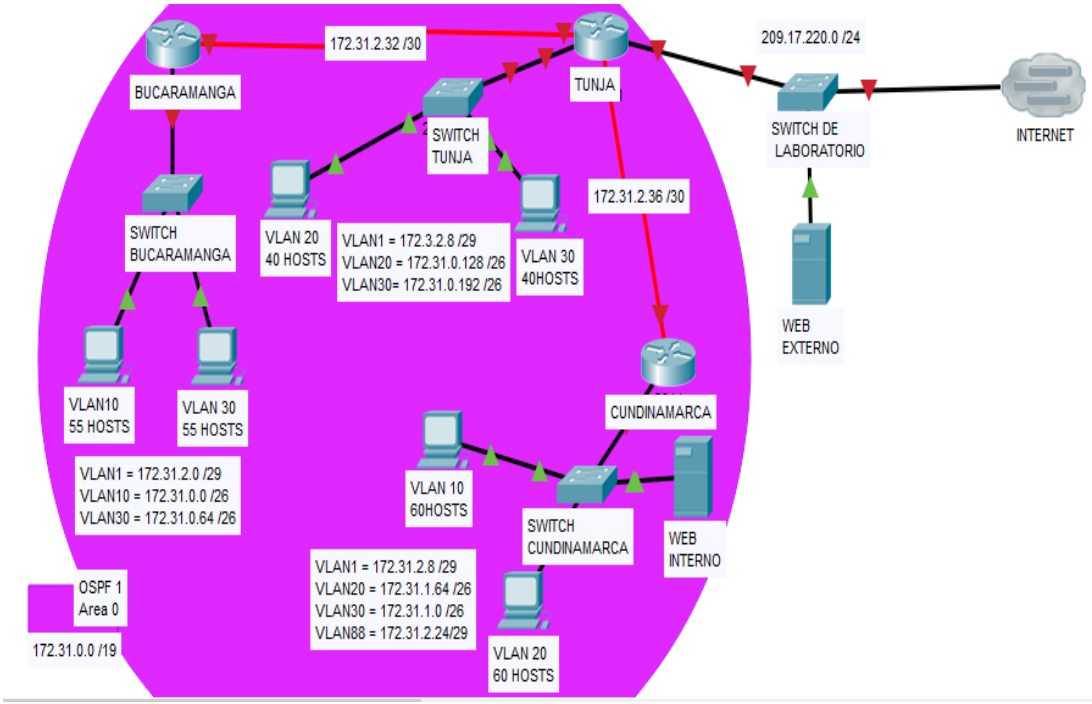
```
SW_Cali>enable
Password:
SW_Cali#exit



SW_Cali con0 is now available



Press RETURN to get started.
```

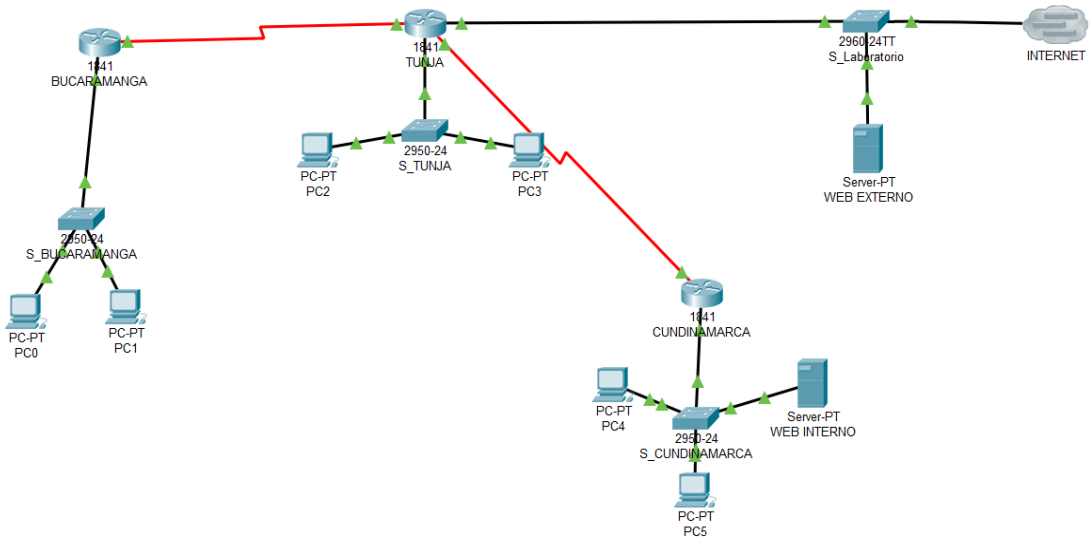
```
Router>enable
Password:
Router#show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone
Device ID    Local Intrfce   Holdtme    Capability   Platform    Port ID
Router       Ser 0/0/0        140            R       C1841       Ser 0/0/0
SW_Medellin  Fas 0/0          140            S       2960        Fas 0/1
Router#exit
```

5.2 Escenario 2

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.

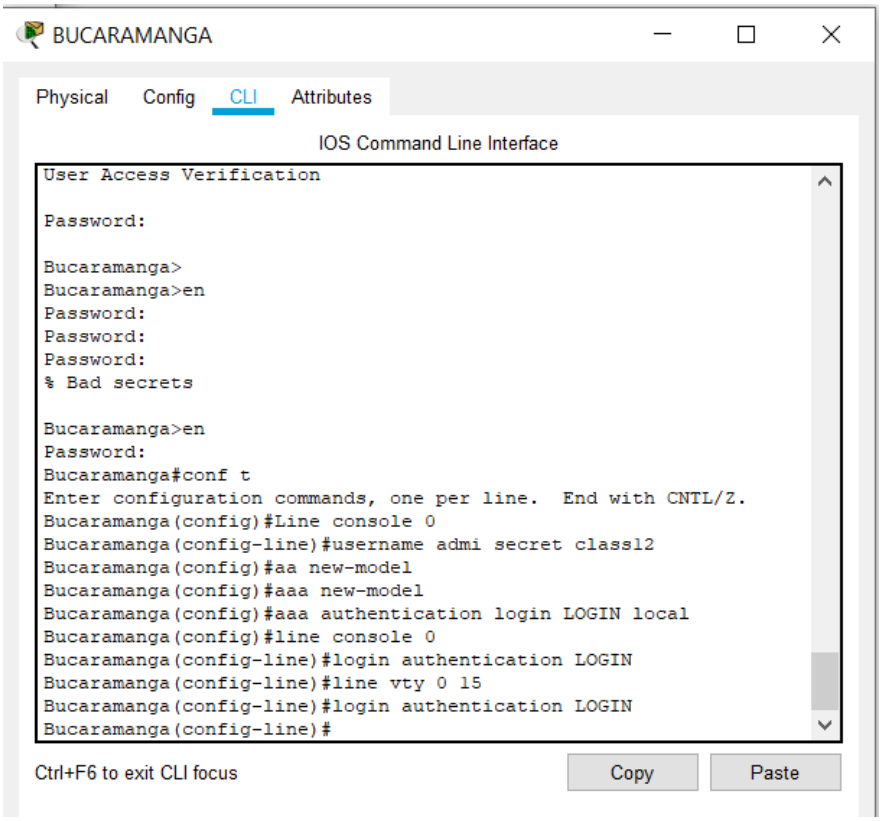


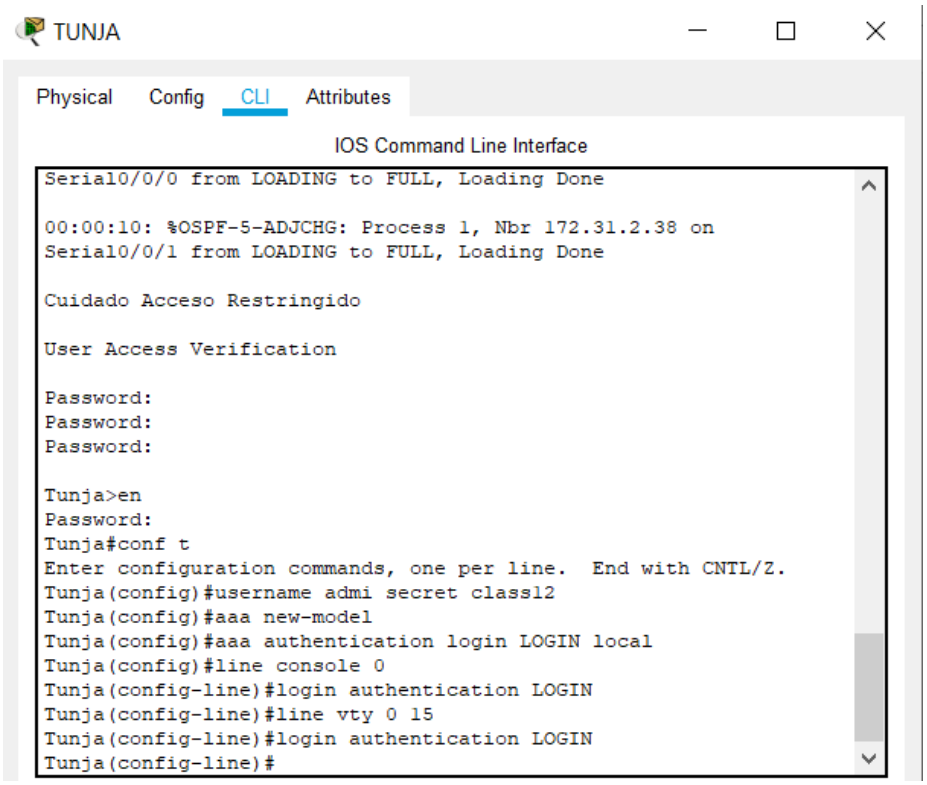


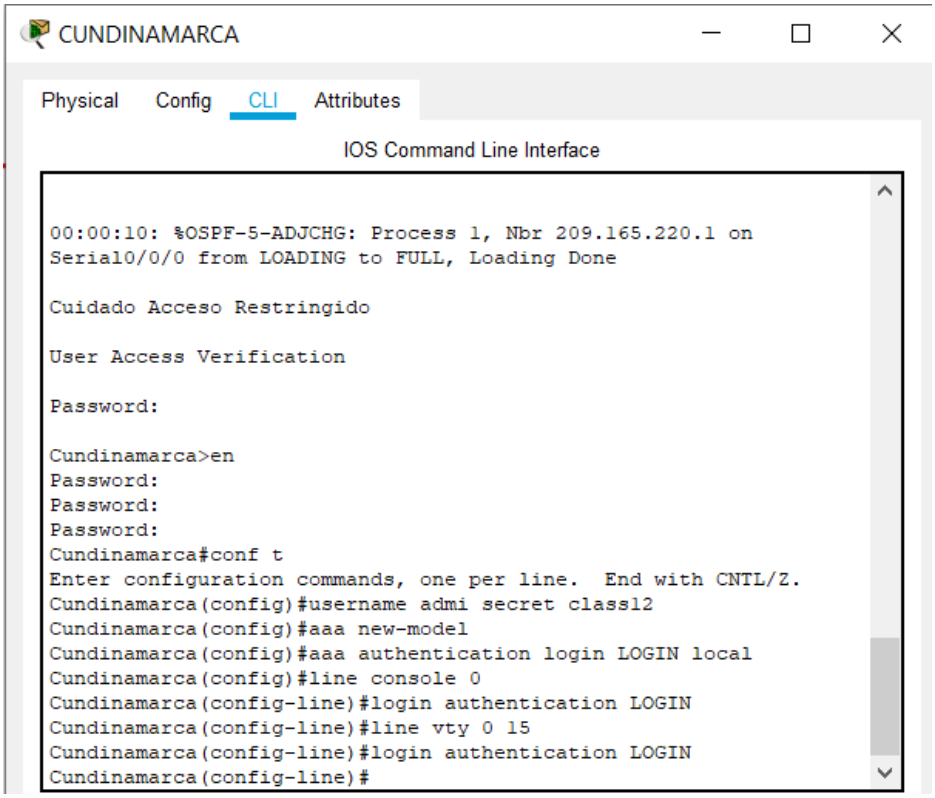
Desarrollo

Los siguientes son los requerimientos necesarios:

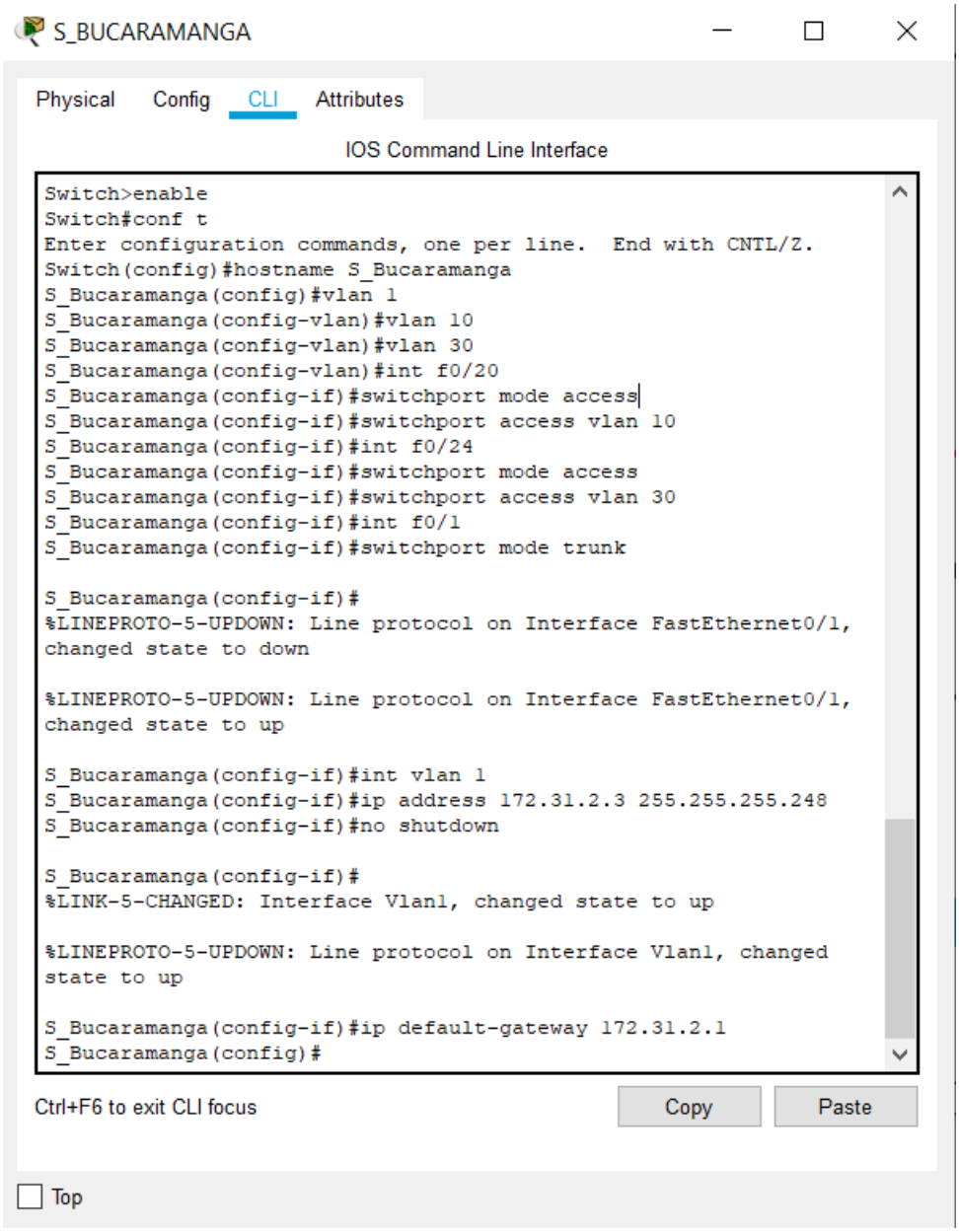
1. Todos los routers deberán tener los siguiente:
   - Configuración básica.
   - Autenticación local con AAA.




TUNJA
Physical
Config
CLI
Attributes
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



Switch>enable

Switch#conf t

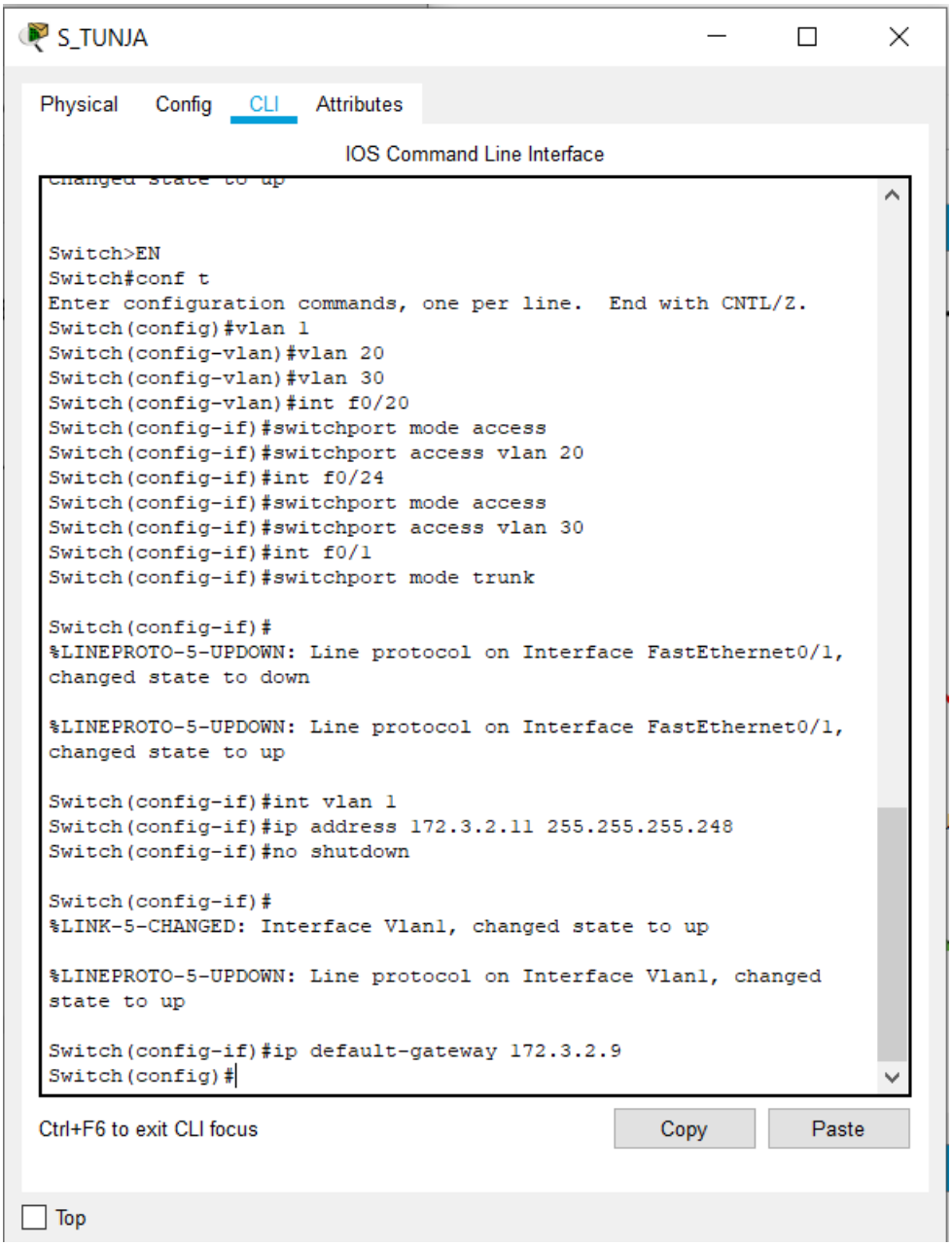
Enter configuration commands, one per line. End with CNTL/Z.

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

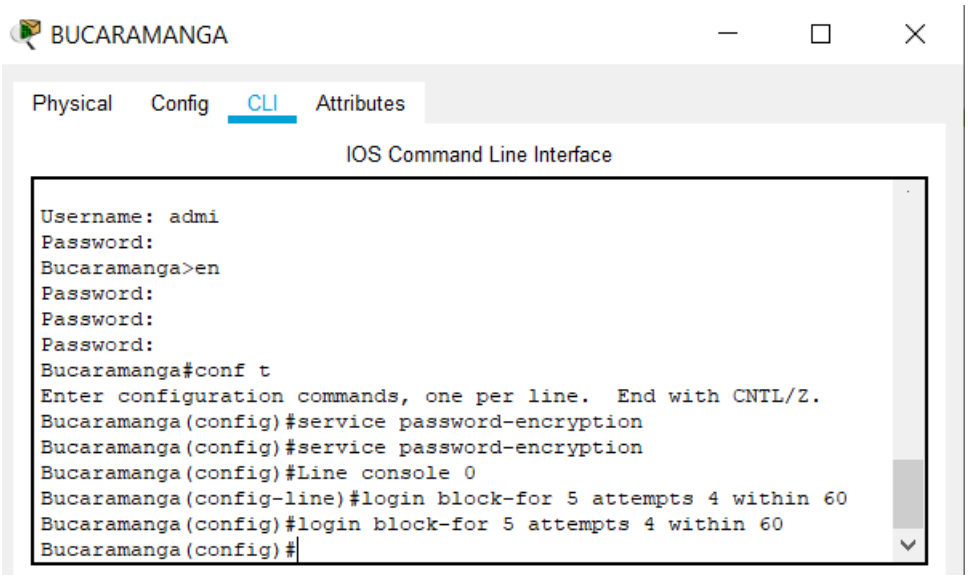
Switch#conf t

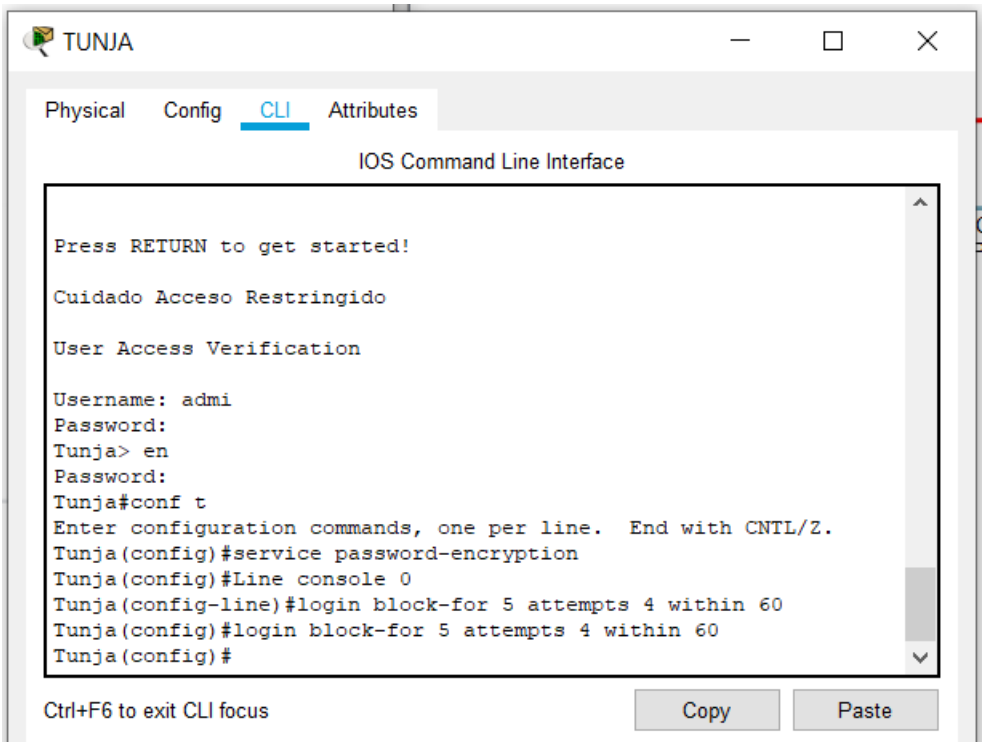
Enter configuration commands, one per line. End with CNTL/Z.

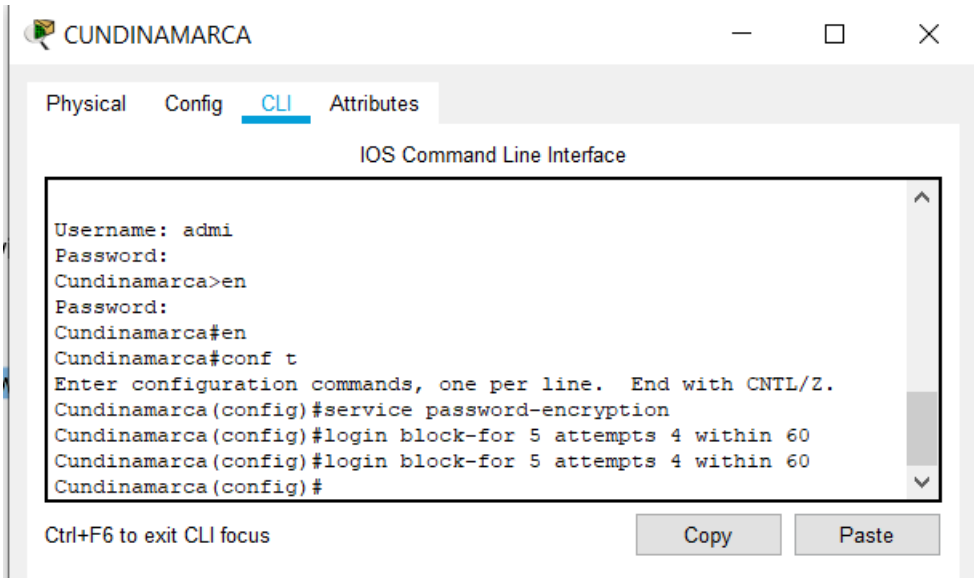
Switch(config)#vlan 1

```
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)#
```

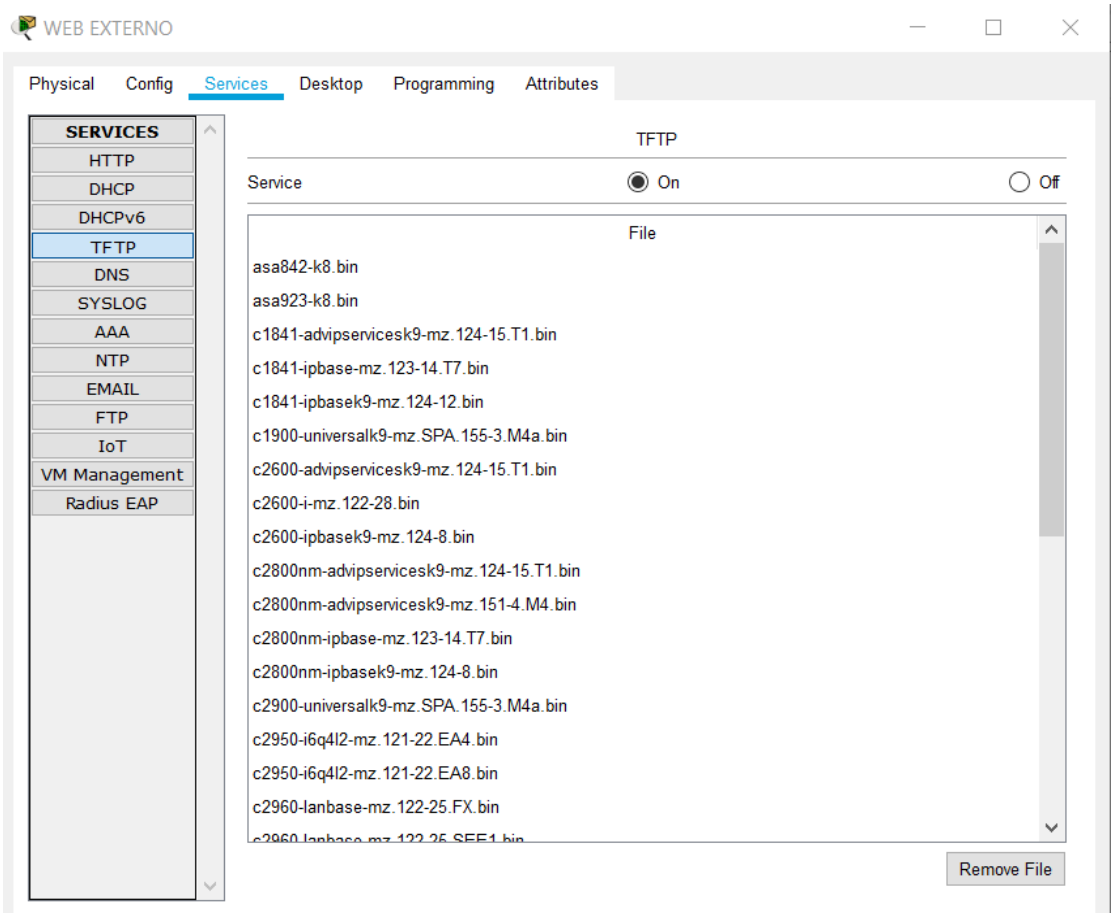
- Cifrado de contraseñas.
- Un máximo de internos para acceder al router.
- Máximo tiempo de acceso al detectar ataques.
- Establezca un servidor TFTP y almacene todos los archivos necesarios de los routers.



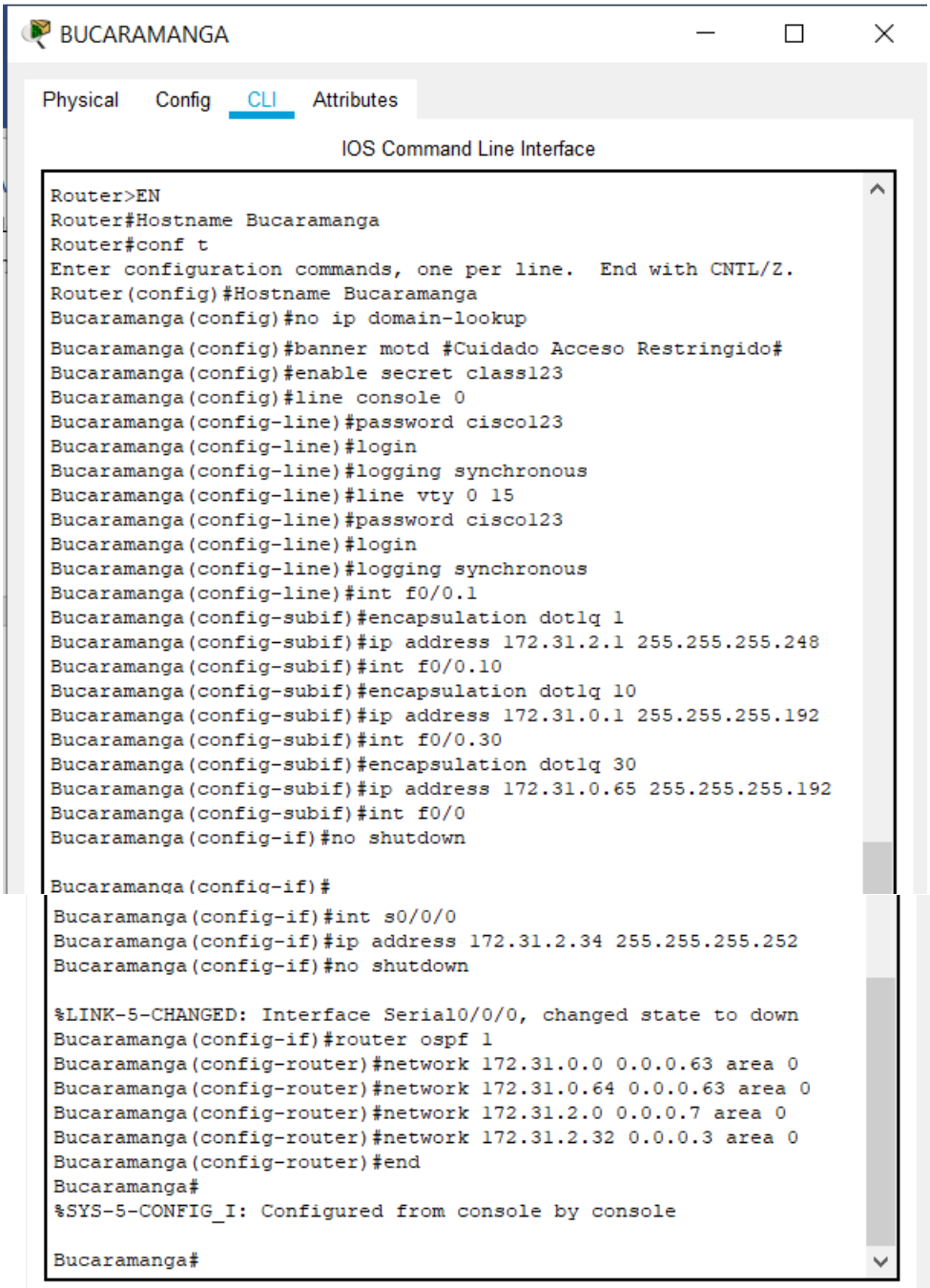




Servidor TFTP



Router Bucaramanga

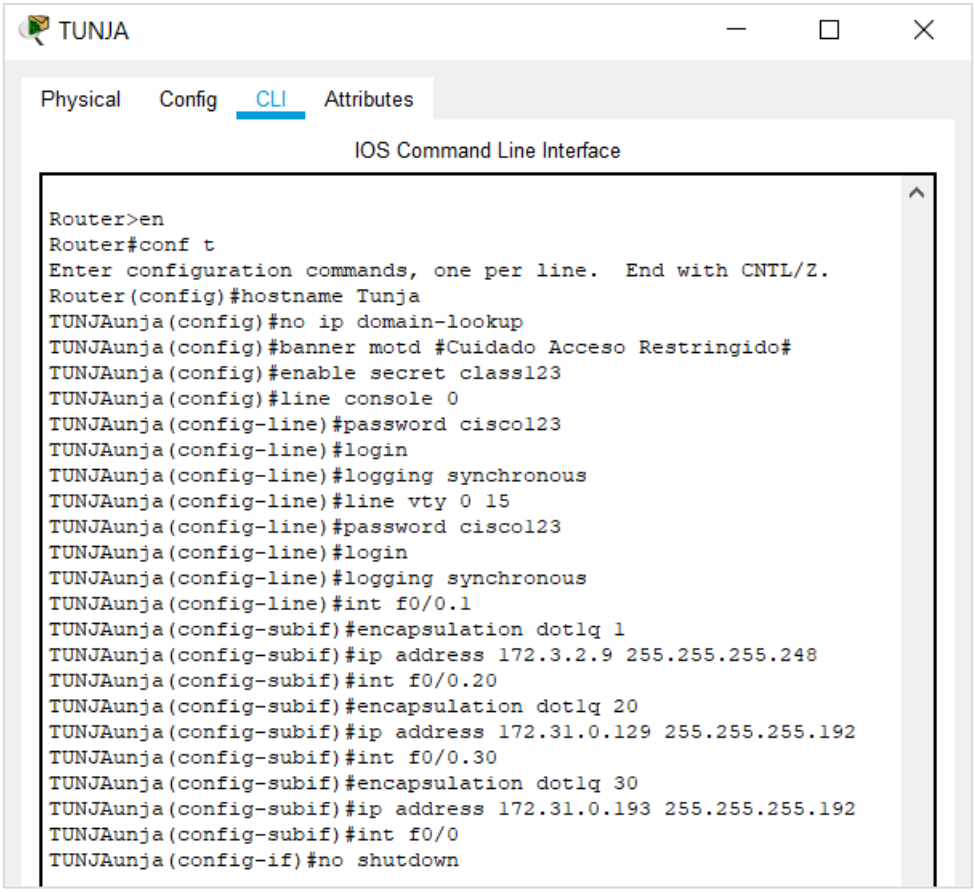


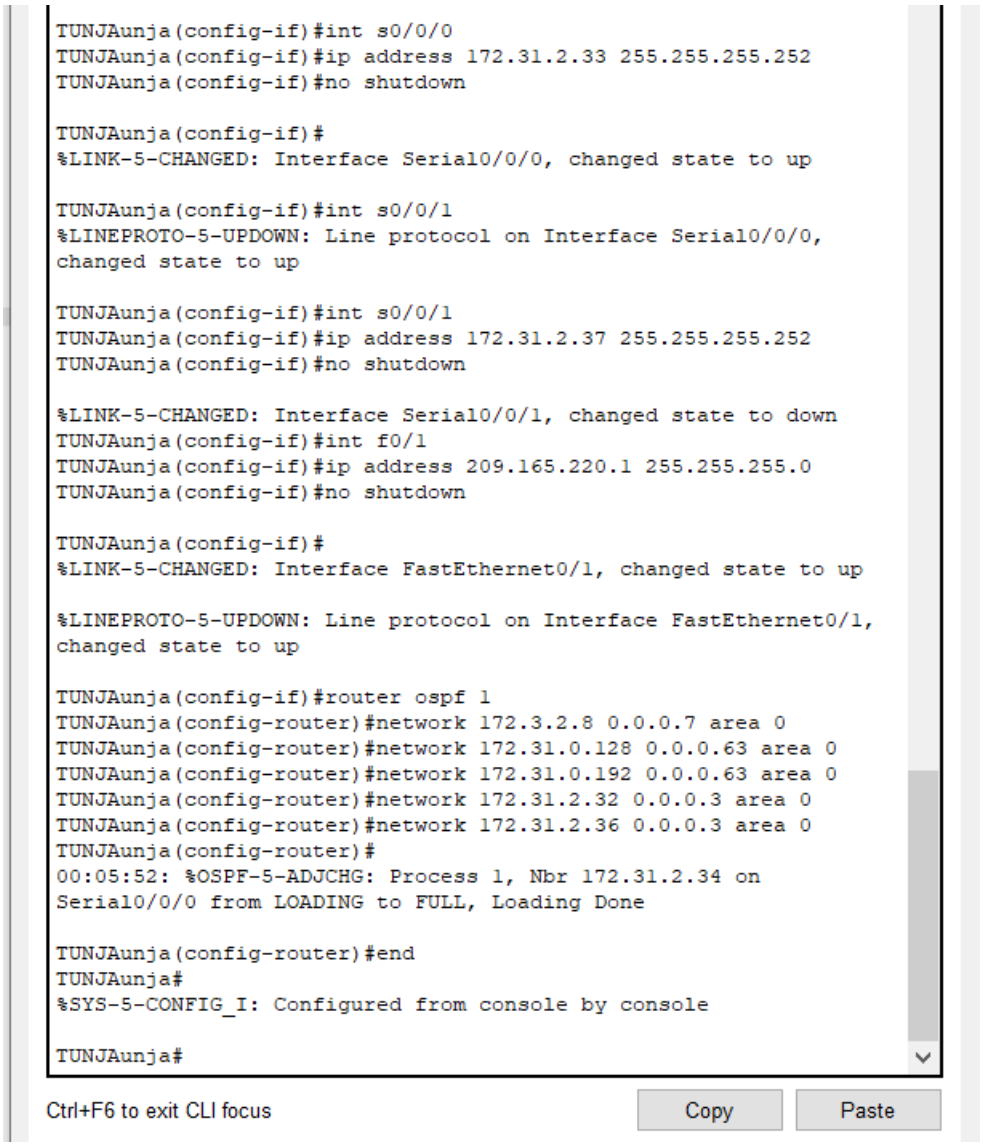
Router>EN
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#Hostname Bucaramanga

```
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





Router>en

Router#conf t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#hostname TUNJAunja

TUNJAunja(config)#no ip domain-lookup

TUNJAunja(config)#banner motd #Cuidado Acceso Restringido#

TUNJAunja(config)#enable secret class123

TUNJAunja(config)#line console 0

```
TUNJAunja(config-line)#password cisco123
TUNJAunja(config-line)#login
TUNJAunja(config-line)#logging synchronous
TUNJAunja(config-line)#line vty 0 15
TUNJAunja(config-line)#password cisco123
TUNJAunja(config-line)#login
TUNJAunja(config-line)#logging synchronous
TUNJAunja(config-line)#int f0/0.1
TUNJAunja(config-subif)#encapsulation dot1q 1
TUNJAunja(config-subif)#ip address 172.3.2.9 255.255.255.248
TUNJAunja(config-subif)#int f0/0.20
TUNJAunja(config-subif)#encapsulation dot1q 20
TUNJAunja(config-subif)#ip address 172.31.0.129 255.255.255.192
TUNJAunja(config-subif)#int f0/0.30
TUNJAunja(config-subif)#encapsulation dot1q 30
TUNJAunja(config-subif)#ip address 172.31.0.193 255.255.255.192
TUNJAunja(config-subif)#int f0/0
TUNJAunja(config-if)#no shutdown

TUNJAunja(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

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#

TUNJAunja#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

TUNJAunja(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

```
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

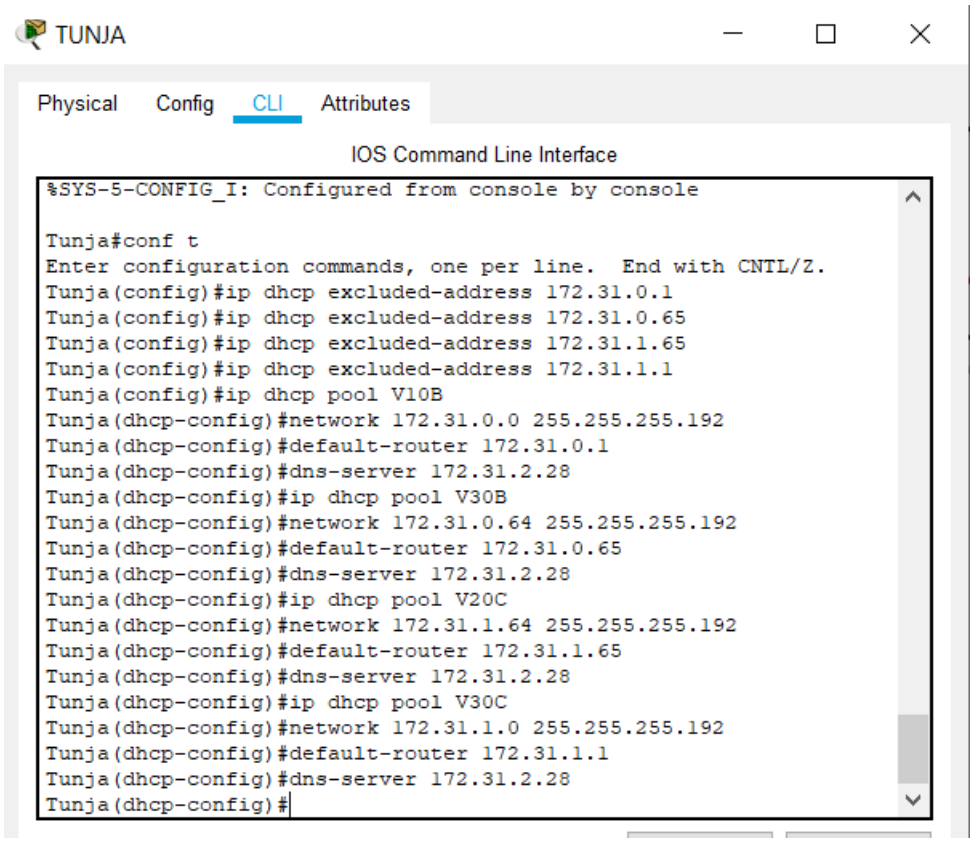
%LINK-5-CHANGED: Interface FastEthernet0/0.88, changed state to up

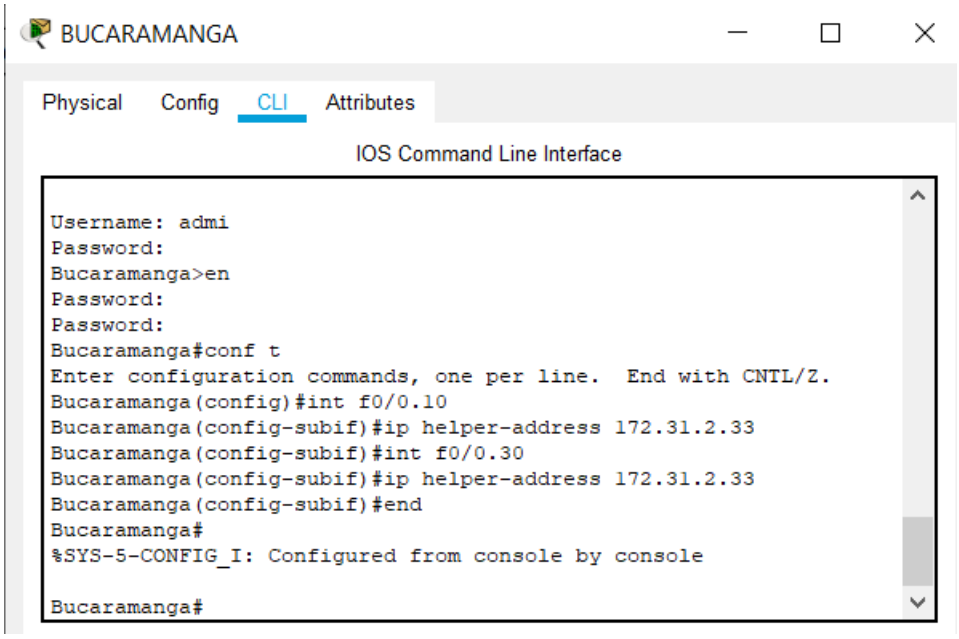
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.88, changed state to up

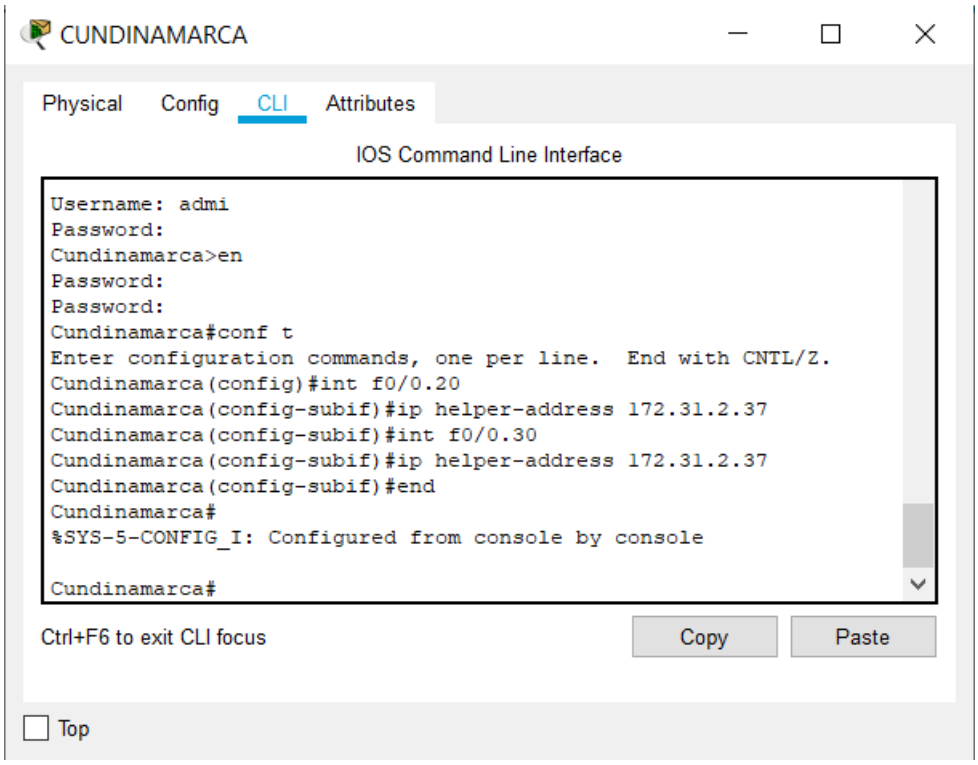
Cundinamarca(config-if)#int s0/0/0

```
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#
```

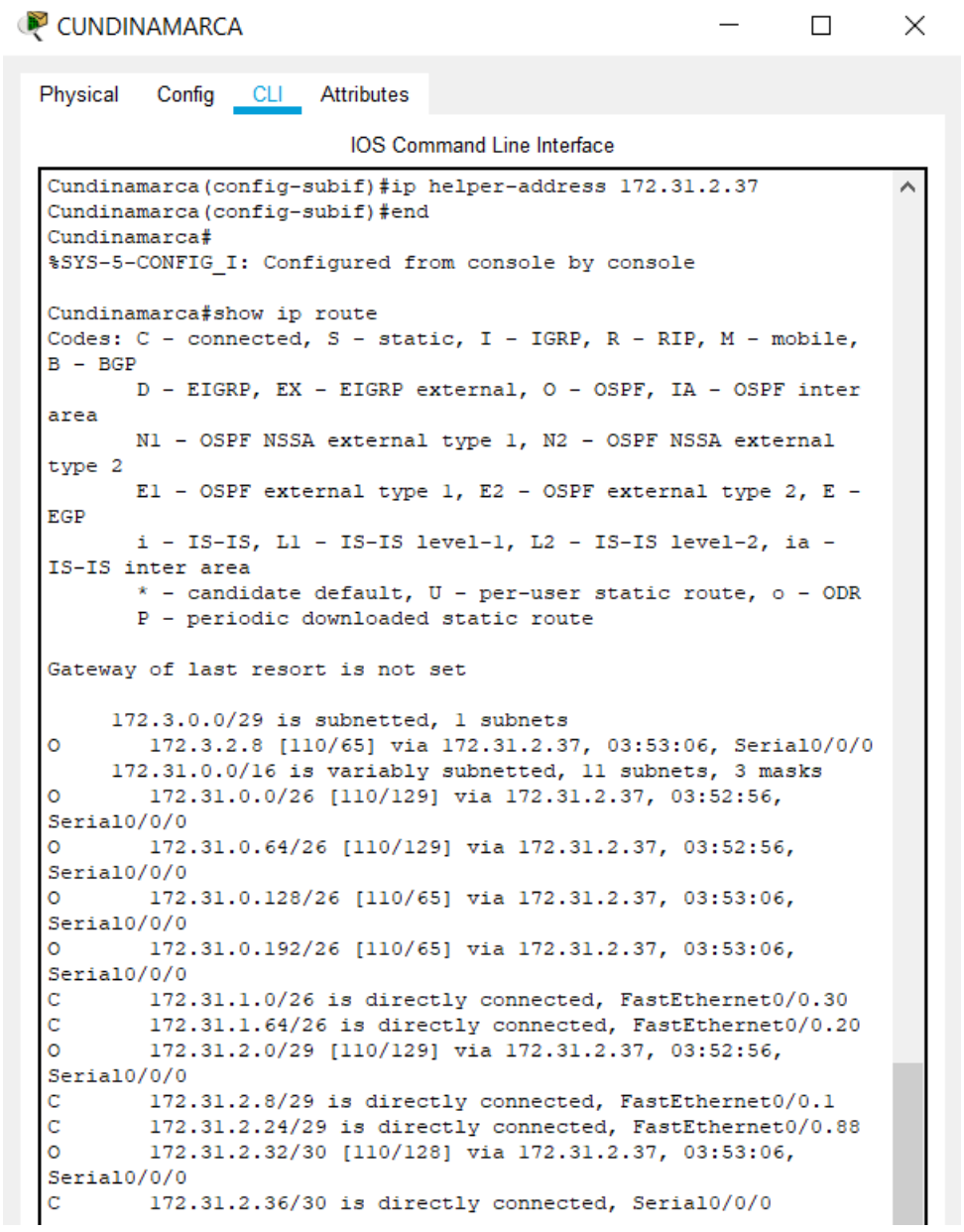
2. El DHCP deberá proporcionar solo direcciones a los hosts de Bucaramanga y Cundinamarca

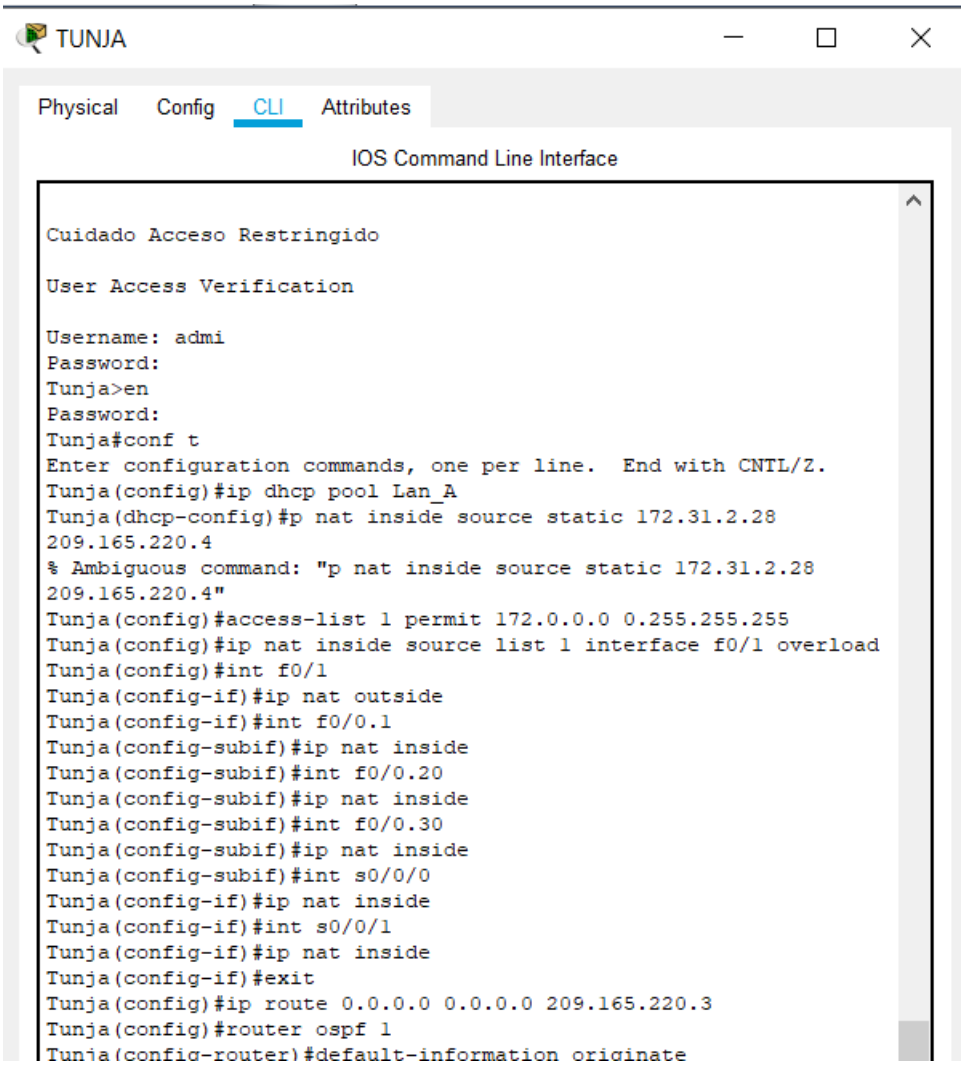

TUNJA
Physical
Config
CLI
Attributes
IOS Command Line Interface
%SYS-5-CONFIG_I: Configured from console by console
Tunja#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Tunja(config)#ip dhcp excluded-address 172.31.0.1
Tunja(config)#ip dhcp excluded-address 172.31.0.65
Tunja(config)#ip 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)#

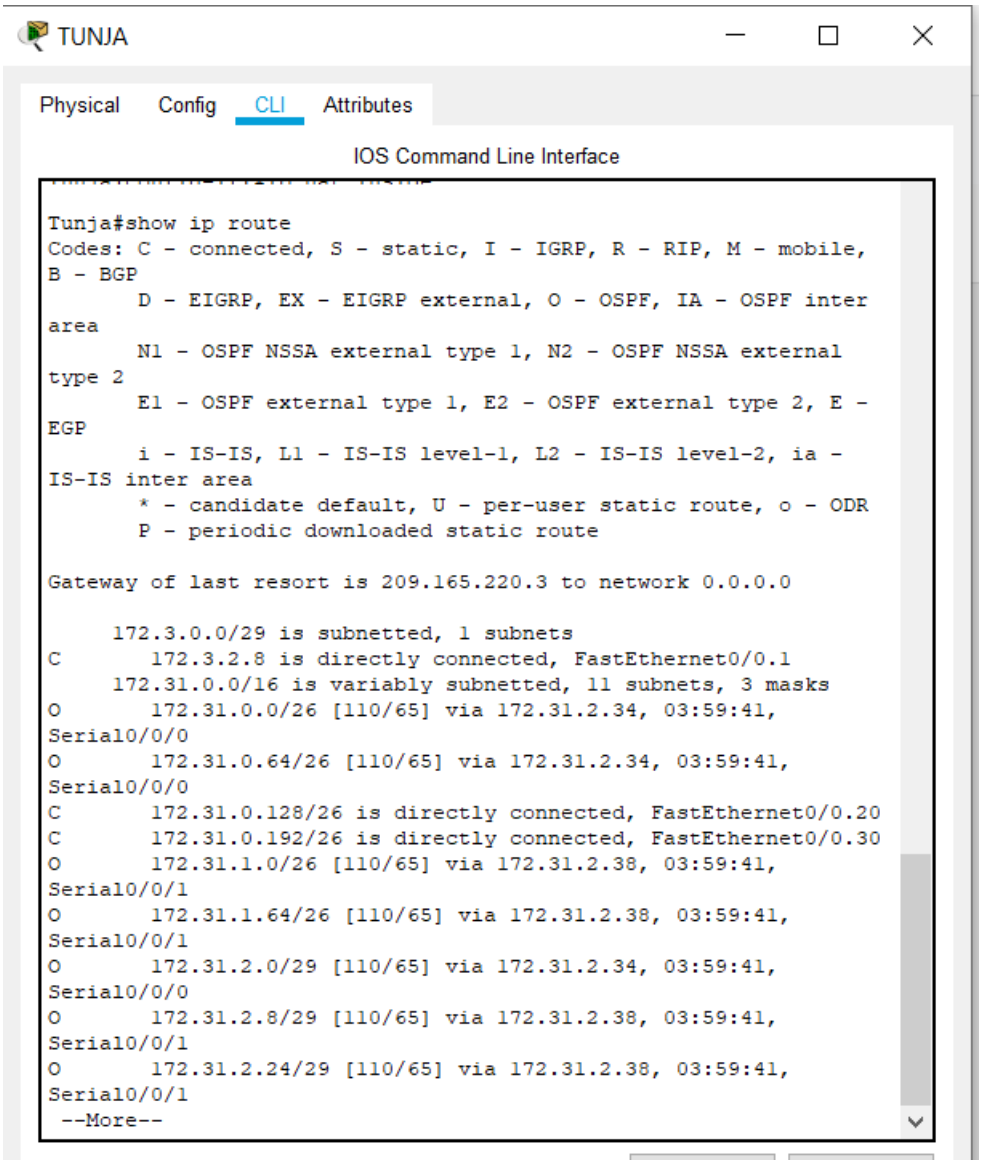

BUCARAMANGA
Physical
Config
CLI
Attributes
IOS Command Line Interface
Username: admi
Password:
Bucaramanga>en
Password:
Password:
Bucaramanga#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Bucaramanga(config)#int f0/0.10
Bucaramanga(config-subif)#ip helper-address 172.31.2.33
Bucaramanga(config-subif)#int 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#

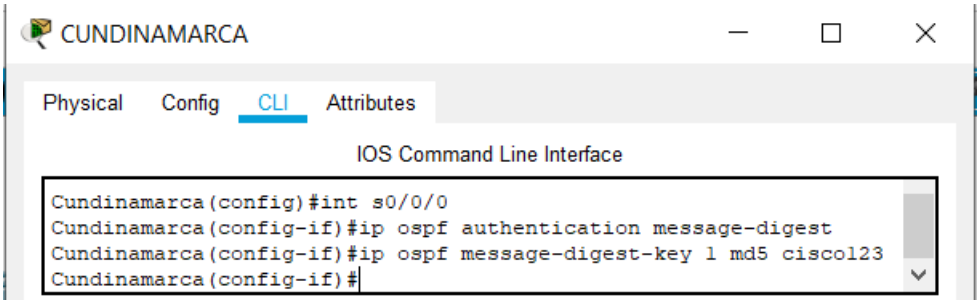

CUNDINAMARCA
Physical
Config
CLI
Attributes
IOS Command Line Interface
Username: admi
Password:
Cundinamarca>en
Password:
Password:
Cundinamarca#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Cundinamarca(config)#int f0/0.20
Cundinamarca(config-subif)#ip helper-address 172.31.2.37
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).

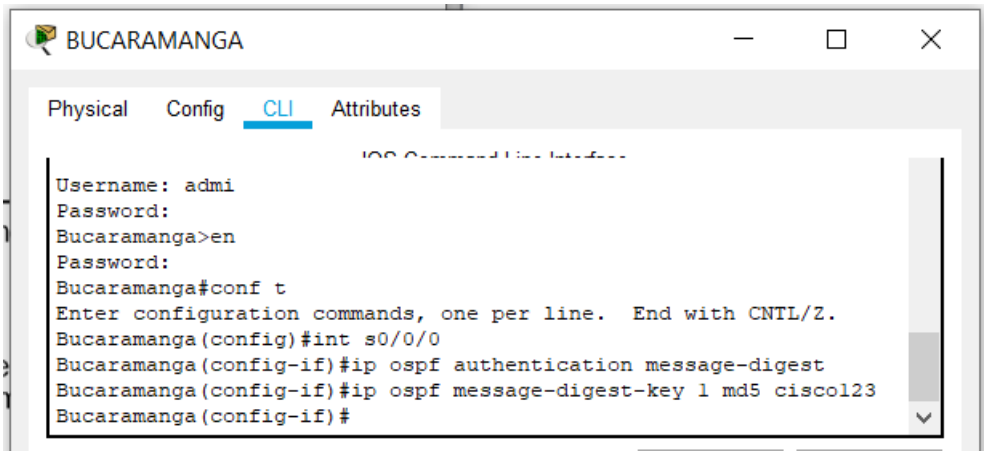


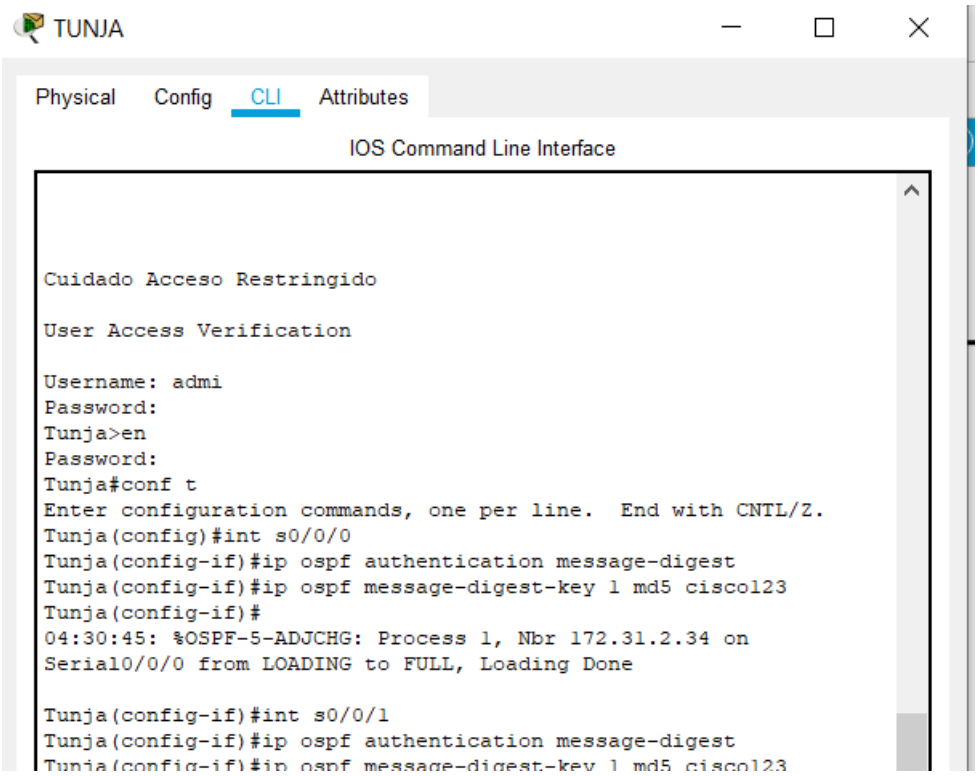

TUNJA
Physical
Config
CLI
Attributes
IOS Command Line Interface
Cuidado Acceso Restringido
User Access Verification
Username: admi
Password:
Tunja>en
Password:
Tunja#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Tunja(config)#ip dhcp pool Lan_A
Tunja(dhcp-config)#p nat inside source static 172.31.2.28
209.165.220.4
% Ambiguous command: "p nat inside source static 172.31.2.28
209.165.220.4"
Tunja(config)#access-list 1 permit 172.0.0.0 0.255.255.255
Tunja(config)#ip nat inside source list 1 interface f0/1 overload
Tunja(config)#int f0/1
Tunja(config-if)#ip nat outside
Tunja(config-if)#int f0/0.1
Tunja(config-subif)#ip nat inside
Tunja(config-subif)#int f0/0.20
Tunja(config-subif)#ip nat inside
Tunja(config-subif)#int f0/0.30
Tunja(config-subif)#ip nat inside
Tunja(config-subif)#int s0/0/0
Tunja(config-if)#ip nat inside
Tunja(config-if)#int s0/0/1
Tunja(config-if)#ip nat inside
Tunja(config-if)#exit
Tunja(config)#ip route 0.0.0.0 0.0.0.0 209.165.220.3
Tunja(config)#router ospf 1
Tunja(config-router)#default-information originate


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--

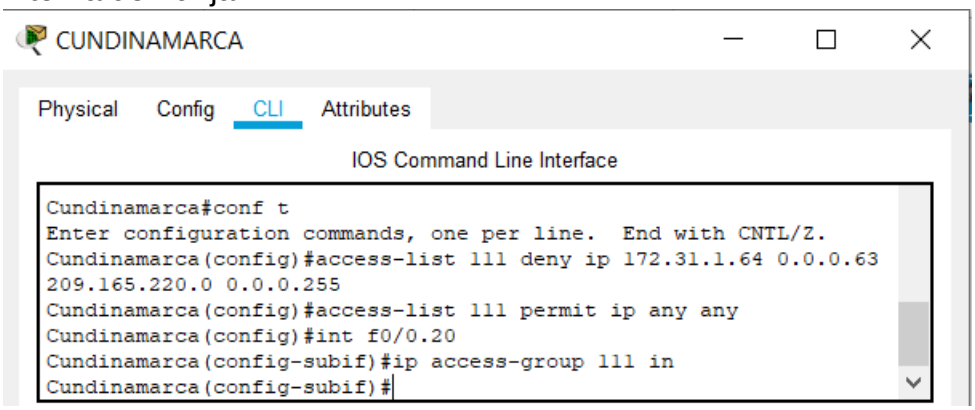

CUNDINAMARCA
Physical
Config
CLI
Attributes
IOS Command Line Interface
Cundinamarca(config)#int s0/0/0
Cundinamarca(config-if)#ip ospf authentication message-digest
Cundinamarca(config-if)#ip ospf message-digest-key 1 md5 ciscol23
Cundinamarca(config-if)#

4. El enrutamiento deberá tener autenticación.

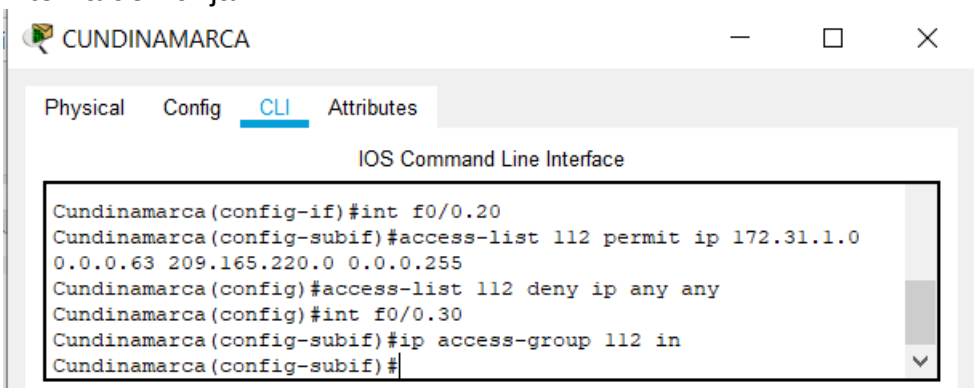




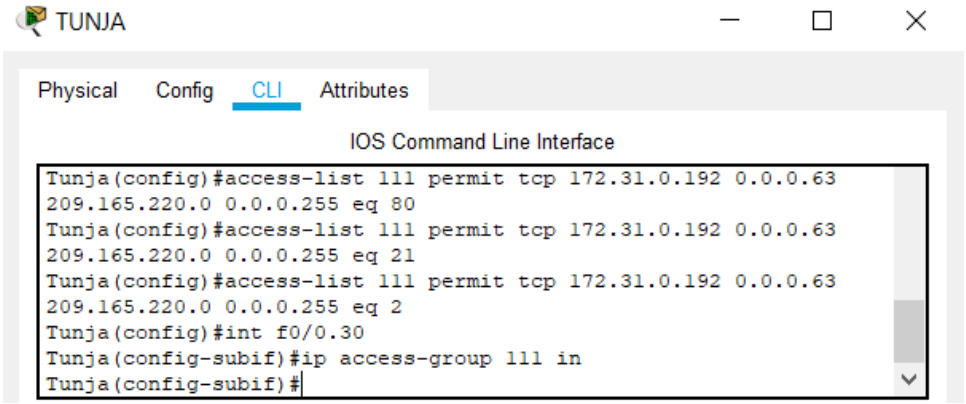
5. Listas de control de acceso:
   - Los hosts de VLAN 20 en Cundinamarca no acceden a internet, solo a la red interna de Tunja.



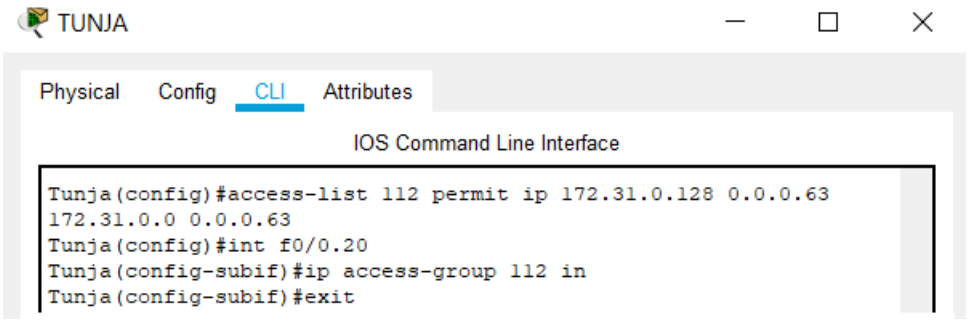
   - Los hosts de VLAN 10 en Cundinamarca si acceden a internet y no a la red interna de Tunja.



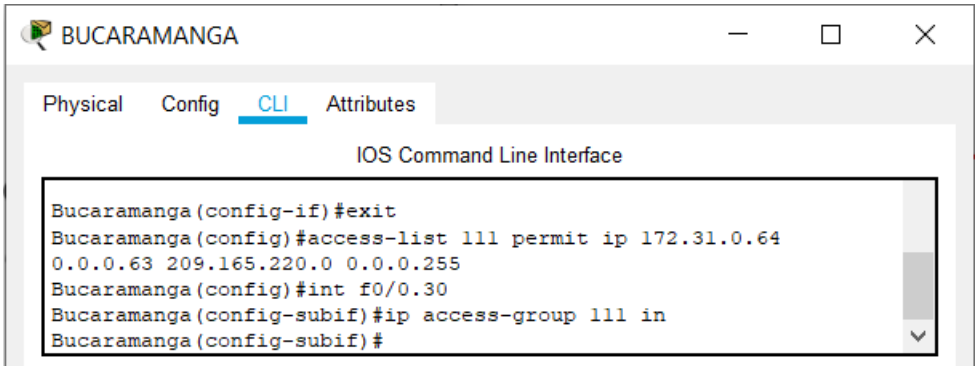
   - Los hosts de VLAN 30 en Tunja solo acceden a servidores web y ftp de internet.



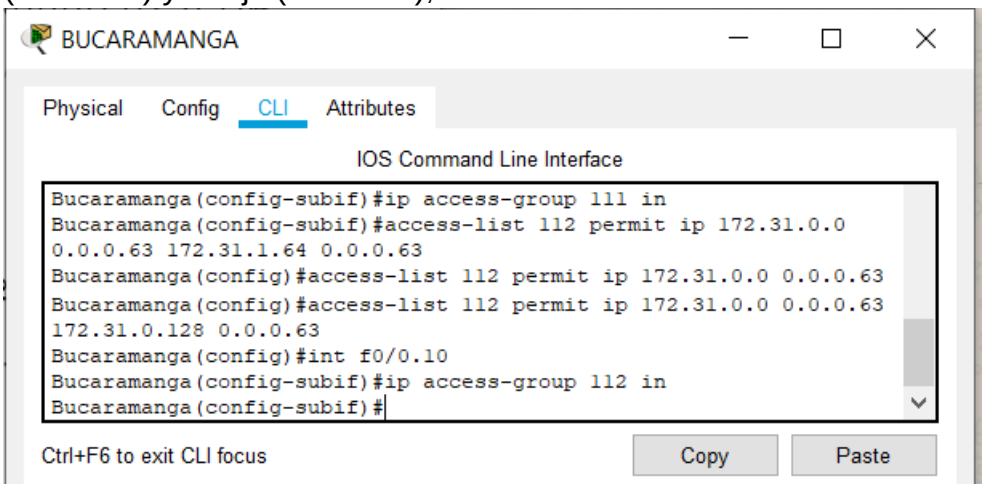
- Los hosts de VLAN 20 en Tunja solo acceden a la VLAN 20 de Cundinamarca y VLAN 10 de Bucaramanga.



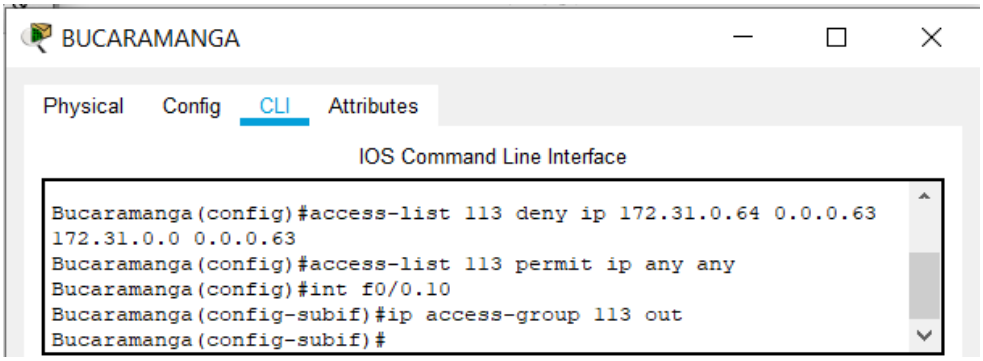
- Los hosts de VLAN 30 de Bucaramanga acceden a internet y a cualquier equipo de VLAN 10.

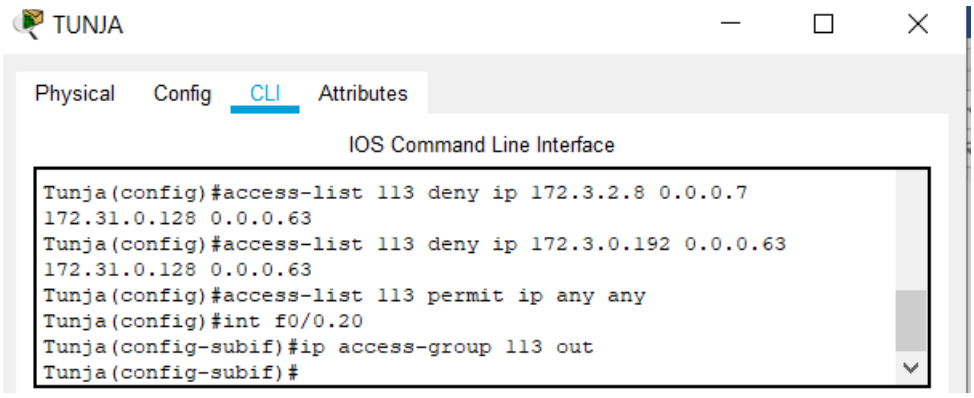


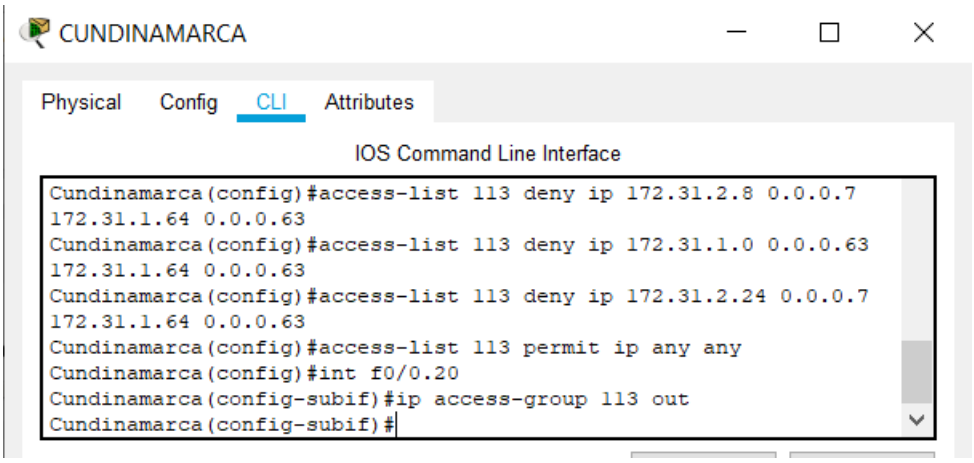
- Los hosts de VLAN 10 en Bucaramanga acceden a la red de Cundinamarca (VLAN 20) y Tunja (VLAN 20), no internet.



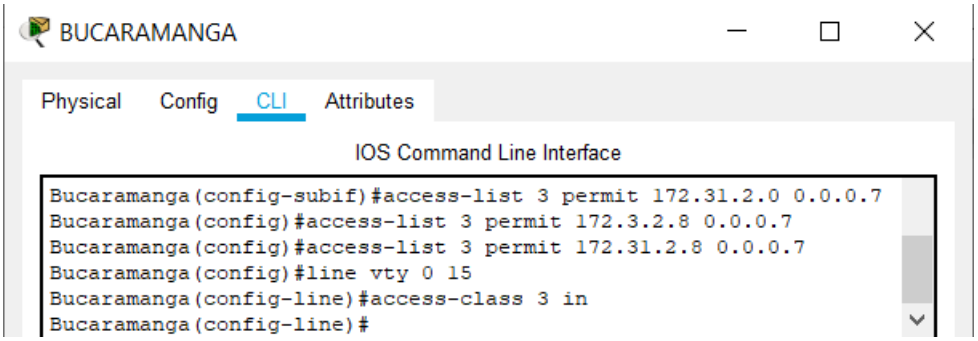
- Los hosts de una VLAN no pueden acceder a los de otra VLAN en una ciudad.

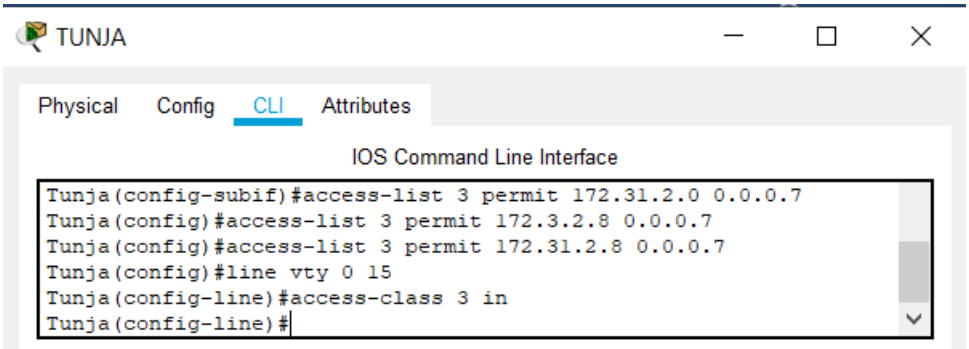


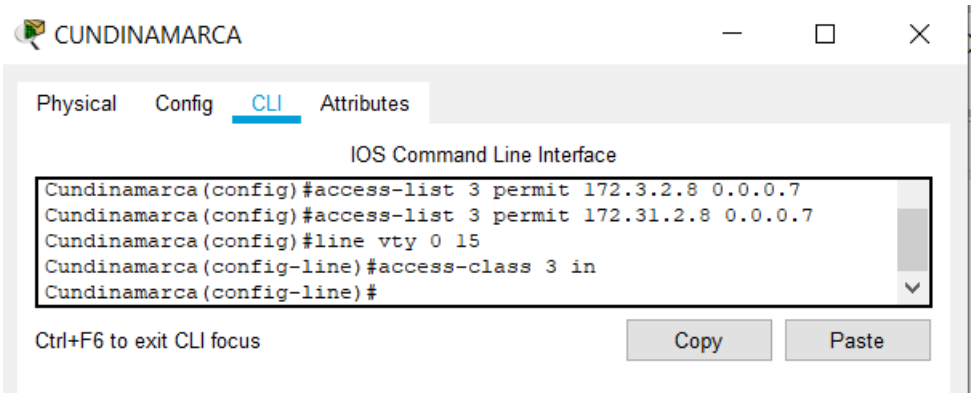




- Solo los hosts de las VLAN administrativas y de la VLAN de servidores tienen accedo a los routers e internet.







6. CONCLUSIONES

Con el desarrollo de este trabajo de manera general nos permitió conocer y desarrollar cada una de las temática, resaltar la importancia que tienen las redes a nivel global y en cada ámbito específico. Se desarrollan las competencias básicas que nos permiten llevar a cabo los procesos de configuración y administración de dispositivos de Networking mediante el estudio de los modelos OSI, la arquitectura TCP/IP además, del uso de recursos y herramientas en función de los protocolos y servicios

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