Diplomado De Profundización Cisco (Diseño E Implementación De Soluciones Integradas Lan / Wan)

Presentado Por:
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VALLEDUPAR
2019

Nota de Aceptación.

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Valledupar César, 12 de diciembre de 2019.

Dedicatoria

Quiero dedicar este logro principalmente a Dios quien fue el que me dio esta oportunidad, de poner en mi vida a la persona que me regalo esta hermosa carrera, mi madrina, lo dedico también a toda mi familia que han sido mi motor en este proceso, agradecer a la universidad por brindarme esta formación autónoma.

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Resumen

El presente trabajo es el resumen de la prueba de habilidades CCNA en el cual consiste de la realización de dos escenarios prácticos.

Dentro del presente informe el lector encontrará información como:

El resumen que le permita conocer los conceptos a manejar en la prueba de habilidades;

El registro de configuración de cada uno de los dispositivos, la descripción detallada del paso a paso de cada una de las etapas realizadas durante el proceso de aprendizaje, el registro de los procesos de verificación de conectividad mediante el uso de los comandos ping, traceroute, show ip route, entre otros.

Como toda actividad practica el presente informe contiene el contenido, resumen, abstract, introducción, objetivos, el desarrollo de los dos escenarios.

Para concluir el siguiente informe el lector encontrara las conclusiones relacionadas con los objetivos de aprendizaje y la bibliografía consultada utilizadas a lo largo de la construcción y desarrollo de la prueba de habilidades práctica.

Abstract

The present work is the summary of the CCNA skills test which consists of the realization of two practical scenarios.

Within this report the reader specified information such as:

The summary that allows you to know the concepts to handle in the skills test;

The configuration register of each of the devices, the specific description of the step by step of each of the stages performed during the learning process, the registration of the connectivity verification processes through the use of the ping, traceroute commands, show ip route, among others.

Like all practical activity this report contains the content, summary, summary, introduction, objectives, the development of the two scenarios.

To conclude the following report, the reader will find the conclusions related to the learning objectives and the bibliography consulted throughout the construction and development of the practical skills test.

Introducción

El presente proyecto de grado trata del desarrollo de la evaluación denominada prueba de habilidades prácticas, que consiste en realizar 2 escenarios prácticos, y tiene como objetivo identificar el grado de competencias, y habilidades, que fueron adquiridas a lo largo del diplomado.

La actividad se desarrolló paso por paso, agregando sus respectivos códigos, y captures de pantallas, como evidencias a resultados de comandos como: **ping** (comprobar la conectividad)**, traceroute** (cantidad de saltos)**, show ip route** (tabla de enrutamiento de los dispositivos)**.**

Configuraciones básicas de dispositivos, de enrutamiento, y de rutas tomadas por los mismos para dirigir el tráfico a la red interna o externa. Finalmente se utilizó la última versión de Packet tracer para el desarrollo de la actividad.

Objetivos

Objetivos Generales

Aplicar los diferentes protocolos y configuraciones de las redes en los dos escenarios propuestos utilizando conceptos tales como.

Fundamentos de Networking, Modelo OSI y Direccionamiento IP, Configuración de Sistemas de red soportados en VLANs, y Enrutamiento en soluciones de red.

Objetivos Específicos

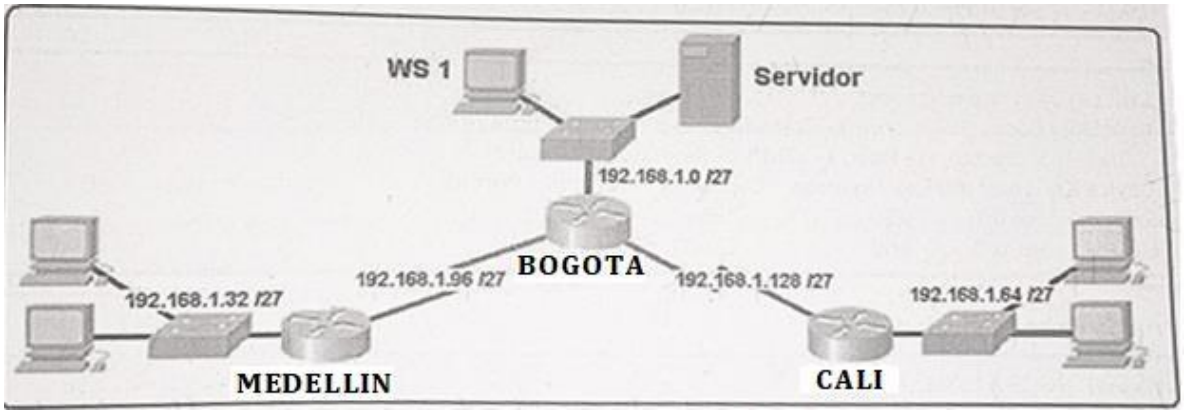
- Diseñar las topologías lógica y física de las redes propuestas en cada escenario.
- Documentar un esquema de direccionamiento según los requisitos.
- Aplicar configuración básica a los dispositivos de red.
- Realizar enrutamiento a las redes de los escenarios, utilizando los protocolos RID y OSPF.
- Configurar servicio DHCP
- Establecer una lista de control de acceso de acuerdo con los criterios señalados.
- Habilitar las opciones en puerto consola y terminal virtual

Desarrollo de los escenarios

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.



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 física 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.**

Para subnetear la red se utilizó la formula 2n donde N será los números de dígitos del ultimo octeto de la macará 255.255.255.0000. para ello tomamos 3 dígitos de dicho octeto, quedando como resultado: 23 =8, lo correcto sería tomarlo a 24 para tener más de 8 subredes dado que de cada red se deben de dejar de utilizar 2 redes que son la dirección de red y la dirección de Broadcast pero siguiendo el gráfico del escenario donde ya hay unas direcciones definidas con una máscara con prefijo 27 se muestra que se utilizó 23 de esa manera se obtienen 8 redes pero se tiene claro que solo será utilizadas 6 redes en total.

No	Subred	Primera IP utilizable	Ultima IP utilizable	Broadcast
1	192.168.1.0	192.168.1.1	192.168.1.30	192.168.1.31
2	192.168.1.32	192.168.1.33	192.168.1.62	192.168.1.63
3	192.168.1.64	192.168.1.65	192.168.1.94	192.168.1.95
4	192.168.1.96	192.168.1.97	192.168.1.126	192.168.1.127
5	192.168.1.128	192.168.1.129	192.168.1.158	192.168.1.159
6	192.168.1.160	192.168.1.161	192.168.1.190	192.168.1.191
7	192.168.1.192	192.168.1.193	192.168.1.122	192.168.1.123
8	192.168.1.224	192.168.1.225	192.168.1.254	192.168.1.255

b. **Asignar una dirección IP a la red.**

Se asignaron las direcciones de acuerdo a cada router

Medellín

UserAccess Verification

Password:

Medellin>enable

Password:

Hostname>Medellin

Medellin(config)#interface Serial0/1/0

Medellin(config-if)#ip address 192.168.1.99 255.255.255.224

Medellin(config-if)#no shutdown

Medellin(config)#interface GigabitEthernet0/0

Medellin(config-if)#ip address 192.168.1.33 255.255.255.224

Bogotá

Router#config t

Router(config)#hostname Bogota

Bogota(config)#

Bogota(config)#interface Serial0/1/0

Bogota(config-if)#ip address 192.168.1.98 255.255.255.224

Bogota(config-if)#no shutdown

Bogota(config)#interface Serial0/1/1

Bogota(config-if)#ip address 192.168.1.130 255.255.255.224

Bogota(config-if)#no shutdown

Bogota(config)#interface GigabitEthernet0/0

Bogota(config-if)#ip address 192.168.1.1 255.255.255.224

Bogota(config-if)#no shutdown

Cali

Router#config t

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

Router(config)#hostname Cali

Cali(config)#interface GigabitEthernet0/0

Cali(config)#interface Serial0/1/0

Cali(config-if)#ip address 192.168.1.131 255.255.255.224

Cali(config-if)#no shutdown

Cali(config)#interface GigabitEthernet0/0

Cali(config-if)#ip address 192.168.1.65 255.255.255.224

Cali(config-if)#no shutdown

Parte 2: Configuración Básica.

a. **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

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

Gateway of last resort is not set

192.168.1.0/24 is variably subnetted, 8 subnets, 2 masks
C 192.168.1.0/27 is directly connected, GigabitEthernet0/0
L 192.168.1.1/32 is directly connected, GigabitEthernet0/0
D 192.168.1.32/27 [90/2172416] via 192.168.1.99, 00:59:15, Serial0/1/0

D 192.168.1.64/27 [90/2172416] via 192.168.1.131, 00:59:14, Serial0/1/1
C 192.168.1.96/27 is directly connected, Serial0/1/0
L 192.168.1.98/32 is directly connected, Serial0/1/0
C 192.168.1.128/27 is directly connected, Serial0/1/1
L 192.168.1.130/32 is directly connected, Serial0/1/1

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

Gateway of last resort is not set

192.168.1.0/24 is variably subnetted, 7 subnets, 2 masks
D 192.168.1.0/27 [90/2172416] via 192.168.1.98, 00:57:09, Serial0/1/0
C 192.168.1.32/27 is directly connected, GigabitEthernet0/0
L 192.168.1.33/32 is directly connected, GigabitEthernet0/0
D 192.168.1.64/27 [90/2684416] via 192.168.1.98, 00:57:08, Serial0/1/0
C 192.168.1.96/27 is directly connected, Serial0/1/0
L 192.168.1.99/32 is directly connected, Serial0/1/0
D 192.168.1.128/27 [90/2681856] via 192.168.1.98, 00:57:09, Serial0/1/0

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

Gateway of last resort is not set

192.168.1.0/24 is variably subnetted, 7 subnets, 2 masks
D 192.168.1.0/27 [90/2172416] via 192.168.1.130, 01:00:17, Serial0/1/0
D 192.168.1.32/27 [90/2684416] via 192.168.1.130, 01:00:17, Serial0/1/0
C 192.168.1.64/27 is directly connected, GigabitEthernet0/0
L 192.168.1.65/32 is directly connected, GigabitEthernet0/0
D 192.168.1.96/27 [90/2681856] via 192.168.1.130, 01:00:17, Serial0/1/0
C 192.168.1.128/27 is directly connected, Serial0/1/0
L 192.168.1.131/32 is directly connected, Serial0/1/0

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

Utilizando el comando show ip route se realizó el balanceo de carga de cada router

```
Medellin>en
Medellin#show ip route 192.168.1.131
Routing entry for 192.168.1.128/27
Known via "eigrp 200", distance 90, metric 2681856, type internal
Redistributing via eigrp 200
Last update from 192.168.1.98 on Serial0/1/0, 00:23:15 ago
Routing Descriptor Blocks:
* 192.168.1.98, from 192.168.1.98, 00:23:15 ago, via Serial0/1/0
Route metric is 2681856, traffic share count is 1
Total delay is 40000 microseconds, minimum bandwidth is 1544 Kbit
Reliability 255/255, minimum MTU 1500 bytes
Loading 1/255, Hops 1

Medellin#show ip route 192.168.1.1
Routing entry for 192.168.1.0/27
Known via "eigrp 200", distance 90, metric 2172416, type internal
Redistributing via eigrp 200
Last update from 192.168.1.98 on Serial0/1/0, 00:25:32 ago
Routing Descriptor Blocks:
* 192.168.1.98, from 192.168.1.98, 00:25:32 ago, via Serial0/1/0
Route metric is 2172416, traffic share count is 1
Total delay is 20100 microseconds, minimum bandwidth is 1544 Kbit
Reliability 255/255, minimum MTU 1500 bytes
Loading 1/255, Hops 1

Cali>en
Cali#show ip route 192.168.1.33
Routing entry for 192.168.1.32/27
Known via "eigrp 200", distance 90, metric 2684416, type internal
Redistributing via eigrp 200
Last update from 192.168.1.130 on Serial0/1/0, 00:26:43 ago
Routing Descriptor Blocks:
* 192.168.1.130, from 192.168.1.130, 00:26:43 ago, via Serial0/1/0
Route metric is 2684416, traffic share count is 1
Total delay is 40100 microseconds, minimum bandwidth is 1544 Kbit
Reliability 255/255, minimum MTU 1500 bytes
Loading 1/255, Hops 2

Bogota>en
```

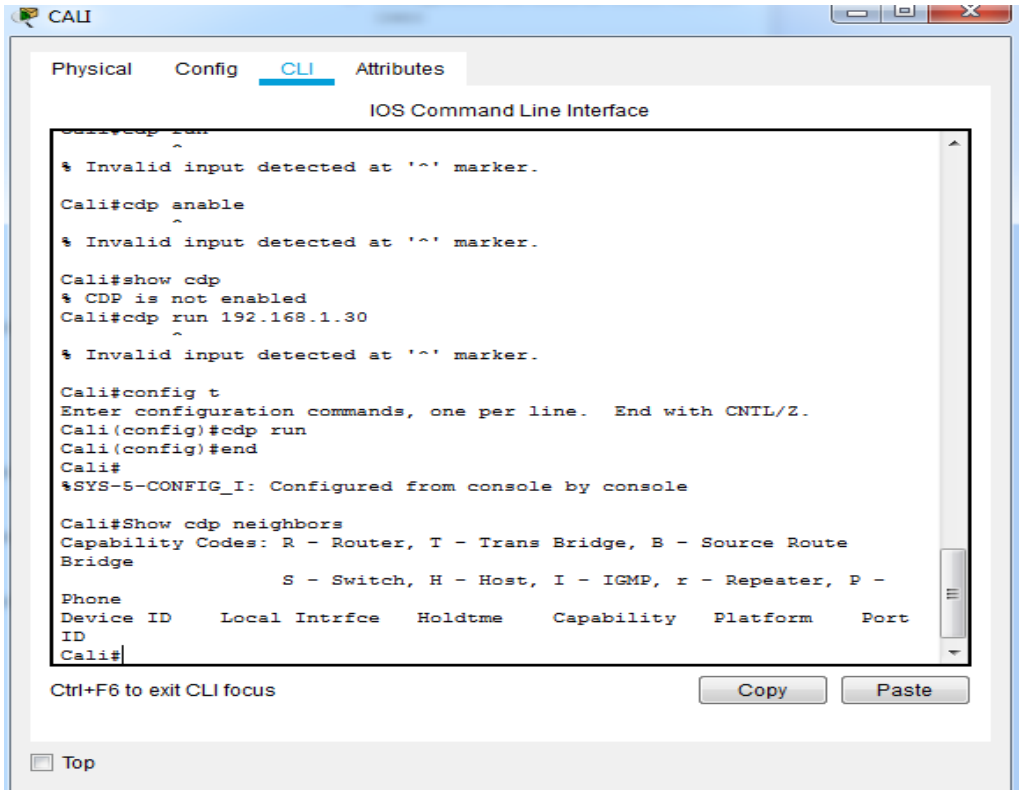
Bogota#show ip route 192.168.1.33
Routing entry for 192.168.1.32/27
Known via "eigrp 200", distance 90, metric 2172416, type internal
Redistributing via eigrp 200
Last update from 192.168.1.99 on Serial0/1/0, 00:27:29 ago
Routing Descriptor Blocks:
* 192.168.1.99, from 192.168.1.99, 00:27:29 ago, via Serial0/1/0
Route metric is 2172416, traffic share count is 1
Total delay is 20100 microseconds, minimum bandwidth is 1544 Kbit
Reliability 255/255, minimum MTU 1500 bytes
Loading 1/255, Hops 1

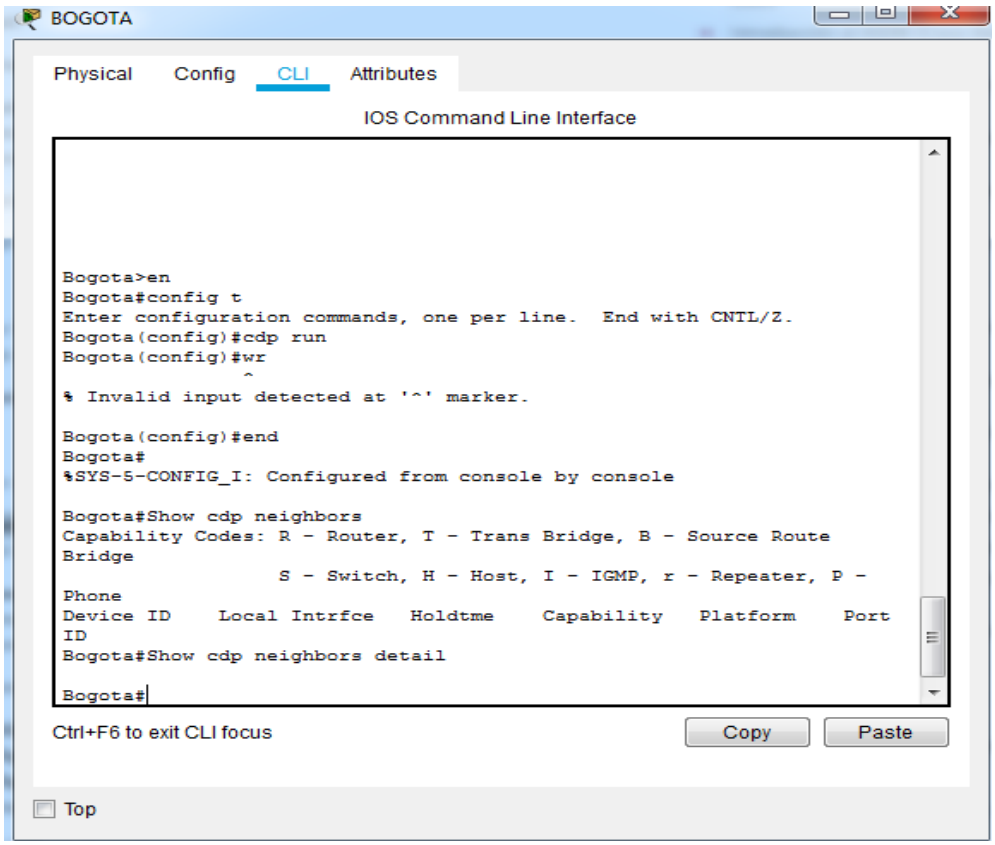
d. Realizar un diagnóstico de vecinos usando elcomando cdp.

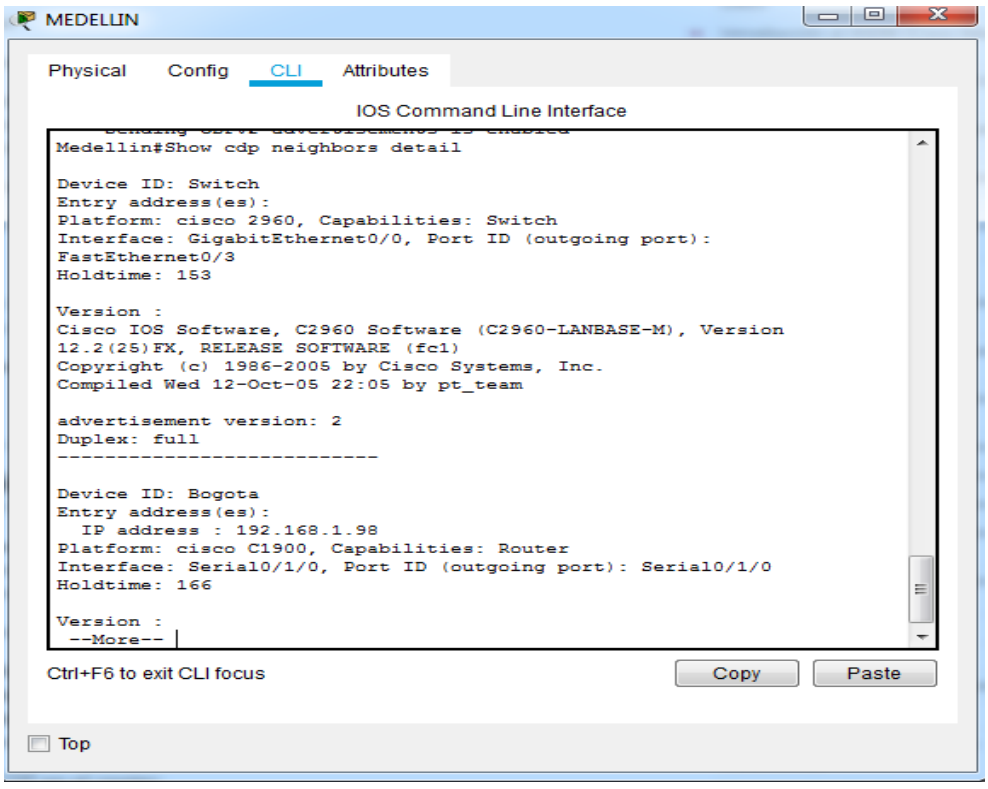
Se activó el comando cdp asi:

Configure terminal cdp run.

Realizo el diagnostico de vecinos utilizando el comando **Show cdp neighbors**



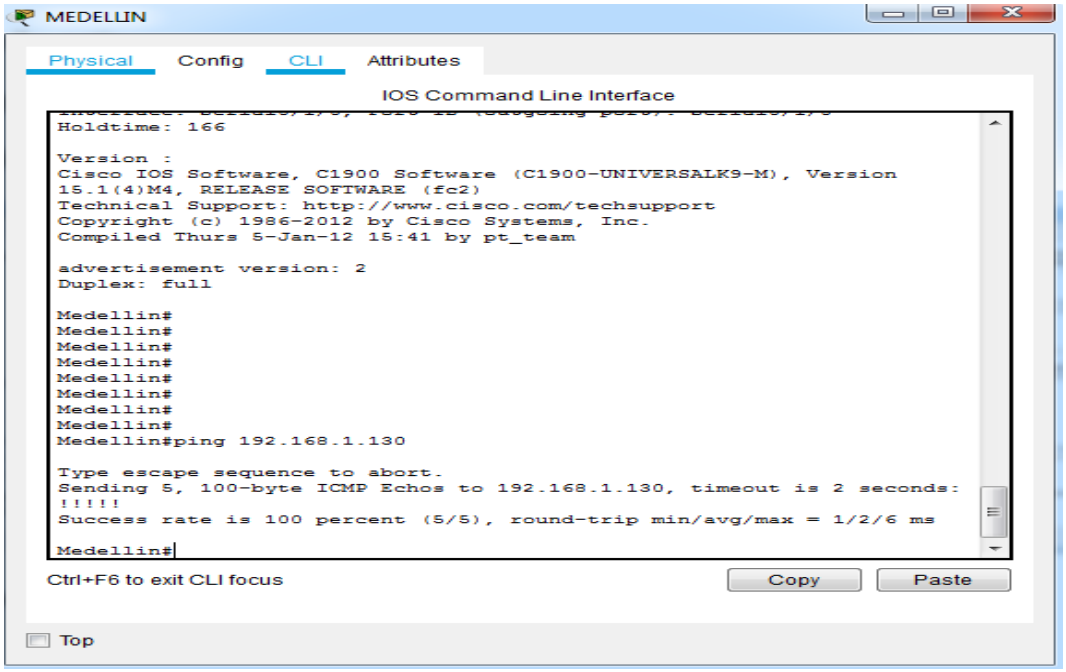

BOGOTA
Physical
Config
CLI
Attributes
IOS Command Line Interface
Bogota>en
Bogota#config t
Enter configuration commands, one per line. End with CNTL/Z.
Bogota(config)#cdp run
Bogota(config)#wr
^
% Invalid input detected at '^' marker.
Bogota(config)#end
Bogota#
%SYS-5-CONFIG_I: Configured from console by console
Bogota#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
Bogota#Show cdp neighbors detail
Bogota#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

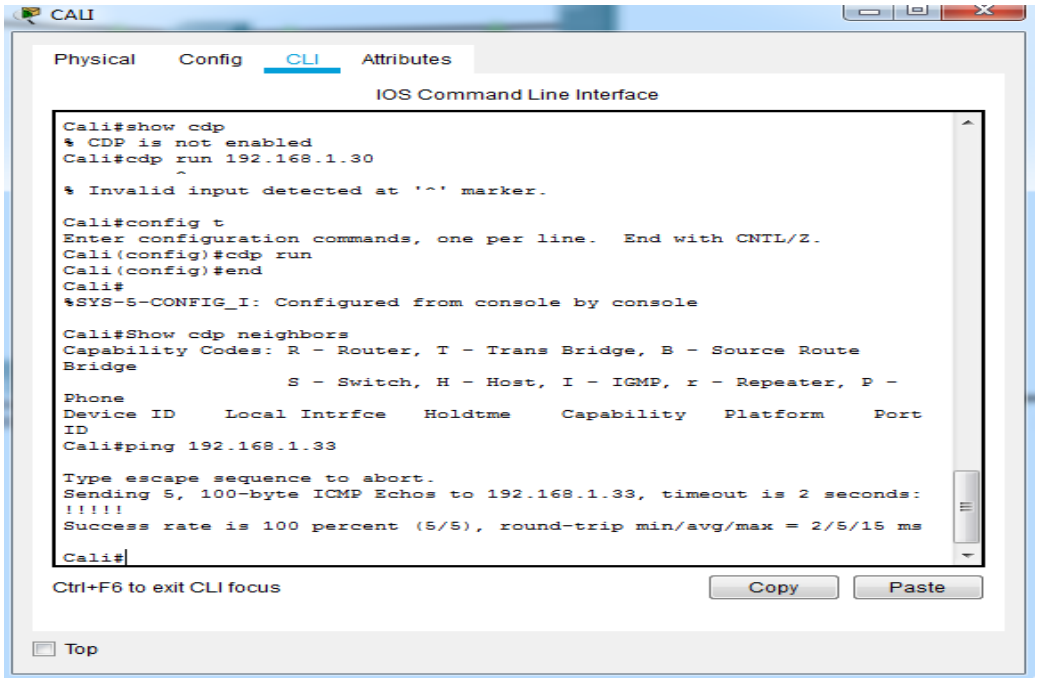

MEDELLIN
Physical
Config
CLI
Attributes
IOS Command Line Interface
Medellin#Show cdp neighbors detail
Device ID: Switch
Entry address(es):
Platform: cisco 2960, Capabilities: Switch
Interface: GigabitEthernet0/0, Port ID (outgoing port):
FastEthernet0/3
Holdtime: 153
Version :
Cisco IOS Software, C2960 Software (C2960-LANBASE-M), Version
12.2(25)FX, RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2005 by Cisco Systems, Inc.
Compiled Wed 12-Oct-05 22:05 by pt_team
advertisement version: 2
Duplex: full

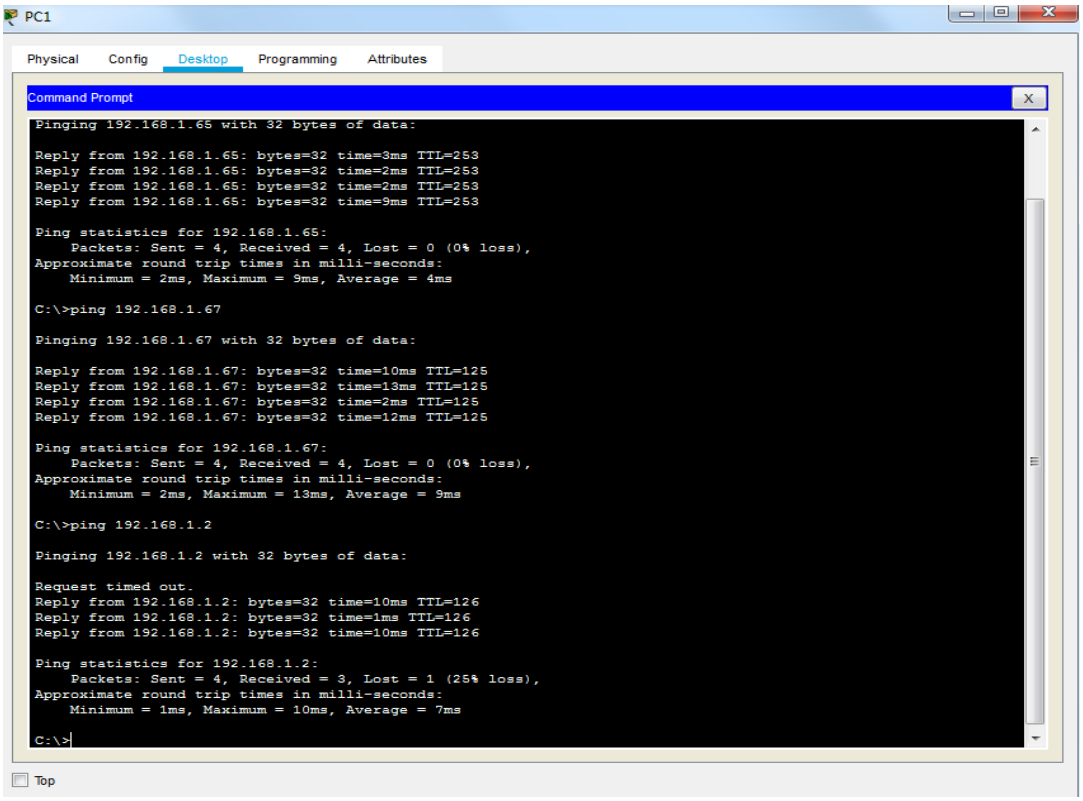
Device ID: Bogota
Entry address(es):
IP address : 192.168.1.98
Platform: cisco C1900, Capabilities: Router
Interface: Serial0/1/0, Port ID (outgoing port): Serial0/1/0
Holdtime: 166
Version :
--More--
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

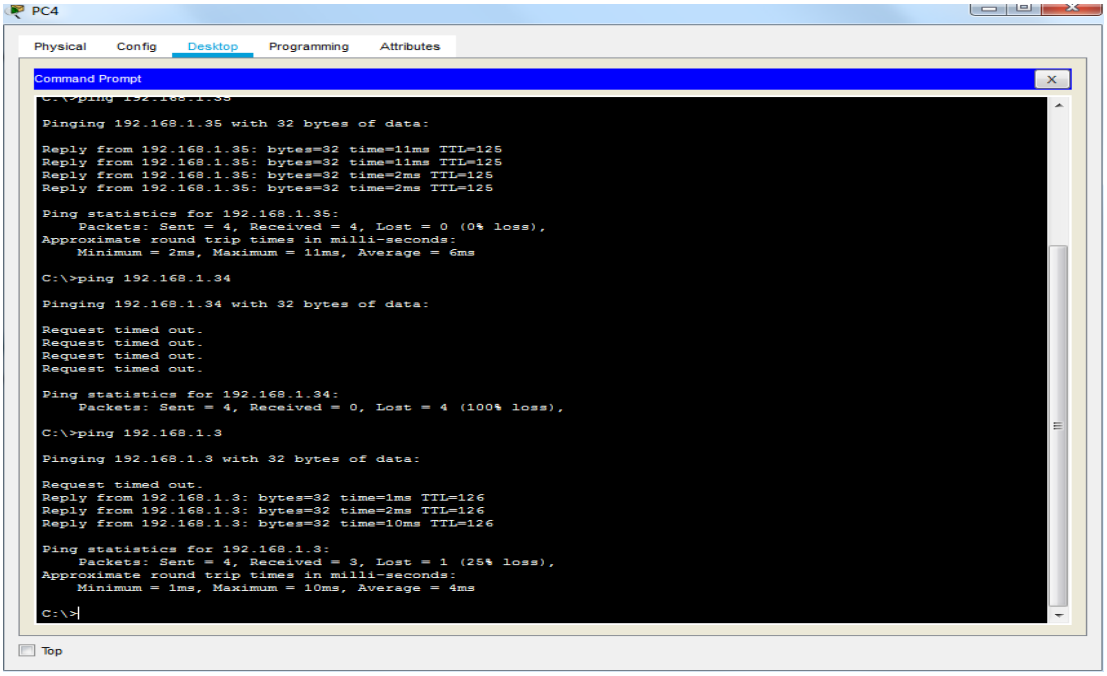
e. Realizar una prueba de conectividad en cada tramo de la ruta usando Ping.

Utilizando el comando ping a cada dirección se verifico que hubiese conexión con cada router y los host de las redes.






PC1
Physical
Config
Desktop
Programming
Attributes
Command Prompt
Pinging 192.168.1.65 with 32 bytes of data:
Reply from 192.168.1.65: bytes=32 time=3ms TTL=253
Reply from 192.168.1.65: bytes=32 time=2ms TTL=253
Reply from 192.168.1.65: bytes=32 time=2ms TTL=253
Reply from 192.168.1.65: bytes=32 time=9ms TTL=253
Ping statistics for 192.168.1.65:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 9ms, Average = 4ms
C:\>ping 192.168.1.67
Pinging 192.168.1.67 with 32 bytes of data:
Reply from 192.168.1.67: bytes=32 time=10ms TTL=125
Reply from 192.168.1.67: bytes=32 time=13ms TTL=125
Reply from 192.168.1.67: bytes=32 time=2ms TTL=125
Reply from 192.168.1.67: bytes=32 time=12ms TTL=125
Ping statistics for 192.168.1.67:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 13ms, Average = 9ms
C:\>ping 192.168.1.2
Pinging 192.168.1.2 with 32 bytes of data:
Request timed out.
Reply from 192.168.1.2: bytes=32 time=10ms TTL=126
Reply from 192.168.1.2: bytes=32 time=1ms TTL=126
Reply from 192.168.1.2: bytes=32 time=10ms TTL=126
Ping statistics for 192.168.1.2:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 10ms, Average = 7ms
C:\>
Top


PC4
Physical
Config
Desktop
Programming
Attributes
Command Prompt
Pinging 192.168.1.35 with 32 bytes of data:
Reply from 192.168.1.35: bytes=32 time=11ms TTL=125
Reply from 192.168.1.35: bytes=32 time=11ms TTL=125
Reply from 192.168.1.35: bytes=32 time=2ms TTL=125
Reply from 192.168.1.35: bytes=32 time=2ms TTL=125
Ping statistics for 192.168.1.35:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 11ms, Average = 6ms
C:\>ping 192.168.1.34
Pinging 192.168.1.34 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 192.168.1.34:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 192.168.1.3
Pinging 192.168.1.3 with 32 bytes of data:
Request timed out.
Reply from 192.168.1.3: bytes=32 time=1ms TTL=126
Reply from 192.168.1.3: bytes=32 time=2ms 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 = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 10ms, Average = 4ms
C:\>
Top

Parte 3: Configuración de Enrutamiento.

a. **Asignar el protocolo de enrutamiento EIGRP a los routers considerando el direccionamiento diseñado.**

```
Medellin>en
Medellin#config t
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 192.168.1.96
Medellin(config-router)#network 192.168.1.32
Medellin(config-router)#end

Bogota>en
Bogota#config t
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 192.168.1.0
Bogota(config-router)#network 192.168.1.96
Bogota(config-router)#network 192.168.1.128
Bogota(config-router)#end


Cali>en
Cali#config t
Enter configuration commands, one per line. End with CNTL/Z.
Cali(config)#router eigrp 200
Cali(config-router)#network 192.168.1.128
```

b. **Verificar si existe vecindad con los routers configurados con EIGRP.**

Para verificar vecindad entre router se utilizó el comando. **show ip eigrp neighbors**

```
Bogota#show ip eigrp neighbors
IP-EIGRP neighbors for process 200
H Address Interface Hold Uptime SRTT RTO Q Seq
(sec) (ms) Cnt Num
0 192.168.1.99 Se0/1/0 13 00:14:11 40 1000 0 7
1 192.168.1.131 Se0/1/1 11 00:06:24 40 1000 0 7
```

Medellin>en
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 Se0/1/0 13 00:17:00 40 1000 0 5

Cali#show ip eigrp neighbors
IP-EIGRP neighbors for process 200
H Address Interface Hold Uptime SRTT RTO Q Seq
(sec) (ms) Cnt Num
0 192.168.1.130 Se0/1/0 13 00:10:17 40 1000 0 6

c. Realizar la comprobación de las tablas de enrutamiento en cada uno de los routers para verificar cada una de las rutas establecidas.

Para verificar las tablas de enrutamiento se puede utilizar el comando: **ip route**

Tablas de enrutamiento router **Medellín**

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

192.168.1.0/24 is variably subnetted, 7 subnets, 2 masks
D 192.168.1.0/27 [90/2172416] via 192.168.1.98, 00:24:48, Serial0/1/0
C 192.168.1.32/27 is directly connected, GigabitEthernet0/0
L 192.168.1.33/32 is directly connected, GigabitEthernet0/0
D 192.168.1.64/27 [90/2684416] via 192.168.1.98, 00:17:01, Serial0/1/0
C 192.168.1.96/27 is directly connected, Serial0/1/0
L 192.168.1.99/32 is directly connected, Serial0/1/0
D 192.168.1.128/27 [90/2681856] via 192.168.1.98, 00:24:48,

Tablas de enrutamiento router **Bogotá**

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

192.168.1.0/24 is variably subnetted, 8 subnets, 2 masks
C 192.168.1.0/27 is directly connected, GigabitEthernet0/0
L 192.168.1.1/32 is directly connected, GigabitEthernet0/0
D 192.168.1.32/27 [90/2172416] via 192.168.1.99, 00:25:42, Serial0/1/0
D 192.168.1.64/27 [90/2172416] via 192.168.1.131, 00:17:55, Serial0/1/1
C 192.168.1.96/27 is directly connected, Serial0/1/0
L 192.168.1.98/32 is directly connected, Serial0/1/0
C 192.168.1.128/27 is directly connected, Serial0/1/1
L 192.168.1.130/32 is directly connected, Serial0/1/1

Tablas de enrutamiento router **Cali**

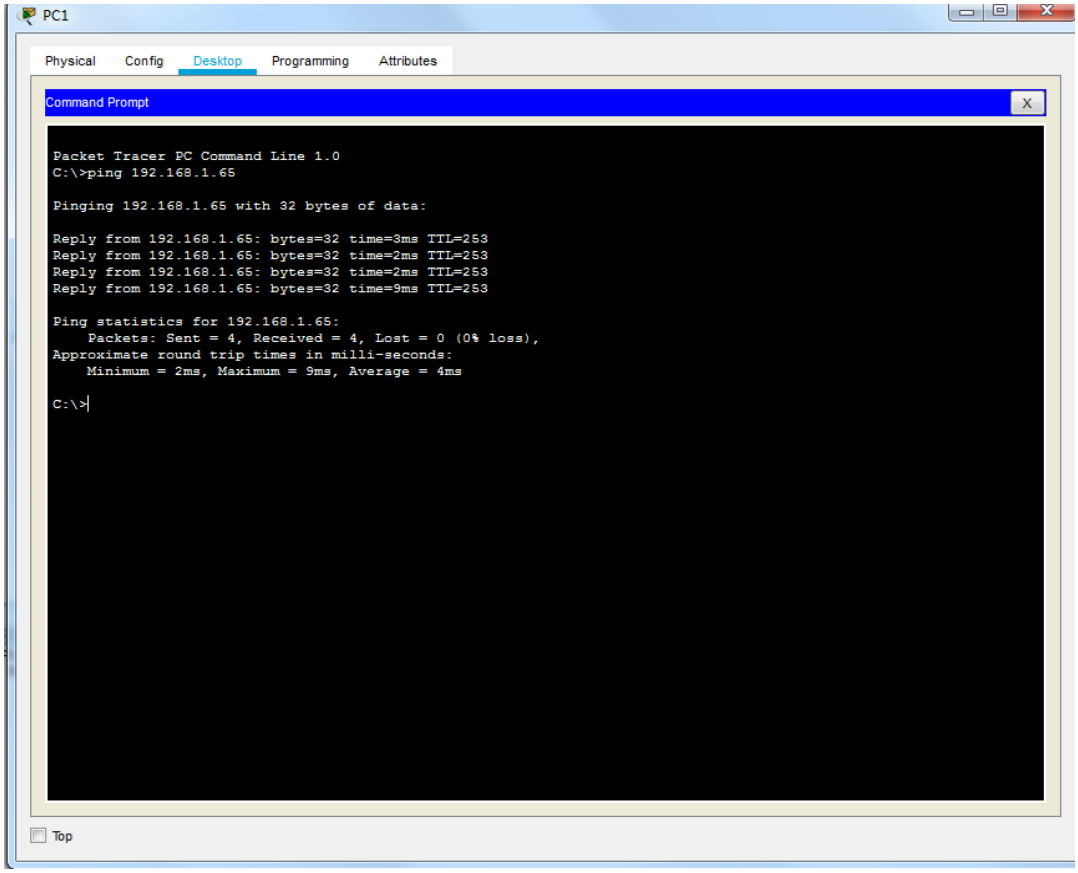
Cali#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS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

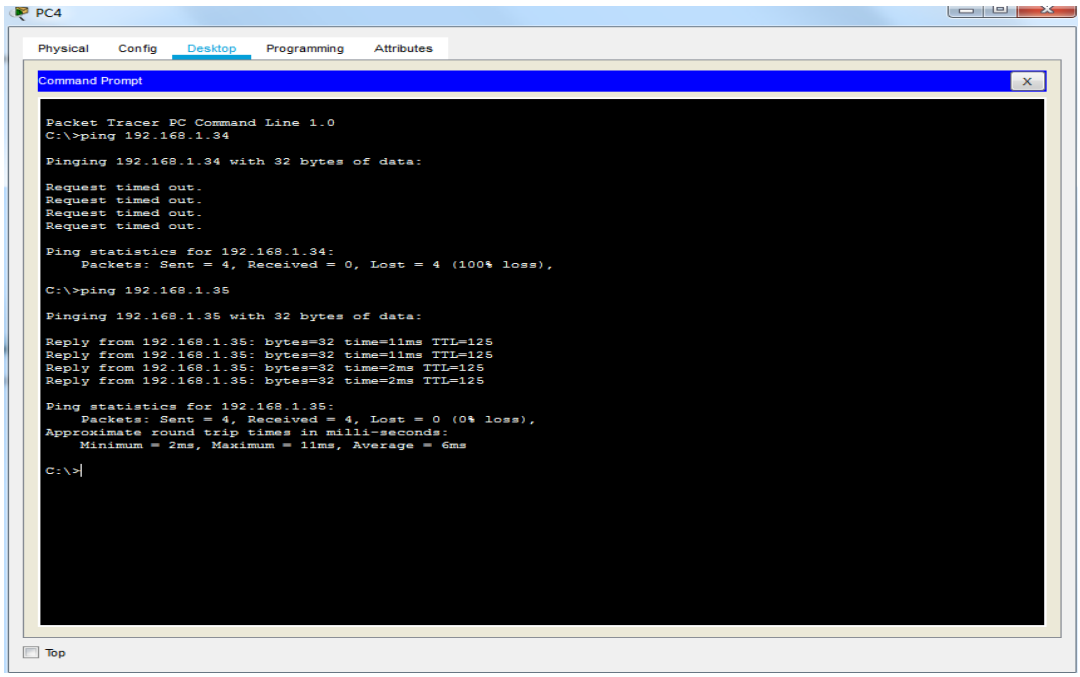
Gateway of last resort is not set

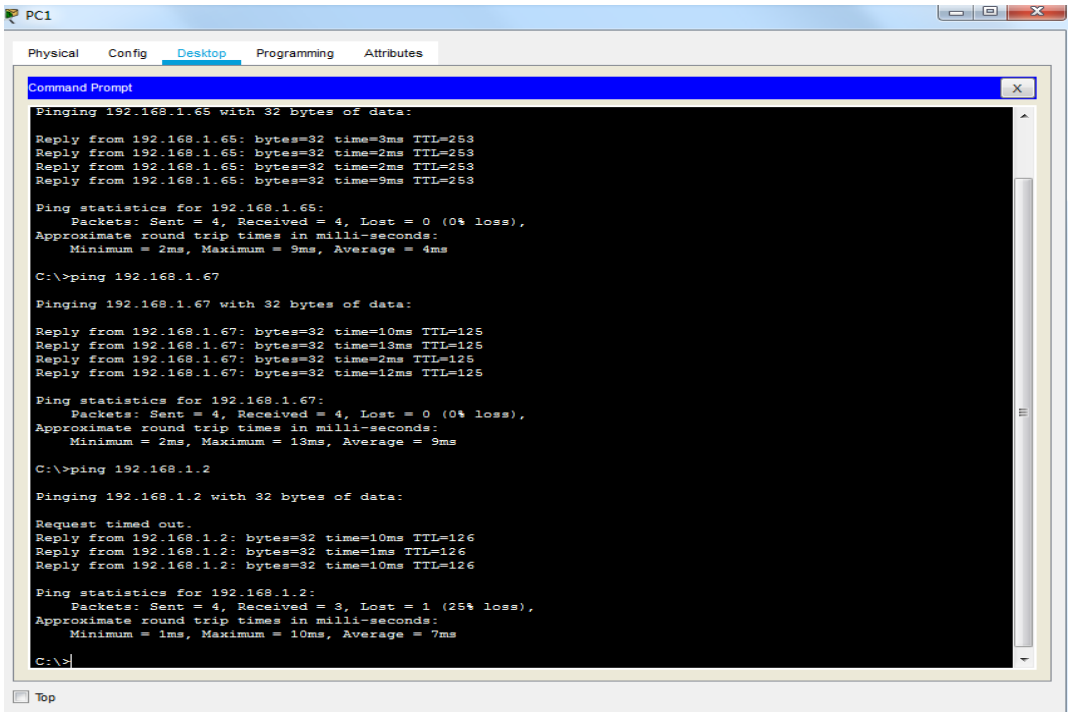
192.168.1.0/24 is variably subnetted, 7 subnets, 2 masks
D 192.168.1.0/27 [90/2172416] via 192.168.1.130, 00:13:14, Serial0/1/0
D 192.168.1.32/27 [90/2684416] via 192.168.1.130, 00:13:14, Serial0/1/0
C 192.168.1.64/27 is directly connected, Gi
gabitEthernet0/0
L 192.168.1.65/32 is directly connected, GigabitEthernet0/0
D 192.168.1.96/27 [90/2681856] via 192.168.1.130, 00:13:14, Serial0/1/0
C 192.168.1.128/27 is directly connected, Serial0/1/0
L 192.168.1.131/32 is directly connected, Serial0/1/0

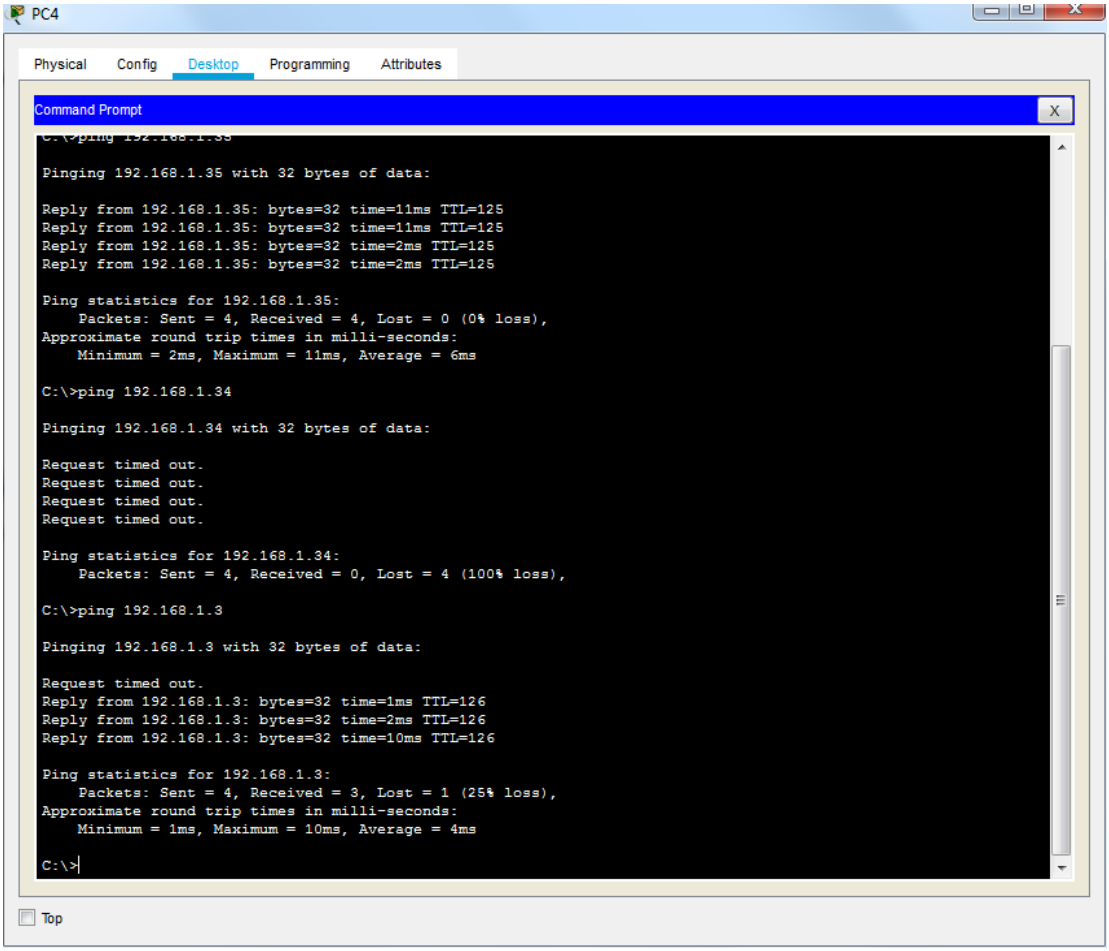
Realizar un diagnóstico para comprobar que cada uno de los puntos de la red se puedan ver y tengan conectividad entre sí. Realizar esta prueba desde un host de la red LAN del router CALI, primero a la red de MEDELLIN y luego al servidor.

Se realizó un ping desde el host de la red del router Medellín hasta los host de la red del router Cali de acuerdo a imágenes.




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:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 192.168.1.34:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
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=11ms TTL=125
Reply from 192.168.1.35: bytes=32 time=11ms TTL=125
Reply from 192.168.1.35: bytes=32 time=2ms TTL=125
Reply from 192.168.1.35: bytes=32 time=2ms TTL=125
Ping statistics for 192.168.1.35:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 11ms, Average = 6ms
C:\>
Top


PC1
Physical
Config
Desktop
Programming
Attributes
Command Prompt
Pinging 192.168.1.65 with 32 bytes of data:
Reply from 192.168.1.65: bytes=32 time=3ms TTL=253
Reply from 192.168.1.65: bytes=32 time=2ms TTL=253
Reply from 192.168.1.65: bytes=32 time=2ms TTL=253
Reply from 192.168.1.65: bytes=32 time=9ms TTL=253
Ping statistics for 192.168.1.65:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 9ms, Average = 4ms
C:\>ping 192.168.1.67
Pinging 192.168.1.67 with 32 bytes of data:
Reply from 192.168.1.67: bytes=32 time=10ms TTL=125
Reply from 192.168.1.67: bytes=32 time=13ms TTL=125
Reply from 192.168.1.67: bytes=32 time=2ms TTL=125
Reply from 192.168.1.67: bytes=32 time=12ms TTL=125
Ping statistics for 192.168.1.67:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 13ms, Average = 9ms
C:\>ping 192.168.1.2
Pinging 192.168.1.2 with 32 bytes of data:
Request timed out.
Reply from 192.168.1.2: bytes=32 time=10ms TTL=126
Reply from 192.168.1.2: bytes=32 time=1ms TTL=126
Reply from 192.168.1.2: bytes=32 time=10ms TTL=126
Ping statistics for 192.168.1.2:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 10ms, Average = 7ms
C:\>
Top



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:

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

Para configurar Telnet en cada router, se procedió asignar clave a cada equipo como consta a continuación.

Medellín>en

Medellin#config t

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

Medellin(config)#line vty 0

Medellin(config-line)#pass cisco

Medellin(config-line)#login

Medellin(config-line)#service password-encryption

Medellin(config)#end

Bogota>en

Bogota#config t

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

Bogota(config)#line vty 0

Bogota(config-line)#pass cisco

Bogota(config-line)#service password-encryption

Bogota(config)#wr

Cali>en

Cali#config t

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

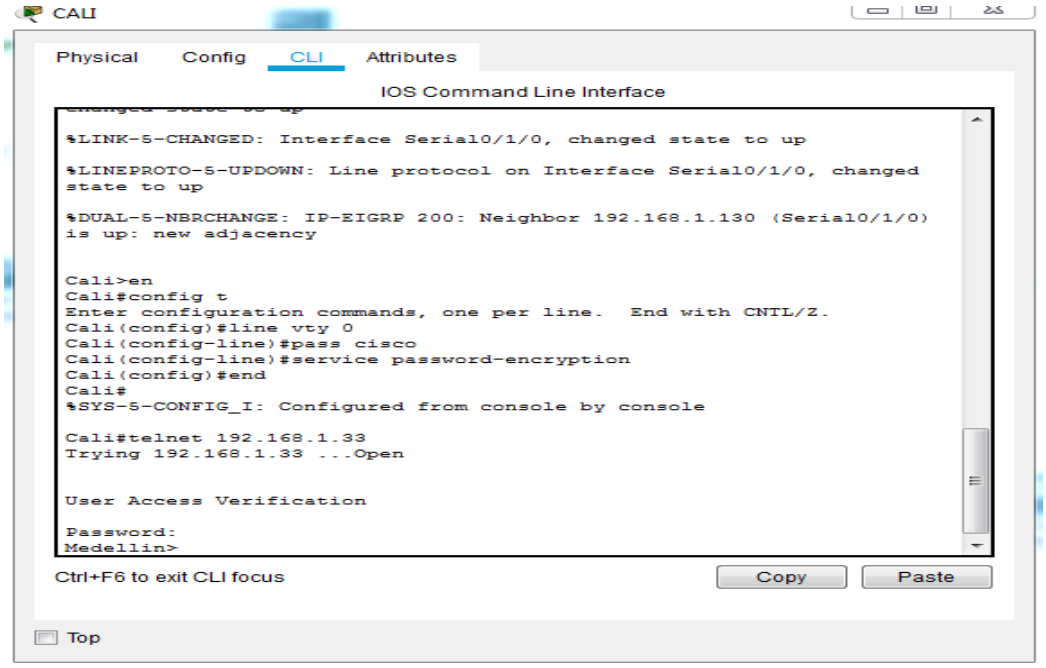
Cali(config)#line vty 0

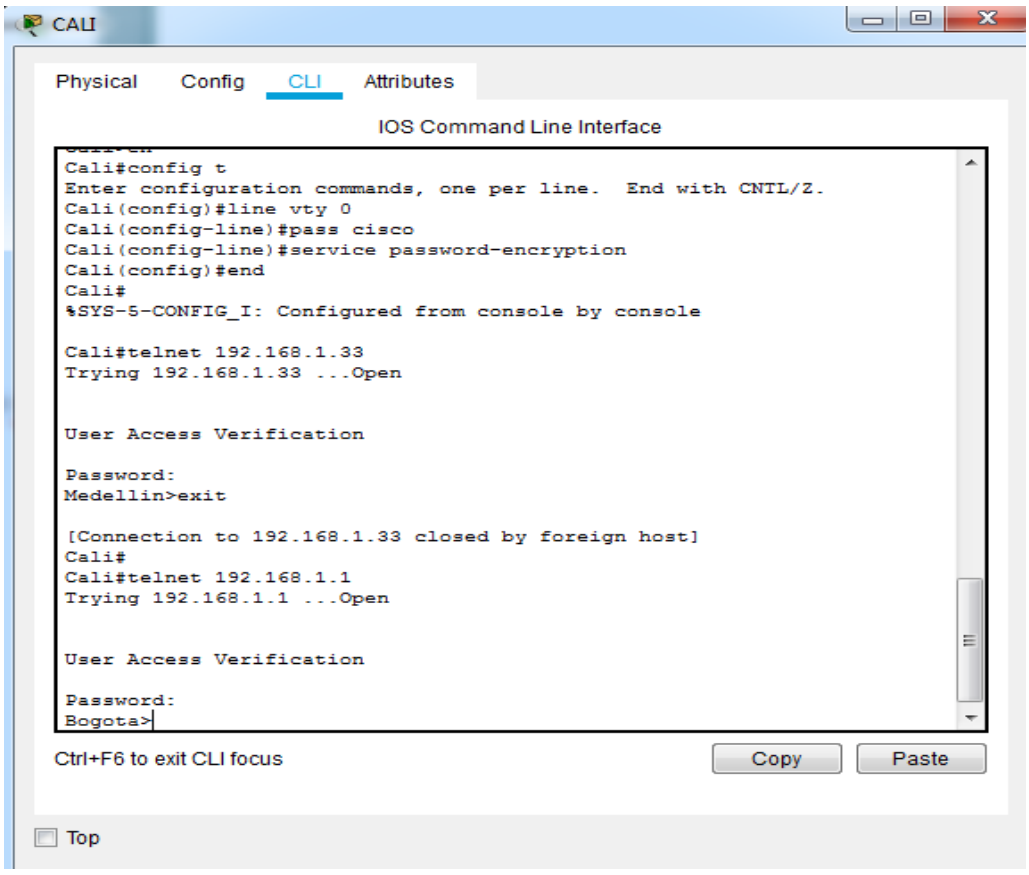
Cali(config-line)#pass cisco

Cali(config-line)#service password-encryption

Cali(config)#end.

Ingreso desde Router Cali a router Medellín y Bogotá a través de Telnet


CALI
Physical
Config
CLI
Attributes
IOS Command Line Interface
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up
%DUAL-5-NBRCHANGE: IP-EIGRP 200: Neighbor 192.168.1.130 (Serial0/1/0) is up: new adjacency
Cali>en
Cali#config t
Enter configuration commands, one per line. End with CNTL/Z.
Cali(config)#line vty 0
Cali(config-line)#pass cisco
Cali(config-line)#service password-encryption
Cali(config)#end
Cali#
%SYS-5-CONFIG_I: Configured from console by console
Cali#telnet 192.168.1.33
Trying 192.168.1.33 ...Open
User Access Verification
Password:
Medellin>
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


CALI
Physical
Config
CLI
Attributes
IOS Command Line Interface
Cali#config t
Enter configuration commands, one per line. End with CNTL/Z.
Cali(config)#line vty 0
Cali(config-line)#pass cisco
Cali(config-line)#service password-encryption
Cali(config)#end
Cali#
%SYS-5-CONFIG_I: Configured from console by console
Cali#telnet 192.168.1.33
Trying 192.168.1.33 ...Open
User Access Verification
Password:
Medellin>exit
[Connection to 192.168.1.33 closed by foreign host]
Cali#
Cali#telnet 192.168.1.1
Trying 192.168.1.1 ...Open
User Access Verification
Password:
Bogota>
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

De igual forma se realizaron las pruebas a desde los demás router obtenido conectividad sin problemas.

b. 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 Server-PT

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 Server-PT

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:

CALI#config terminal

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

CALI(config)#ip access-list extended Server-PT

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

c. 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.

Se crearon listas de control de acceso utilizando los comandos necesarios como lo son:

access-list, permit.

MEDELLIN>enable

Password:

MEDELLIN#config terminal

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

MEDELLIN(config)#ip access-list extended Server-PT

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 g0/0

MEDELLIN(config-if)#ip access-group Server-PT 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 Server-PT

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 g0/0

CALI(config-if)#ip access-group Server-PT in

CALI(config-if)#end

Parte 5: Comprobación de la red instalada.

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

   Se verificaron que las listas estuvieran creadas en cada router utilizando el comando **show Access-list**

MEDELLIN#show Access-list
Extended IP access list Server-PT
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 Server-PT
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

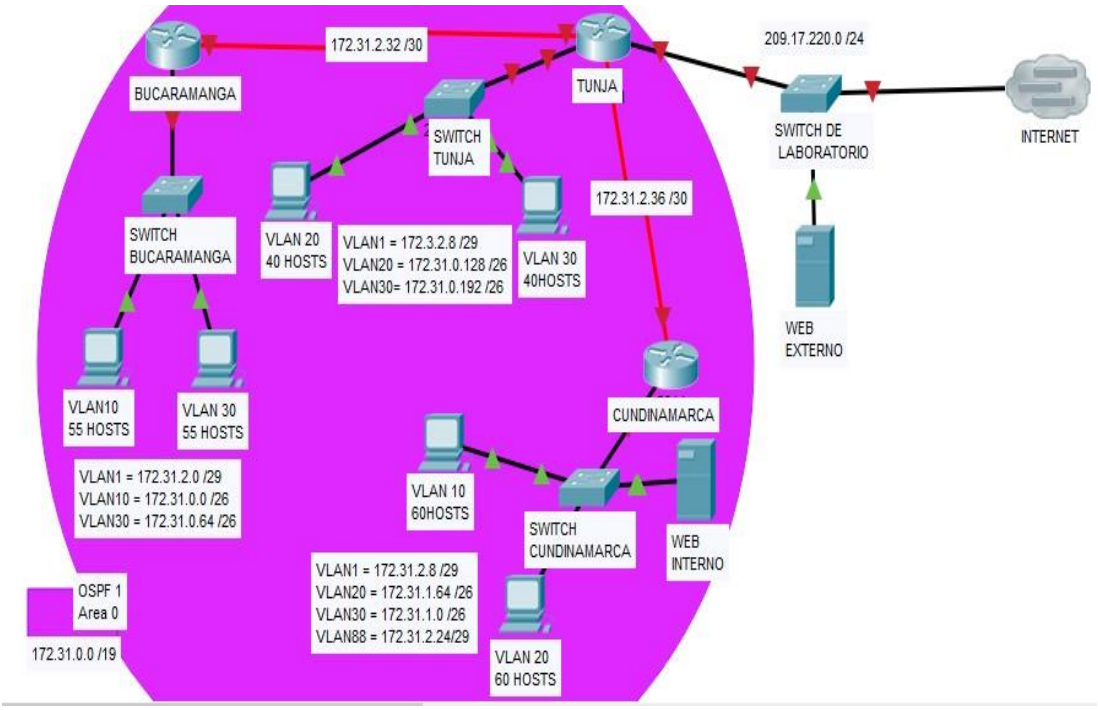
CALI>enable
Password:
CALI#show access-list
Extended IP access list Server-PT
10 permit ip any host 192.168.1.3
20 permit ip any host 192.168.1.99
30 permit ip any host 192.168.1.1
40 permit ip any host 192.168.1.65

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	Acceso Ok
	WS_1	Router BOGOTA	Acceso Ok
	Servidor	Router CALI	Acceso Ok
	Servidor	Router MEDELLIN	Acceso Ok
	LAN del Router MEDELLIN	Router CALI	Acceso denegado
	LAN del Router CALI	Router CALI	Acceso Ok
TELNET	LAN del Router MEDELLIN	Router MEDELLIN	Acceso Ok
	LAN del Router CALI	Router MEDELLIN	Acceso denegado
	LAN del Router CALI	WS_1	Acceso denegado
PING	LAN del Router MEDELLIN	WS_1	Acceso denegado
	LAN del Router MEDELLIN	LAN del Router CALI	Acceso denegado
	LAN del Router CALI	Servidor	Acceso Ok
	LAN del Router MEDELLIN	Servidor	Acceso Ok
PING	Servidor	LAN del Router MEDELLIN	Acceso Ok
	Servidor	LAN del Router CALI	Acceso Ok
	Router CALI	LAN del Router MEDELLIN	Acceso Ok
	Router MEDELLIN	LAN del Router CALI	Acceso Ok

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.
   - 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.

Configuración Básica

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)#service password-encryption
BUCARAMANGA(config)#banner motd #
Enter TEXT message. End with the character '#'.

ACCESO NO AUTORIZADO !

#

BUCARAMANGA(config)#enable secret class1
BUCARAMANGA(config)#line console 0
BUCARAMANGA(config-line)#password cisco1
BUCARAMANGA(config-line)#login
BUCARAMANGA(config-line)#line vty 0 4
BUCARAMANGA(config-line)#password cisco1
BUCARAMANGA(config-line)#login
BUCARAMANGA(config-line)#int g0/0.1
BUCARAMANGA(config-subif)#encapsulation dot1q 1
BUCARAMANGA(config-subif)#ip address 172.31.2.1 255.255.255.248
BUCARAMANGA(config-subif)#int g0/0.10
BUCARAMANGA(config-subif)#encapsulation dot1q 10
BUCARAMANGA(config-subif)#ip address 172.31.0.1 255.255.255.192
BUCARAMANGA(config-subif)#int g0/0.30
BUCARAMANGA(config-subif)#encapsulation dot1q 30
BUCARAMANGA(config-subif)#ip address 172.31.0.65 255.255.255.192
BUCARAMANGA(config-subif)#int g0/0
BUCARAMANGA(config-if)#no shutdown

BUCARAMANGA(config-if)#

BUCARAMANGA(config-if)#int s0/0/0
BUCARAMANGA(config-if)#ip address 172.31.2.34 255.255.255.252
BUCARAMANGA(config-if)#no shut
```

Switch Bucaramanga

```
Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname SWITCH-BUCARAMANGA
SWITCH-BUCARAMANGA(config)#vlan  1
SWITCH-BUCARAMANGA(config-vlan)#vlan 10
SWITCH-BUCARAMANGA(config-vlan)#vlan 30
SWITCH-BUCARAMANGA(config-vlan)#int f0/10
SWITCH-BUCARAMANGA(config-if)#switchport mode access
SWITCH-BUCARAMANGA(config-if)#
SWITCH-BUCARAMANGA(config-if)#switchport access vlan 10
SWITCH-BUCARAMANGA(config-if)#int f0/14
SWITCH-BUCARAMANGA(config-if)#switchport mode access
SWITCH-BUCARAMANGA(config-if)#switchport access vlan 30
SWITCH-BUCARAMANGA(config-if)#int g0/1
SWITCH-BUCARAMANGA(config-if)#switchport mode trunk

SWITCH-BUCARAMANGA(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to down

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

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

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

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

SWITCH-BUCARAMANGA(config-if)#ip default-gateway  172.31.2.1
```

Router Tunja

```
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)#service password-encryption
TUNJA(config)#banner motd #
Enter TEXT message. End with the character '#'.

ACCESO NO AUTORIZADO !

#

TUNJA(config)#enable secret class1
TUNJA(config)#line console 0
TUNJA(config-line)#password cisco1
TUNJA(config-line)#login
TUNJA(config-line)#line vty 0 4
TUNJA(config-line)#password cisco1
TUNJA(config-line)#login
TUNJA(config-line)#int g0/0.1
TUNJA(config-subif)#encapsulation dot1q 1
TUNJA(config-subif)#ip address 172.3.2.9 255.255.255.248
TUNJA(config-subif)#int g0/0.20
TUNJA(config-subif)#encapsulation dot1q 20
TUNJA(config-subif)#ip address 172.31.0.129 255.255.255.192
TUNJA(config-subif)#int g0/0.30
TUNJA(config-subif)#encapsulation dot1q 30
TUNJA(config-subif)#ip address 172.31.0.193 255.255.255.192
TUNJA(config-subif)#int g0/0
TUNJA(config-if)#no  shutdown

TUNJA(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, 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)#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 g0/1
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 GigabitEthernet0/1, changed state to up
TUNJA#
%SYS-5-CONFIG_I: Configured from console by console

Switch Tunja

Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname SWITCH-TUNJA
SWITCH-TUNJA(config)#vlan 1
SWITCH-TUNJA(config-vlan)#vlan 20
SWITCH-TUNJA(config-vlan)#vlan 30
SWITCH-TUNJA(config-vlan)#int f0/10
SWITCH-TUNJA(config-if)#switchport mode access
SWITCH-TUNJA(config-if)#switchport access vlan 20
SWITCH-TUNJA(config-if)#int f0/14
SWITCH-TUNJA(config-if)#switchport mode access
SWITCH-TUNJA(config-if)#switchport access vlan 30
SWITCH-TUNJA(config-if)#int g0/1
SWITCH-TUNJA(config-if)#switchport mode trunk

SWITCH-TUNJA(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to down

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

SWITCH-TUNJA(config-if)#int vlan 1
SWITCH-TUNJA(config-if)#ip address 172.3.2.11 255.255.255.248
SWITCH-TUNJA(config-if)#no shutdown

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)#service password-encryption

```
CUNDINAMARCA(config)#banner motd #
Enter TEXT message. End with the character '#'.

ACCESO NO AUTORIZADO !

#

CUNDINAMARCA(config)#enable secret class1
CUNDINAMARCA(config)#line console 0
CUNDINAMARCA(config-line)#password cisco1
CUNDINAMARCA(config-line)#login
CUNDINAMARCA(config-line)#line  vty 0 4
CUNDINAMARCA(config-line)#password cisco1
CUNDINAMARCA(config-line)#login
CUNDINAMARCA(config-line)#int g0/0.1
CUNDINAMARCA(config-subif)#encapsulation dot1q 1
CUNDINAMARCA(config-subif)#ip address 172.31.2.9 255.255.255.248
CUNDINAMARCA(config-subif)#int g0/0.20
CUNDINAMARCA(config-subif)#encapsulation dot1q 20
CUNDINAMARCA(config-subif)#ip address 172.31.1.65 255.255.255.192
CUNDINAMARCA(config-subif)#int g0/0.30
CUNDINAMARCA(config-subif)#encapsulation dot1q 30
CUNDINAMARCA(config-subif)#ip address 172.31.1.1 255.255.255.192
CUNDINAMARCA(config-subif)#int g0/0.88
CUNDINAMARCA(config-subif)#encapsulation dot1q 88
CUNDINAMARCA(config-subif)#ip address 172.31.2.25 255.255.255.248
CUNDINAMARCA(config-subif)#int g0/0
CUNDINAMARCA(config-if)#no shutdown

CUNDINAMARCA(config-if)#

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

Switch Cundinamarca

```
witch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname SWITCH-CUNDINAMARCA
SWITCH-CUNDINAMARCA(config)#vlan  1
SWITCH-CUNDINAMARCA(config-vlan)#vlan 20
SWITCH-CUNDINAMARCA(config-vlan)#vlan 30
SWITCH-CUNDINAMARCA(config-vlan)#vlan 88
SWITCH-CUNDINAMARCA(config-vlan)#exit
SWITCH-CUNDINAMARCA(config)#int f0/10
SWITCH-CUNDINAMARCA(config-if)#switchport mode access
SWITCH-CUNDINAMARCA(config-if)#switchport access vlan 20
SWITCH-CUNDINAMARCA(config-if)#int f0/14
SWITCH-CUNDINAMARCA(config-if)#switchport mode access
SWITCH-CUNDINAMARCA(config-if)#switchport access vlan 30
SWITCH-CUNDINAMARCA(config-if)#int f0/20
SWITCH-CUNDINAMARCA(config-if)#switchport mode access
SWITCH-CUNDINAMARCA(config-if)#switchport access vlan 88
SWITCH-CUNDINAMARCA(config-if)#int g0/1
SWITCH-CUNDINAMARCA(config-if)#switchport mode trunk

SWITCH-CUNDINAMARCA(config-if)#

SWITCH-CUNDINAMARCA(config-if)#int vlan 1
SWITCH-CUNDINAMARCA(config-if)#ip address 172.31.2.11 255.255.255.248
SWITCH-CUNDINAMARCA(config-if)#no shutdown

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

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

SWITCH-CUNDINAMARCA(config-if)#ip default-gateway  172.31.2.9
SWITCH-CUNDINAMARCA(config)#
```

Autenticación local con AAA

Router Bucaramanga

BUCARAMANGA>en

Password:
BUCARAMANGA#conf t
Enter configuration commands, one per line. End with CNTL/Z.
BUCARAMANGA(config)#username admin secret 123
BUCARAMANGA(config)#aaa new-model
BUCARAMANGA(config)#aaa authentication login AAA-LOGIN local
BUCARAMANGA(config)#line console 0
BUCARAMANGA(config-line)#login authentication AAA-LOGIN
BUCARAMANGA(config-line)#line vty 0 4
BUCARAMANGA(config-line)#login authentication AAA-LOGIN

Router Tunja

TUNJA>en
Password:
TUNJA#conf t
Enter configuration commands, one per line. End with CNTL/Z.
TUNJA(config)#username admin secret 123
TUNJA(config)#aaa new-model
TUNJA(config)#aaa authentication login AAA-LOGIN local
TUNJA(config)#line console 0
TUNJA(config-line)#login authentication AAA-LOGIN
TUNJA(config-line)#line vty 0 4
TUNJA(config-line)#login authentication AAA-LOGIN

Router Cundinamarca

CUNDINAMARCA>en
Password:
CUNDINAMARCA#conf t
Enter configuration commands, one per line. End with CNTL/Z.
CUNDINAMARCA(config)#username admin secret 123
CUNDINAMARCA(config)#aaa new-model
CUNDINAMARCA(config)#aaa authentication login AAA-LOGIN local
CUNDINAMARCA(config)#line console 0
CUNDINAMARCA(config-line)#login authentication AAA-LOGIN
CUNDINAMARCA(config-line)#line vty 0 4
CUNDINAMARCA(config-line)#login authentication AAA-LOGIN

- **Un máximo de internos para acceder al router.**

Router Bucaramanga
BUCARAMANGA(config-line)#login block-for 10 attempts 5 within 60

Router Tunja
TUNJA(config-line)#login block-for 10 attempts 5 within 60

Router Cundinarmarca
CUNDINAMARCA(config-line)#login block-for 10 attempts 5 within 60

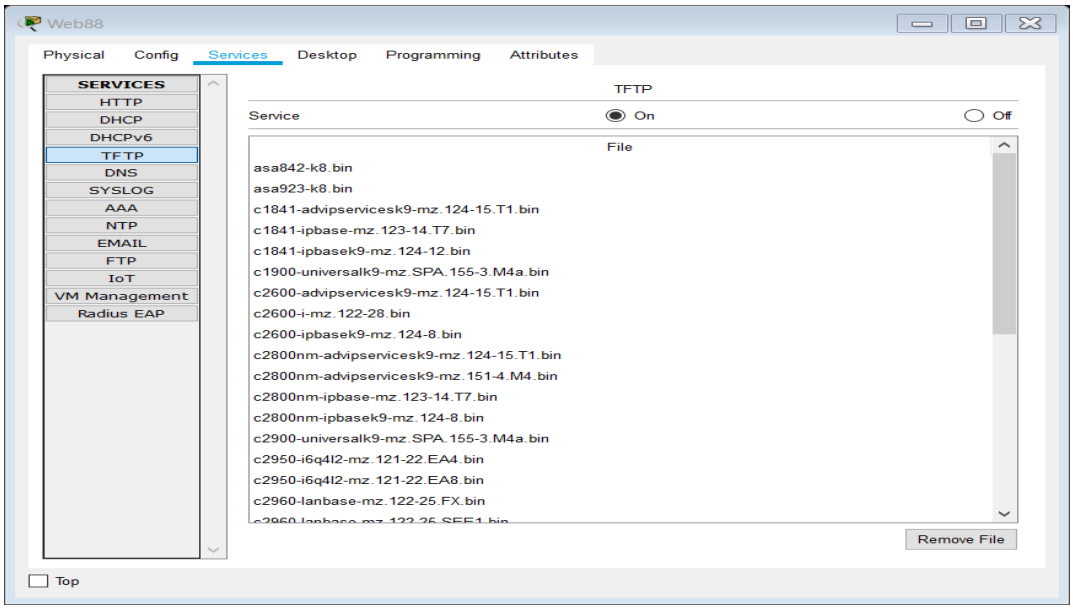
- **Máximo tiempo de acceso al detectar ataques.**

Router Bucaramanga
BUCARAMANGA(config-line)#login block-for 10 attempts 5 within 60

Router Tunja
TUNJA(config-line)#login block-for 10 attempts 5 within 60

Router Cundinarmarca
CUNDINAMARCA(config-line)#login block-for 10 attempts 5 within 60

- **Establezca un servidor TFTP y almacene todos los archivos necesarios de los routers.**



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

```
TUNJA#conf t
Enter configuration commands, one per line. End with CNTL/Z.
TUNJA(config)#ip dhcp excluded-address 172.31.0.1 172.31.0.4
TUNJA(config)#ip  dhcp excluded-address  172.31.0.65 172.31.0.68
TUNJA(config)#ip  dhcp excluded-address  172.31.1.65 172.31.1.68
TUNJA(config)#ip dhcp excluded-address 172.31.1.1 172.31.1.4
TUNJA(config)#ip dhcp pool vlan10B
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 172.31.2.27
TUNJA(dhcp-config)#ip dhcp pool vlan30B
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 172.31.2.27
TUNJA(dhcp-config)#ip dhcp pool vlan20C
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 172.31.2.27
TUNJA(dhcp-config)#ip dhcp pool vlan30C
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 172.31.2.27
```

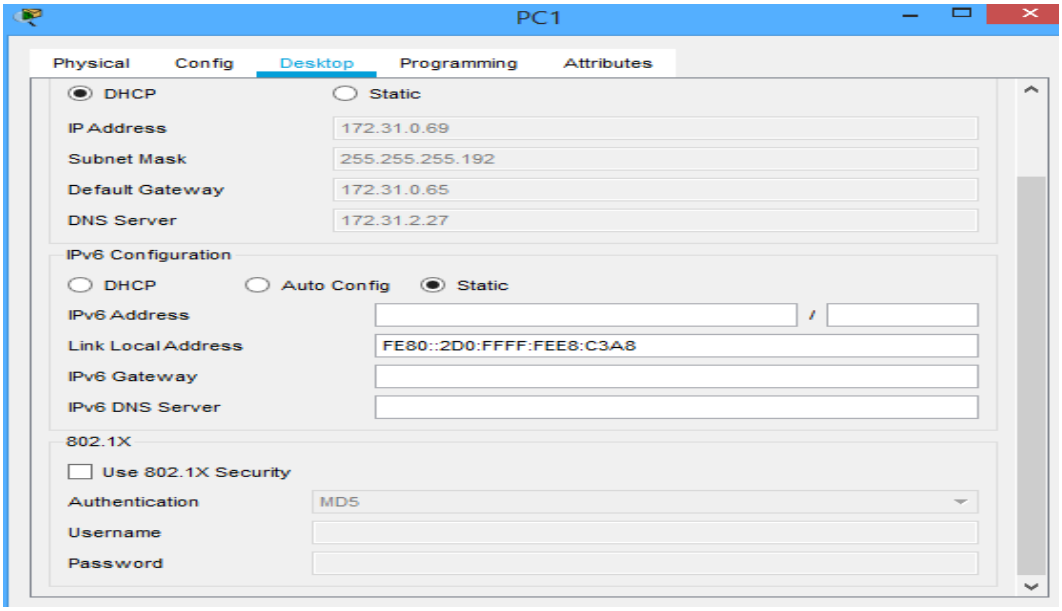
Router Bucaramanga

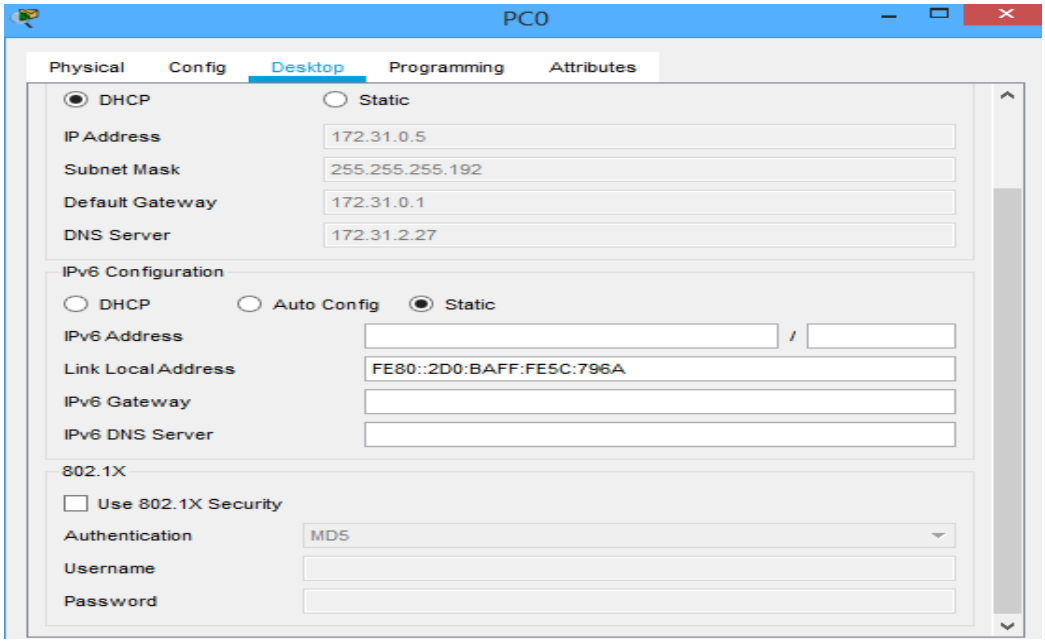
```
BUCARAMANGA#conf t
Enter configuration commands, one per line. End with CNTL/Z.
BUCARAMANGA(config)#line console 0
BUCARAMANGA(config-line)#login block-for 10 attempts 5 within 60
BUCARAMANGA(config)#int g0/0.10
BUCARAMANGA(config-subif)#ip helper-address 172.31.2.33
BUCARAMANGA(config-subif)#int g0/0.30
BUCARAMANGA(config-subif)#ip helper-address 172.31.2.33
BUCARAMANGA(config-subif)#end
```

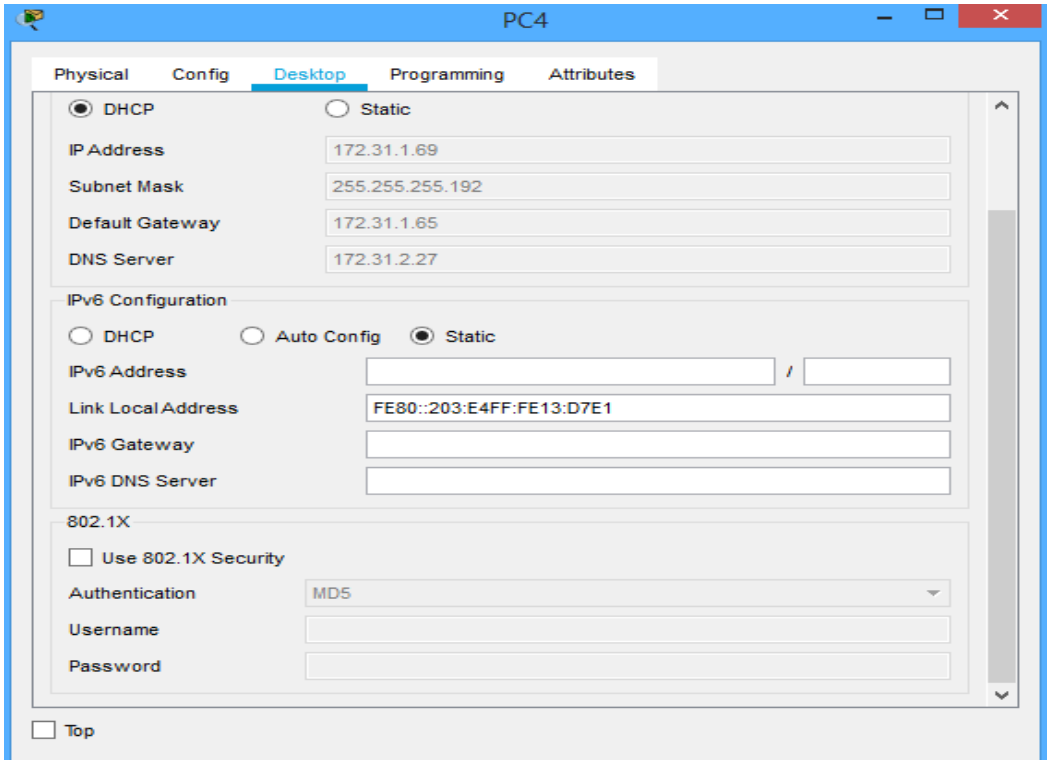
Router Cundinamarca

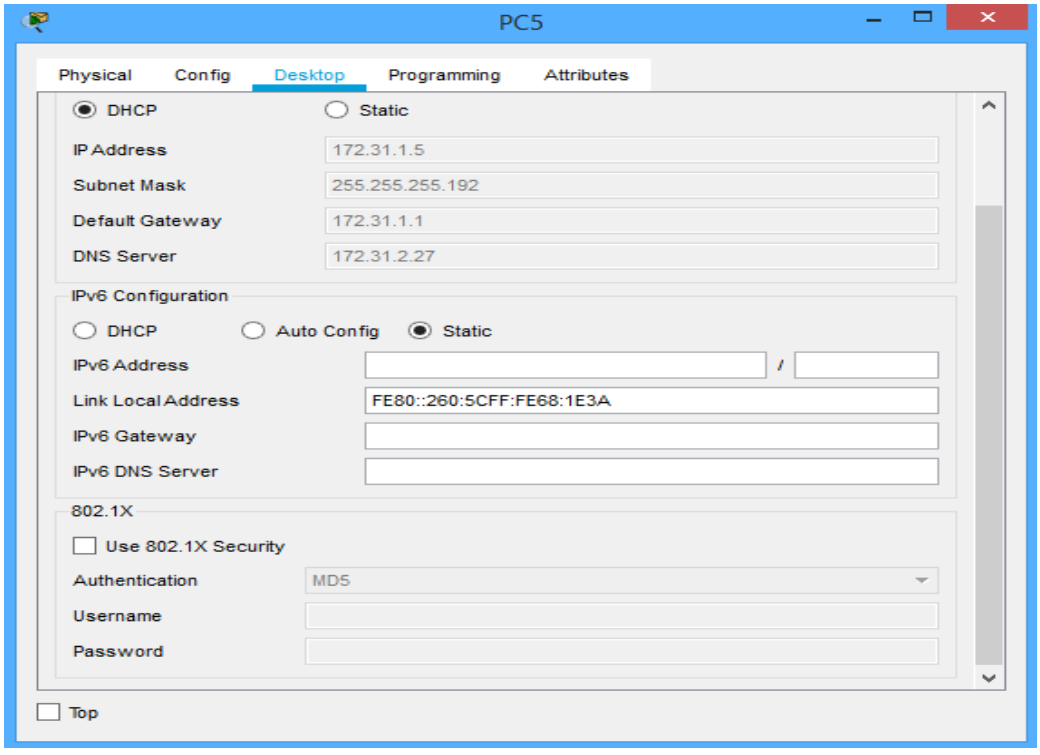
```
Username: admin
Password:
CUNDINAMARCA>en
Password:
CUNDINAMARCA#conf t
```

```
Enter configuration commands, one per line. End with CNTL/Z.
CUNDINAMARCA(config)#int g0/0.20
CUNDINAMARCA(config-subif)#ip helper-address 172.31.2.37
CUNDINAMARCA(config-subif)#int g0/0.30
CUNDINAMARCA(config-subif)#ip helper-address 172.31.2.37
CUNDINAMARCA(config-subif)#end
```






PC4
Physical
Config
Desktop
Programming
Attributes
DHCP
Static
IP Address
172.31.1.69
Subnet Mask
255.255.255.192
Default Gateway
172.31.1.65
DNS Server
172.31.2.27
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::203:E4FF:FE13:D7E1
IPv6 Gateway
IPv6 DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top


PC5
Physical
Config
Desktop
Programming
Attributes
DHCP
Static
IP Address
172.31.1.5
Subnet Mask
255.255.255.192
Default Gateway
172.31.1.1
DNS Server
172.31.2.27
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::260:5CFF:FE68:1E3A
IPv6 Gateway
IPv6 DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top

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

Router Tunja

```
Username: admin
Password:
TUNJA>en
Password:
TUNJA#conf t
Enter configuration commands, one per line. End with CNTL/Z.
TUNJA(config)#ip nat inside source static 172.31.2.27 209.165.220.10
TUNJA(config)#ip access-list standard NAT-ACL
TUNJA(config-std-nacl)#permit 172.31.0.0 0.0.255.255
TUNJA(config-std-nacl)#ip nat inside source list NAT-ACL interface g0/1 overload
TUNJA(config)#int g0/1
TUNJA(config-if)#ip nat outside
TUNJA(config-if)#int g0/0.1
TUNJA(config-subif)#ip nat inside
TUNJA(config-subif)#int g0/0.20
TUNJA(config-subif)#ip nat inside
TUNJA(config-subif)#int g0/0.30
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 0.0.0.0 209.165.220.5
TUNJA(config)#router ospf 1
TUNJA(config-router)#default-i nformation originate
TUNJA(config-router)#end
TUNJA#
%SYS-5-CONFIG_I: Configured from console by console


TUNJA#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
```

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is 209.165.220.5 to network 0.0.0.0

172.3.0.0/16 is variably subnetted, 2 subnets, 2 masks
C 172.3.2.8/29 is directly connected, GigabitEthernet0/0.1
L 172.3.2.9/32 is directly connected, GigabitEthernet0/0.1
172.31.0.0/16 is variably subnetted, 15 subnets, 4 masks
O 172.31.0.0/26 [110/65] via 172.31.2.34, 01:34:01, Serial0/0/0
O 172.31.0.64/26 [110/65] via 172.31.2.34, 01:34:01, Serial0/0/0
C 172.31.0.128/26 is directly connected, GigabitEthernet0/0.20
L 172.31.0.129/32 is directly connected, GigabitEthernet0/0.20
C 172.31.0.192/26 is directly connected, GigabitEthernet0/0.30
L 172.31.0.193/32 is directly connected, GigabitEthernet0/0.30
O 172.31.1.0/26 [110/65] via 172.31.2.38, 01:26:24, Serial0/0/1
O 172.31.1.64/26 [110/65] via 172.31.2.38, 01:26:24, Serial0/0/1
O 172.31.2.0/29 [110/65] via 172.31.2.34, 01:34:01, Serial0/0/0
O 172.31.2.8/29 [110/65] via 172.31.2.38, 01:26:24, Serial0/0/1
O 172.31.2.24/29 [110/65] via 172.31.2.38, 01:26:24, Serial0/0/1
C 172.31.2.32/30 is directly connected, Serial0/0/0
L 172.31.2.33/32 is directly connected, Serial0/0/0
C 172.31.2.36/30 is directly connected, Serial0/0/1
L 172.31.2.37/32 is directly connected, Serial0/0/1
209.165.220.0/24 is variably subnetted, 2 subnets, 2 masks
C 209.165.220.0/24 is directly connected, GigabitEthernet0/1
L 209.165.220.1/32 is directly connected, GigabitEthernet0/1
S* 0.0.0.0/0 [1/0] via 209.165.220.5

Router Bucaramanga

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

Gateway of last resort is 172.31.2.33 to network 0.0.0.0

172.3.0.0/29 is subnetted, 1 subnets
O 172.3.2.8/29 [110/65] via 172.31.2.33, 01:37:52, Serial0/0/0
172.31.0.0/16 is variably subnetted, 15 subnets, 4 masks
C 172.31.0.0/26 is directly connected, GigabitEthernet0/0.10
L 172.31.0.1/32 is directly connected, GigabitEthernet0/0.10
C 172.31.0.64/26 is directly connected, GigabitEthernet0/0.30
L 172.31.0.65/32 is directly connected, GigabitEthernet0/0.30
O 172.31.0.128/26 [110/65] via 172.31.2.33, 01:37:52, Serial0/0/0
O 172.31.0.192/26 [110/65] via 172.31.2.33, 01:37:52, Serial0/0/0
O 172.31.1.0/26 [110/129] via 172.31.2.33, 01:30:06, Serial0/0/0
O 172.31.1.64/26 [110/129] via 172.31.2.33, 01:30:06, Serial0/0/0
C 172.31.2.0/29 is directly connected, GigabitEthernet0/0.1
L 172.31.2.1/32 is directly connected, GigabitEthernet0/0.1
O 172.31.2.8/29 [110/129] via 172.31.2.33, 01:30:06, Serial0/0/0
O 172.31.2.24/29 [110/129] via 172.31.2.33, 01:30:06, Serial0/0/0
C 172.31.2.32/30 is directly connected, Serial0/0/0
L 172.31.2.34/32 is directly connected, Serial0/0/0
O 172.31.2.36/30 [110/128] via 172.31.2.33, 01:30:56, Serial0/0/0
O*E2 0.0.0.0/0 [110/1] via 172.31.2.33, 00:04:43, Serial0/0/0

Router Cundinarmaca

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

Gateway of last resort is 172.31.2.37 to network 0.0.0.0

172.3.0.0/29 is subnetted, 1 subnets
O 172.3.2.8/29 [110/65] via 172.31.2.37, 01:32:40, Serial0/0/0
172.31.0.0/16 is variably subnetted, 16 subnets, 4 masks
O 172.31.0.0/26 [110/129] via 172.31.2.37, 01:32:40, Serial0/0/0
O 172.31.0.64/26 [110/129] via 172.31.2.37, 01:32:40, Serial0/0/0
O 172.31.0.128/26 [110/65] via 172.31.2.37, 01:32:40, Serial0/0/0
O 172.31.0.192/26 [110/65] via 172.31.2.37, 01:32:40, Serial0/0/0
C 172.31.1.0/26 is directly connected, GigabitEthernet0/0.30
L 172.31.1.1/32 is directly connected, GigabitEthernet0/0.30
C 172.31.1.64/26 is directly connected, GigabitEthernet0/0.20
L 172.31.1.65/32 is directly connected, GigabitEthernet0/0.20
O 172.31.2.0/29 [110/129] via 172.31.2.37, 01:32:40, Serial0/0/0

C 172.31.2.8/29 is directly connected, GigabitEthernet0/0.1
L 172.31.2.9/32 is directly connected, GigabitEthernet0/0.1
C 172.31.2.24/29 is directly connected, GigabitEthernet0/0.88
L 172.31.2.25/32 is directly connected, GigabitEthernet0/0.88
O 172.31.2.32/30 [110/128] via 172.31.2.37, 01:32:40, Serial0/0/0
C 172.31.2.36/30 is directly connected, Serial0/0/0
L 172.31.2.38/32 is directly connected, Serial0/0/0
O*E2 0.0.0.0/0 [110/1] via 172.31.2.37, 00:07:10, Serial0/0/0

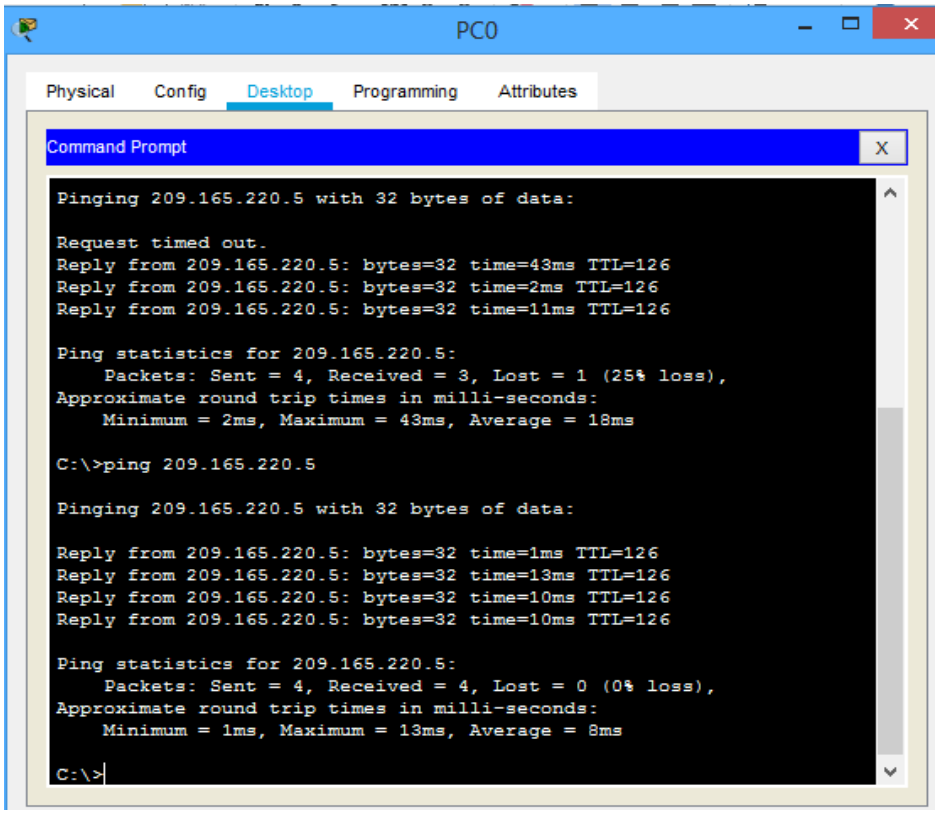
4. El enrutamiento deberá tener autenticación.

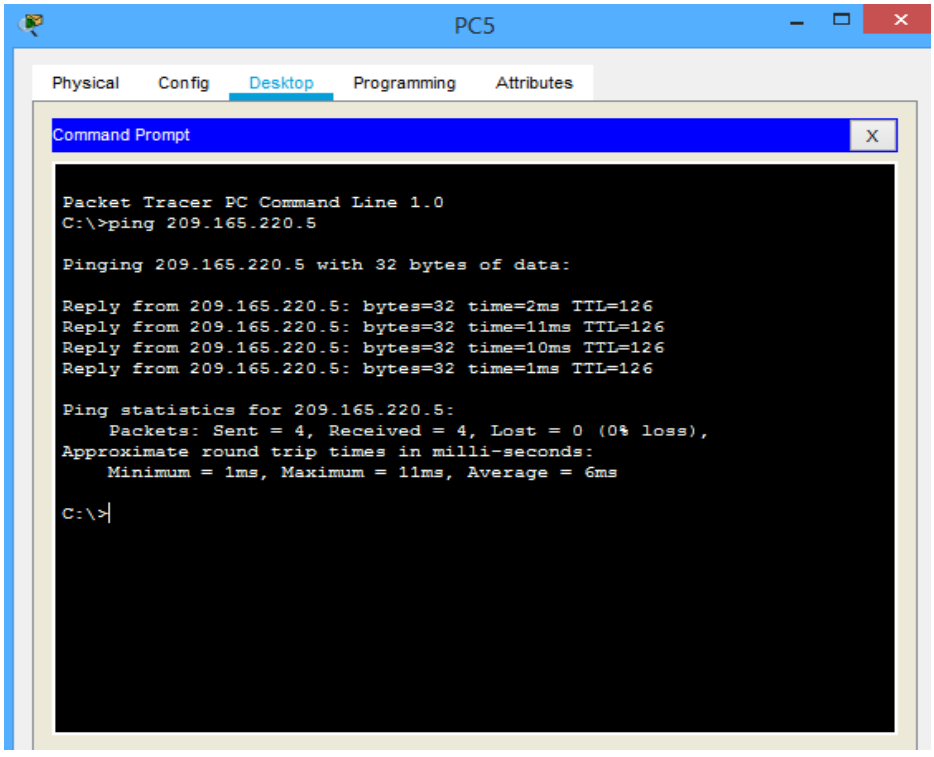
BUCARAMANGA#conf t
Enter configuration commands, one per line. End with CNTL/Z.
BUCARAMANGA(config)#int s0/0/0
BUCARAMANGA(config-if)#ip ospf authentication message-digest
BUCARAMANGA(config-if)#ip ospf message-digest-key 1 md5 ospfospf
BUCARAMANGA(config-if)#

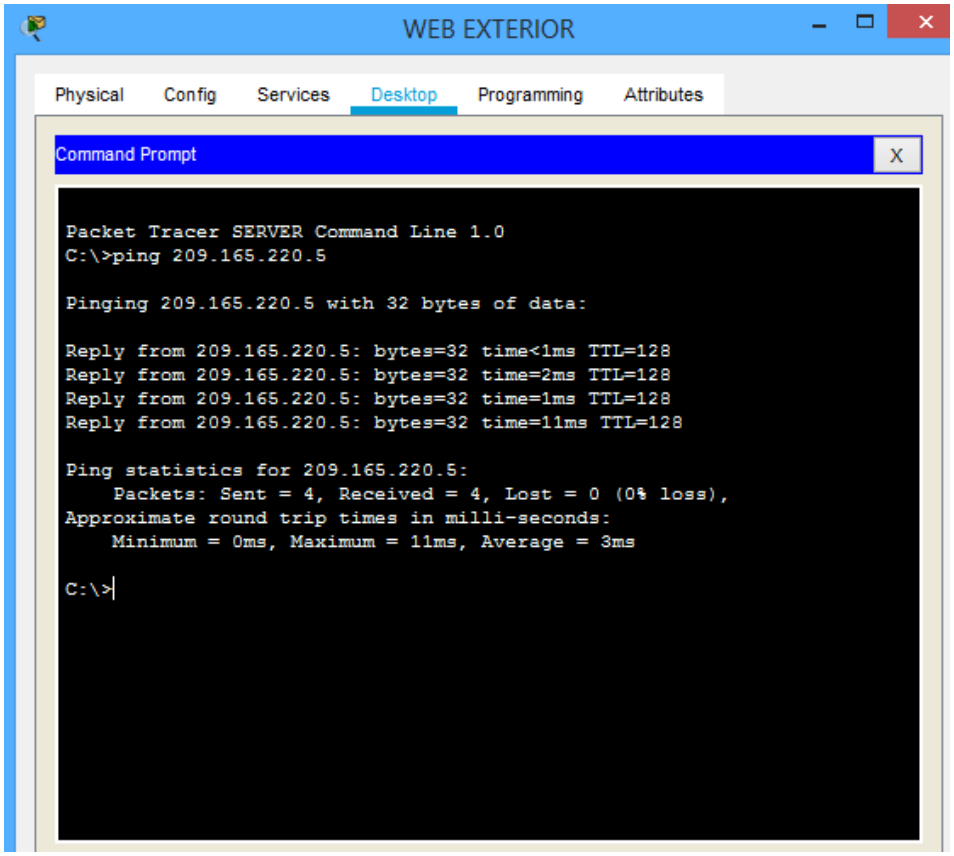
CUNDINAMARCA#conf t
Enter configuration commands, one per line. End with CNTL/Z.
CUNDINAMARCA(config)#int s0/0/0
CUNDINAMARCA(config-if)#ip ospf authentication message-digest
CUNDINAMARCA(config-if)#ip ospf message-digest-key 1 md5 ospfospf
CUNDINAMARCA(config-if)#exit
CUNDINAMARCA(config)#

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 ospfospf
TUNJA(config-if)#int s0/0/1
TUNJA(config-if)#
02:42:15: %OSPF-5-ADJCHG: Process 1, Nbr 172.31.2.34 on Serial0/0/0 from LOADING to FULL, Loading Done

TUNJA(config-if)#ip ospf authentication message-digest
TUNJA(config-if)#ip ospf message-digest-key 1 md5 ospfospf


PC0
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Pinging 209.165.220.5 with 32 bytes of data:
Request timed out.
Reply from 209.165.220.5: bytes=32 time=43ms TTL=126
Reply from 209.165.220.5: bytes=32 time=2ms TTL=126
Reply from 209.165.220.5: bytes=32 time=11ms TTL=126
Ping statistics for 209.165.220.5:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 43ms, Average = 18ms
C:\>ping 209.165.220.5
Pinging 209.165.220.5 with 32 bytes of data:
Reply from 209.165.220.5: bytes=32 time=1ms TTL=126
Reply from 209.165.220.5: bytes=32 time=13ms TTL=126
Reply from 209.165.220.5: bytes=32 time=10ms TTL=126
Reply from 209.165.220.5: bytes=32 time=10ms TTL=126
Ping statistics for 209.165.220.5:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 13ms, Average = 8ms
C:\>

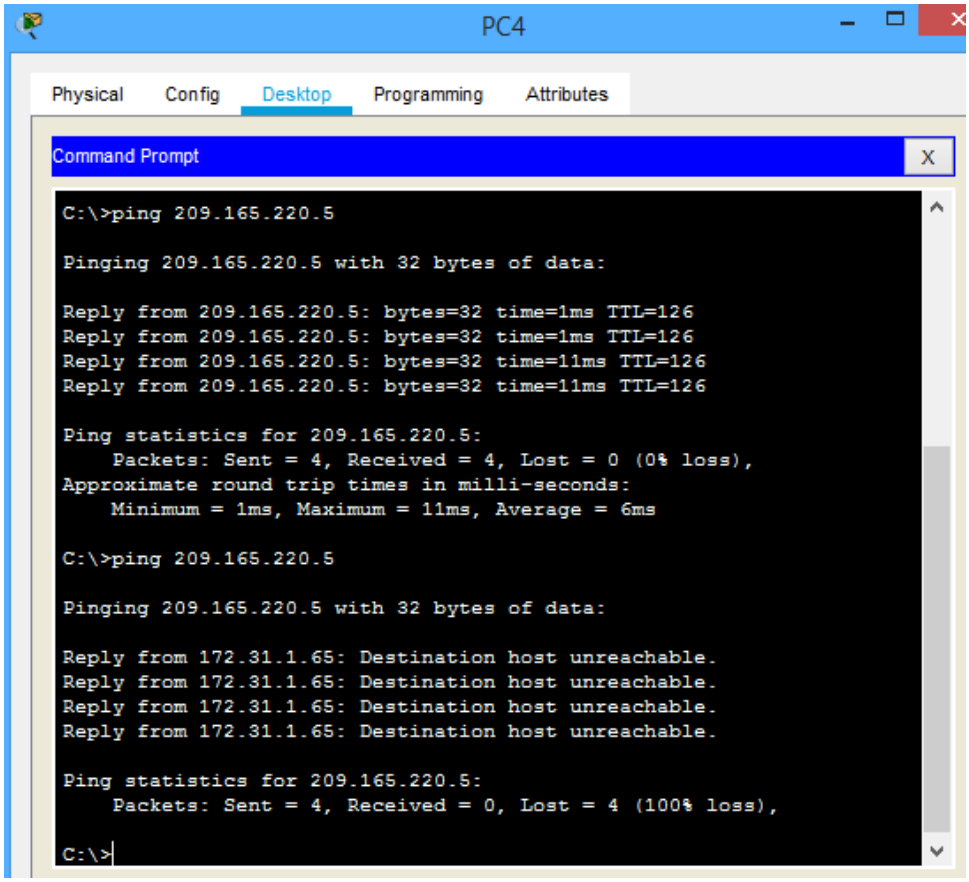

PC5
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Packet Tracer PC Command Line 1.0
C:\>ping 209.165.220.5
Pinging 209.165.220.5 with 32 bytes of data:
Reply from 209.165.220.5: bytes=32 time=2ms TTL=126
Reply from 209.165.220.5: bytes=32 time=11ms TTL=126
Reply from 209.165.220.5: bytes=32 time=10ms TTL=126
Reply from 209.165.220.5: bytes=32 time=1ms TTL=126
Ping statistics for 209.165.220.5:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 11ms, Average = 6ms
C:\>



5. **Listas de control de acceso:**

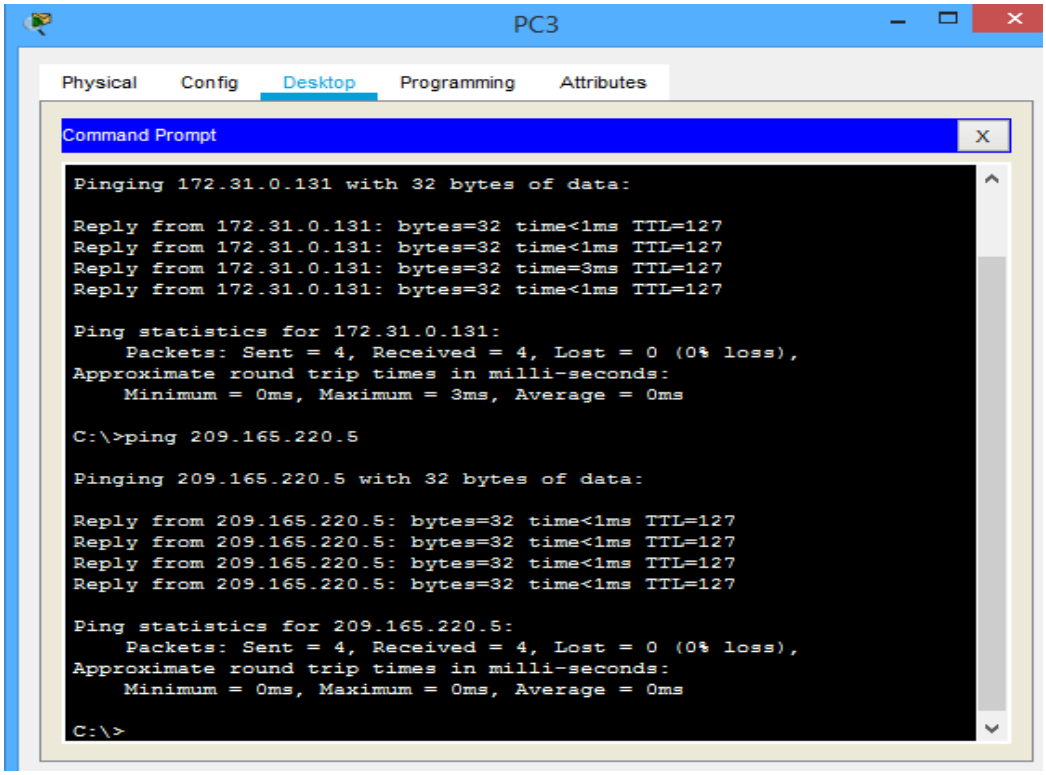
- **Los hosts de VLAN 20 en Cundinamarca no acceden a internet, solo a la red interna de Tunja.**

CUNDINAMARCA#conf t
Enter configuration commands, one per line. End with CNTL/Z.
CUNDINAMARCA(config)#access-list 151 deny ip 172.31.1.64 0.0.0.63 209.165.220.0 0.0.0.255
CUNDINAMARCA(config)#access-list 151 permit ip any any
CUNDINAMARCA(config)#int g0/0.20
CUNDINAMARCA(config-subif)#ip access-group 151 in



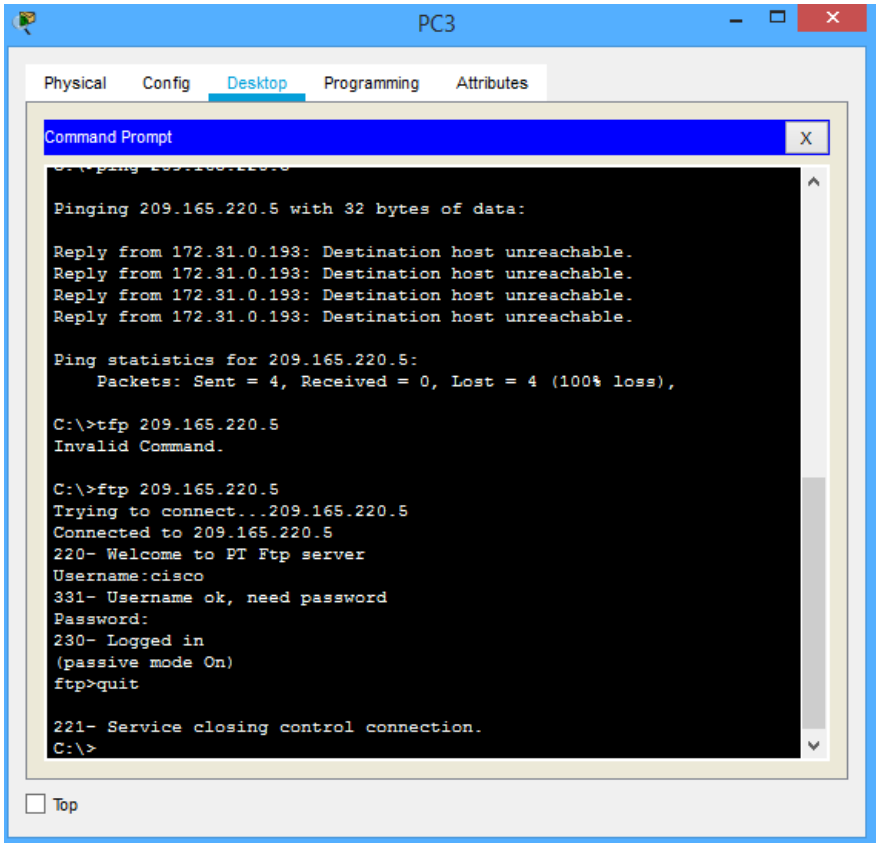
- **Los hosts de VLAN 10 en Cundinamarca si acceden a internet y no a la red interna de Tunja.**

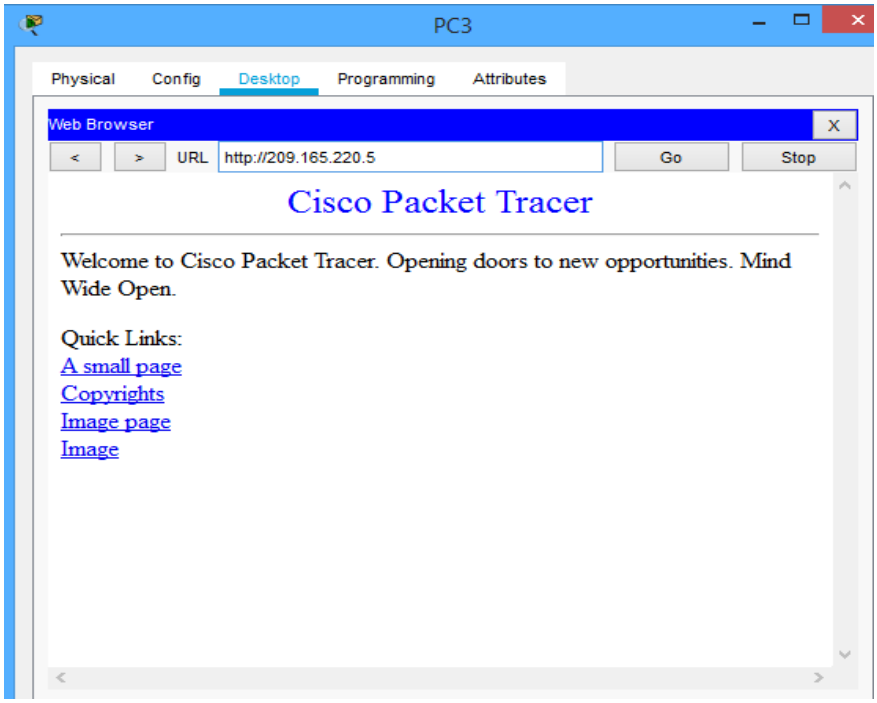
CUNDINAMARCA(config-subif)#access-list 152 permit ip 172.31.1.0 0.0.0.63 209.165.220.0 0.0.0.255
CUNDINAMARCA(config)#access-list 152 deny ip any any
CUNDINAMARCA(config)#int g0/0.30
CUNDINAMARCA(config-subif)#ip access-group 152 in



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

TUNJA#conf t
Enter configuration commands, one per line. End with CNTL/Z.
TUNJA(config)#access-list 151 permit tcp 172.31.0.192 0.0.0.63 209.165.220.0 0.0.0.255 eq 80
TUNJA(config)#access-list 151 permit tcp 172.31.0.192 0.0.0.63 209.165.220.0 0.0.0.255 eq 21
TUNJA(config)#int g0/0.30
TUNJA(config-subif)#ip access-group 151 in


PC3
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Pinging 209.165.220.5 with 32 bytes of data:
Reply from 172.31.0.193: Destination host unreachable.
Reply from 172.31.0.193: Destination host unreachable.
Reply from 172.31.0.193: Destination host unreachable.
Reply from 172.31.0.193: Destination host unreachable.
Ping statistics for 209.165.220.5:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>tfp 209.165.220.5
Invalid Command.
C:\>ftp 209.165.220.5
Trying to connect...209.165.220.5
Connected to 209.165.220.5
220- Welcome to PT Ftp server
Username:cisco
331- Username ok, need password
Password:
230- Logged in
(passive mode On)
ftp>quit
221- Service closing control connection.
C:\>
Top


PC3
Physical
Config
Desktop
Programming
Attributes
Web Browser
X
<
>
URL
http://209.165.220.5
Go
Stop
Cisco Packet Tracer
Welcome to Cisco Packet Tracer. Opening doors to new opportunities. Mind Wide Open.
Quick Links:
A small page
Copyrights
Image page
Image

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

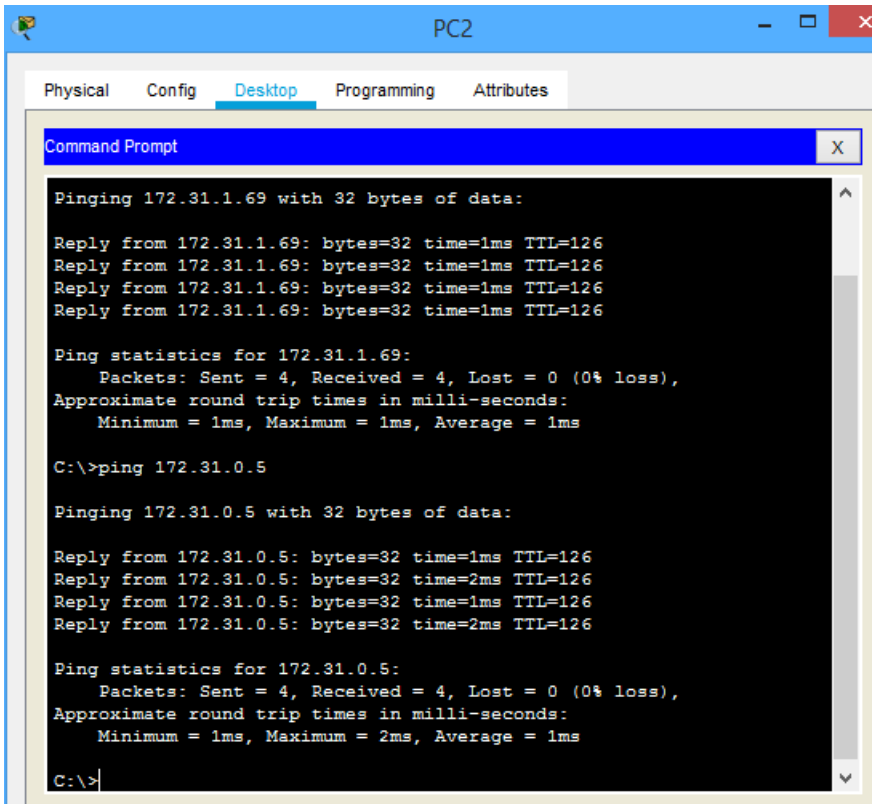
TUNJA(config-subif)#access-list 152 permit ip 172.31.0.128 0.0.0.63 172.31.1.64 0.0.0.63

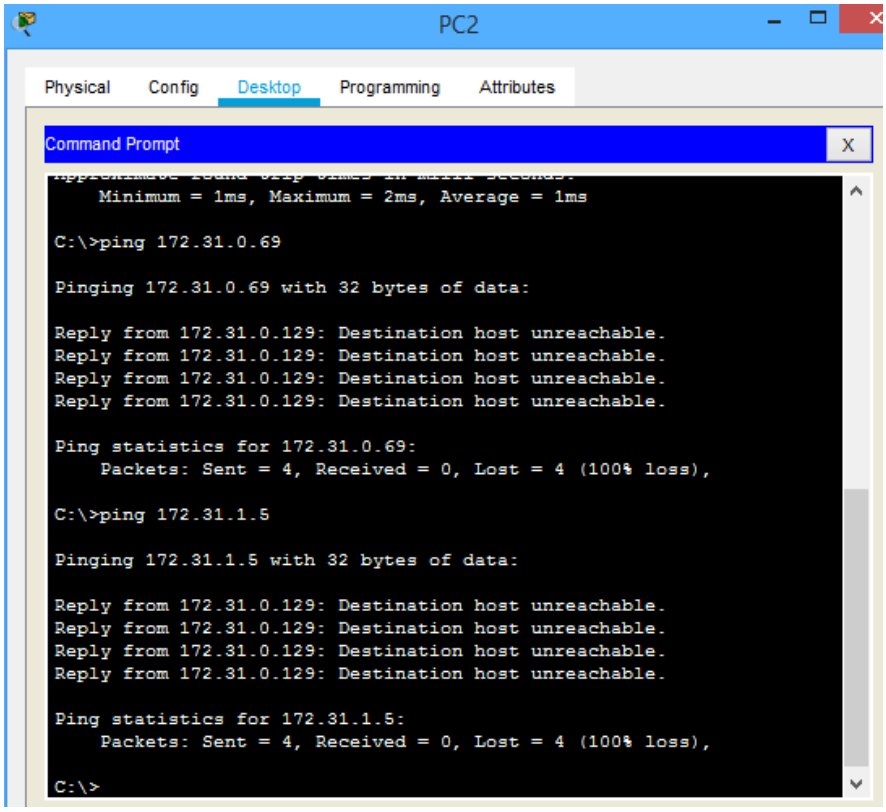
TUNJA(config)#access-list 152 permit ip 172.31.0.128 0.0.0.63 172.31.0.0 0.0.0.63

TUNJA(config)#int g0/0.20

TUNJA(config-subif)#ip access-group 152 in

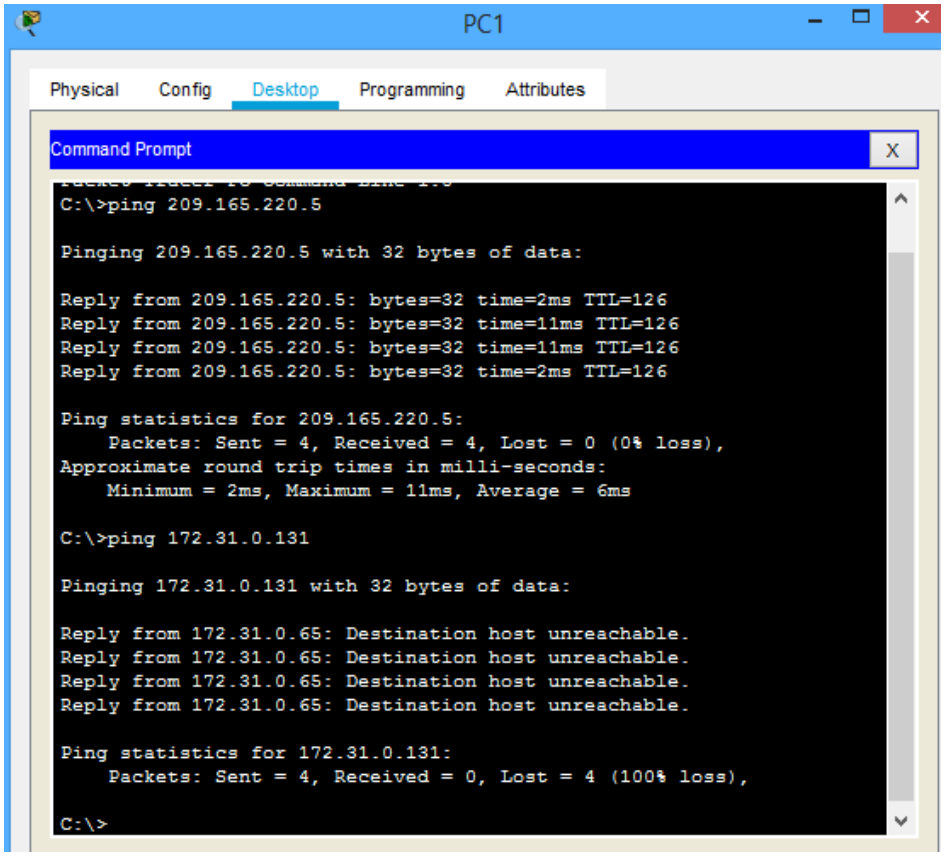
TUNJA(config-subif)#





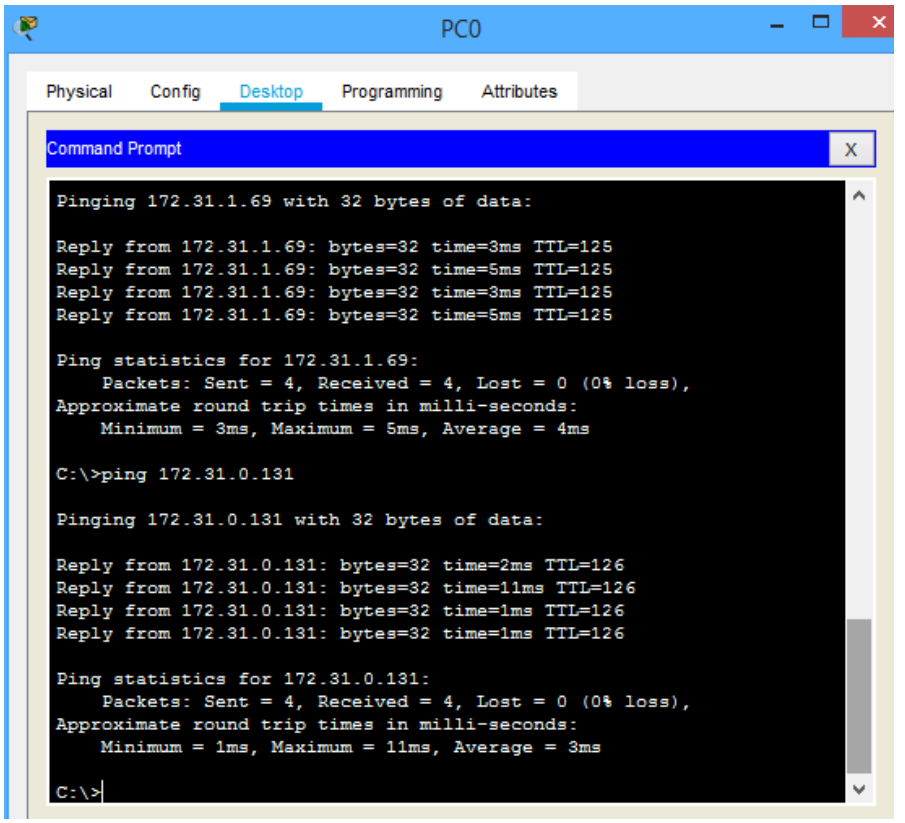
- **Los hosts de VLAN 30 de Bucaramanga acceden a internet y a cualquier equipo de VLAN 10.**

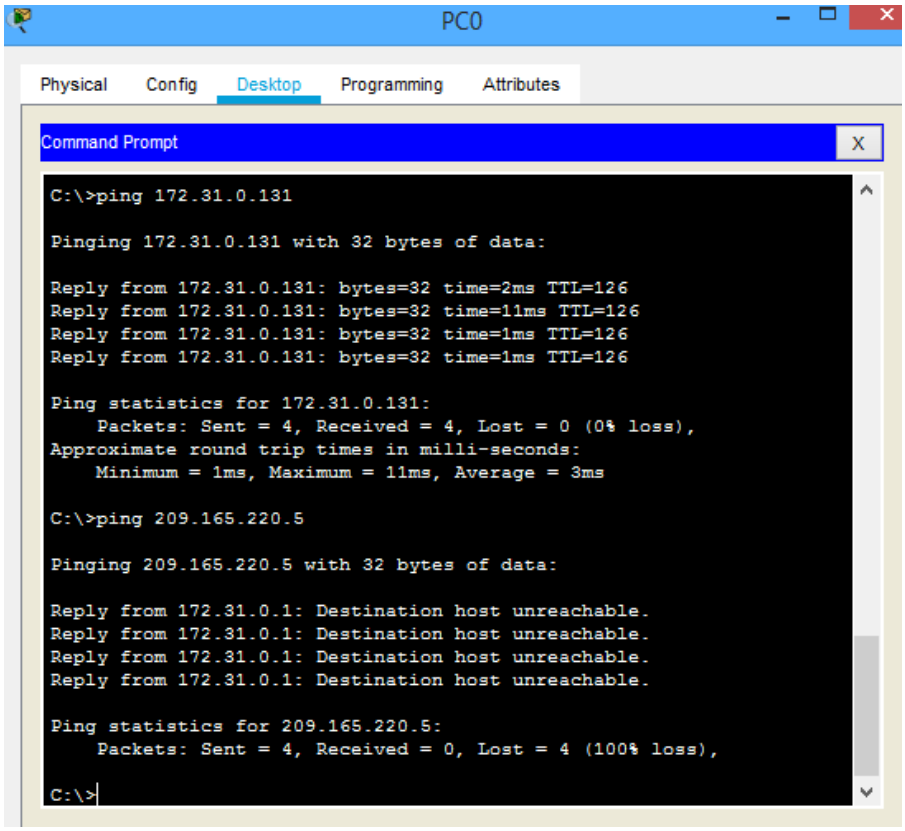
BUCARAMANGA(config)#access-list 151 permit ip 172.31.0.64 0.0.0.63 209.165.220.0 0.0.0.255
BUCARAMANGA(config)#int g0/0.30
BUCARAMANGA(config-subif)#ip access-group 151 in
BUCARAMANGA(config-subif)#



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

BUCARAMANGA(config-subif)#access-list 152 permit ip 172.31.0.0 0.0.0.63 172.31.1.64 0.0.0.63
BUCARAMANGA(config)#
BUCARAMANGA(config)#access-list 152 permit ip 172.31.0.0 0.0.0.63 172.31.0.128 0.0.0.63
BUCARAMANGA(config)#int g0/0.10
BUCARAMANGA(config-subif)#ip access-group 152 in
BUCARAMANGA(config-subif)#


PC0
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Pinging 172.31.1.69 with 32 bytes of data:
Reply from 172.31.1.69: bytes=32 time=3ms TTL=125
Reply from 172.31.1.69: bytes=32 time=5ms TTL=125
Reply from 172.31.1.69: bytes=32 time=3ms TTL=125
Reply from 172.31.1.69: bytes=32 time=5ms TTL=125
Ping statistics for 172.31.1.69:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 3ms, Maximum = 5ms, Average = 4ms
C:\>ping 172.31.0.131
Pinging 172.31.0.131 with 32 bytes of data:
Reply from 172.31.0.131: bytes=32 time=2ms TTL=126
Reply from 172.31.0.131: bytes=32 time=11ms TTL=126
Reply from 172.31.0.131: bytes=32 time=1ms TTL=126
Reply from 172.31.0.131: bytes=32 time=1ms TTL=126
Ping statistics for 172.31.0.131:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 11ms, Average = 3ms
C:\>

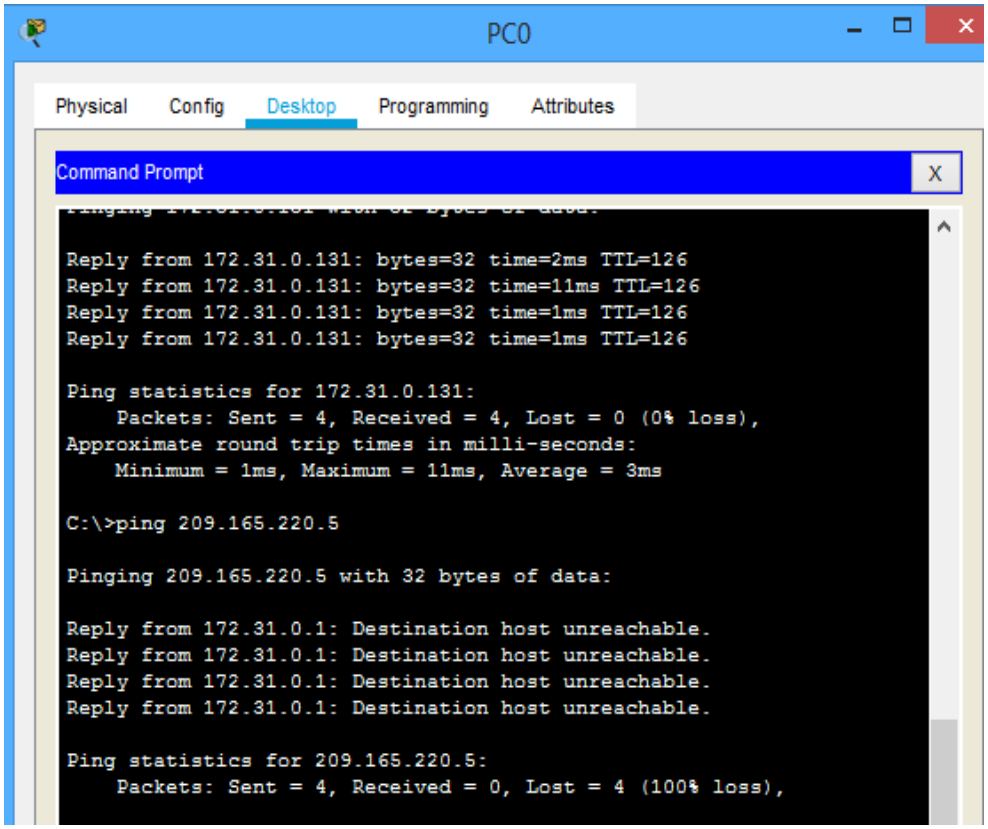

PC0
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
C:\>ping 172.31.0.131
Pinging 172.31.0.131 with 32 bytes of data:
Reply from 172.31.0.131: bytes=32 time=2ms TTL=126
Reply from 172.31.0.131: bytes=32 time=11ms TTL=126
Reply from 172.31.0.131: bytes=32 time=1ms TTL=126
Reply from 172.31.0.131: bytes=32 time=1ms TTL=126
Ping statistics for 172.31.0.131:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 11ms, Average = 3ms
C:\>ping 209.165.220.5
Pinging 209.165.220.5 with 32 bytes of data:
Reply from 172.31.0.1: Destination host unreachable.
Reply from 172.31.0.1: Destination host unreachable.
Reply from 172.31.0.1: Destination host unreachable.
Reply from 172.31.0.1: Destination host unreachable.
Ping statistics for 209.165.220.5:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>

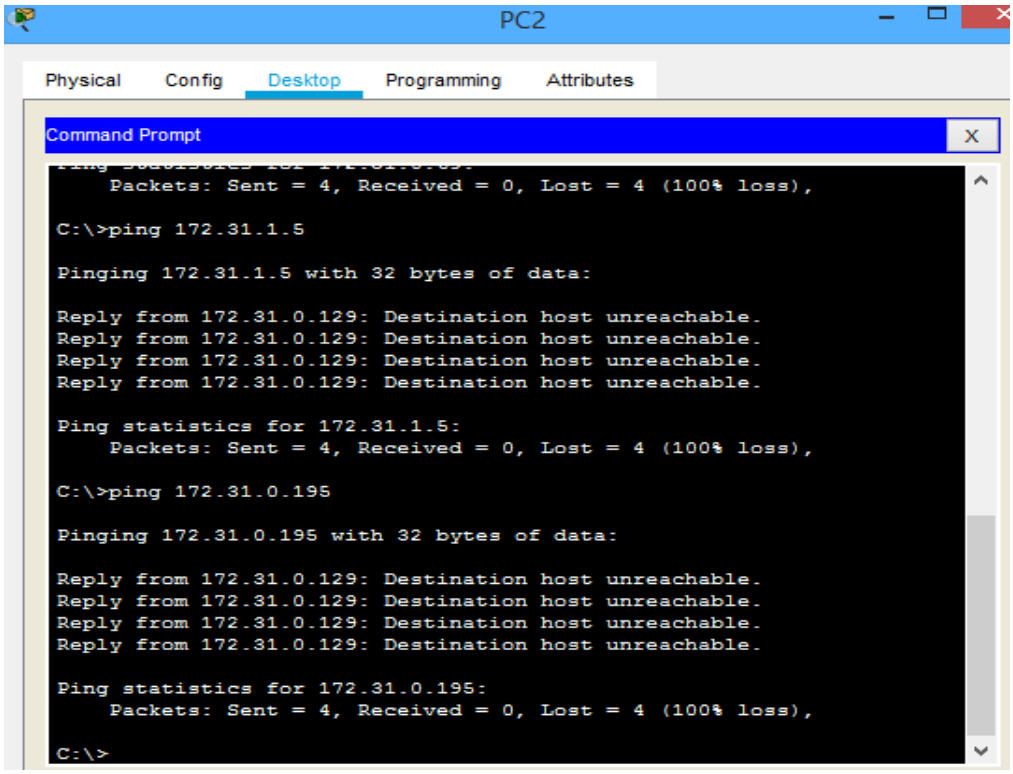
- **Los hosts de una VLAN no pueden acceder a los de otra VLAN en una ciudad.**

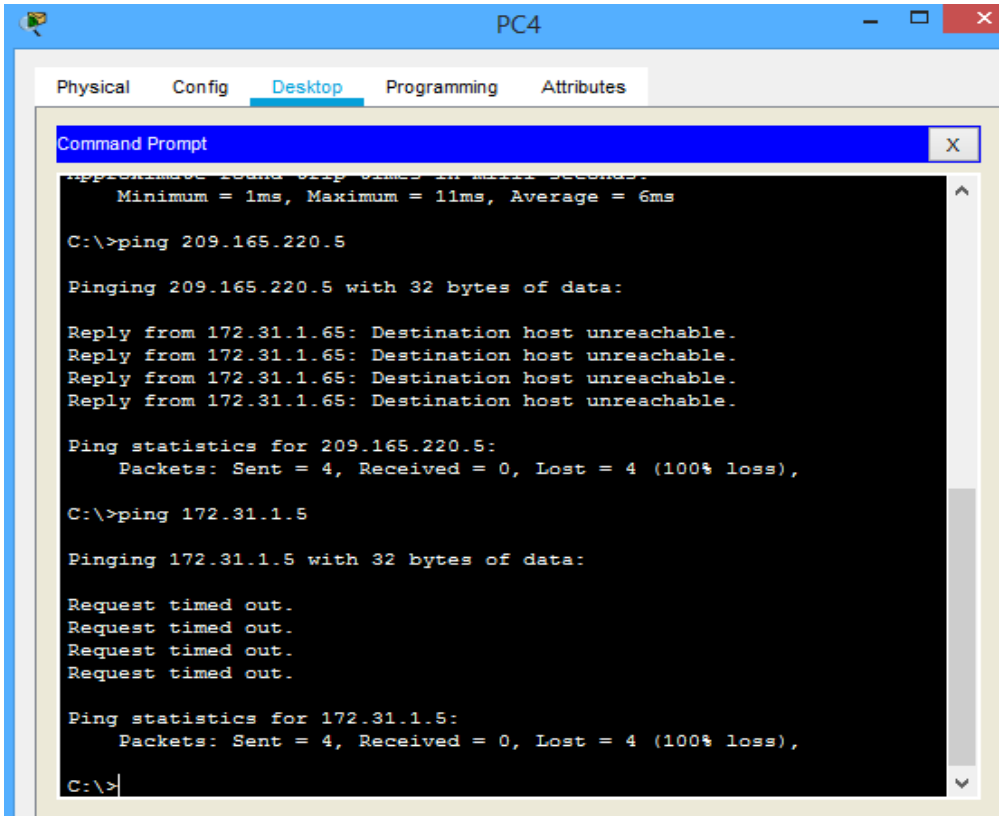
BUCARAMANGA(config-subif)#access-list 153 deny ip 172.31.2.0 0.0.0.7 172.31.0.0 0.0.0.63
BUCARAMANGA(config)#access-list 153 deny ip 172.31.0.64 0.0.0.63 172.31.0.0 0.0.0.63
BUCARAMANGA(config)#access-list 153 permit ip any any
BUCARAMANGA(config)#int g0/0.10
BUCARAMANGA(config-subif)#ip access-group 153 out
BUCARAMANGA(config-subif)#

TUNJA#conf t
Enter configuration commands, one per line. End with CNTL/Z.
TUNJA(config)#access-list 153 deny ip 172.3.2.8 0.0.0.7 172.31.0.128 0.0.0.63
TUNJA(config)#access-list 153 deny ip 172.3.0.192 0.0.0.63 172.31.0.128 0.0.0.63
TUNJA(config)#access-list 153 permit ip any any
TUNJA(config)#int g0/0.20
TUNJA(config-subif)#ip access-group 153 out
TUNJA(config-subif)#

CUNDINAMARCA(config)#access-list 153 deny ip 172.31.2.8 0.0.0.7 172.31.1.64 0.0.0.63
CUNDINAMARCA(config)#access-list 153 deny ip 172.31.1.0 0.0.0.63 172.31.1.64 0.0.0.63
CUNDINAMARCA(config)#access-list 153 deny ip 172.31.2.24 0.0.0.7 172.31.1.64 0.0.0.63
CUNDINAMARCA(config)#access-list 153 permit ip any any
CUNDINAMARCA(config)#int g0/0.20
CUNDINAMARCA(config-subif)#ip access-group 153 out
CUNDINAMARCA(config-subif)#


PC0
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Reply from 172.31.0.131: bytes=32 time=2ms TTL=126
Reply from 172.31.0.131: bytes=32 time=11ms TTL=126
Reply from 172.31.0.131: bytes=32 time=1ms TTL=126
Reply from 172.31.0.131: bytes=32 time=1ms TTL=126
Ping statistics for 172.31.0.131:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 11ms, Average = 3ms
C:\>ping 209.165.220.5
Pinging 209.165.220.5 with 32 bytes of data:
Reply from 172.31.0.1: Destination host unreachable.
Reply from 172.31.0.1: Destination host unreachable.
Reply from 172.31.0.1: Destination host unreachable.
Reply from 172.31.0.1: Destination host unreachable.
Ping statistics for 209.165.220.5:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),


PC2
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 172.31.1.5
Pinging 172.31.1.5 with 32 bytes of data:
Reply from 172.31.0.129: Destination host unreachable.
Reply from 172.31.0.129: Destination host unreachable.
Reply from 172.31.0.129: Destination host unreachable.
Reply from 172.31.0.129: Destination host unreachable.
Ping statistics for 172.31.1.5:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 172.31.0.195
Pinging 172.31.0.195 with 32 bytes of data:
Reply from 172.31.0.129: Destination host unreachable.
Reply from 172.31.0.129: Destination host unreachable.
Reply from 172.31.0.129: Destination host unreachable.
Reply from 172.31.0.129: Destination host unreachable.
Ping statistics for 172.31.0.195:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>

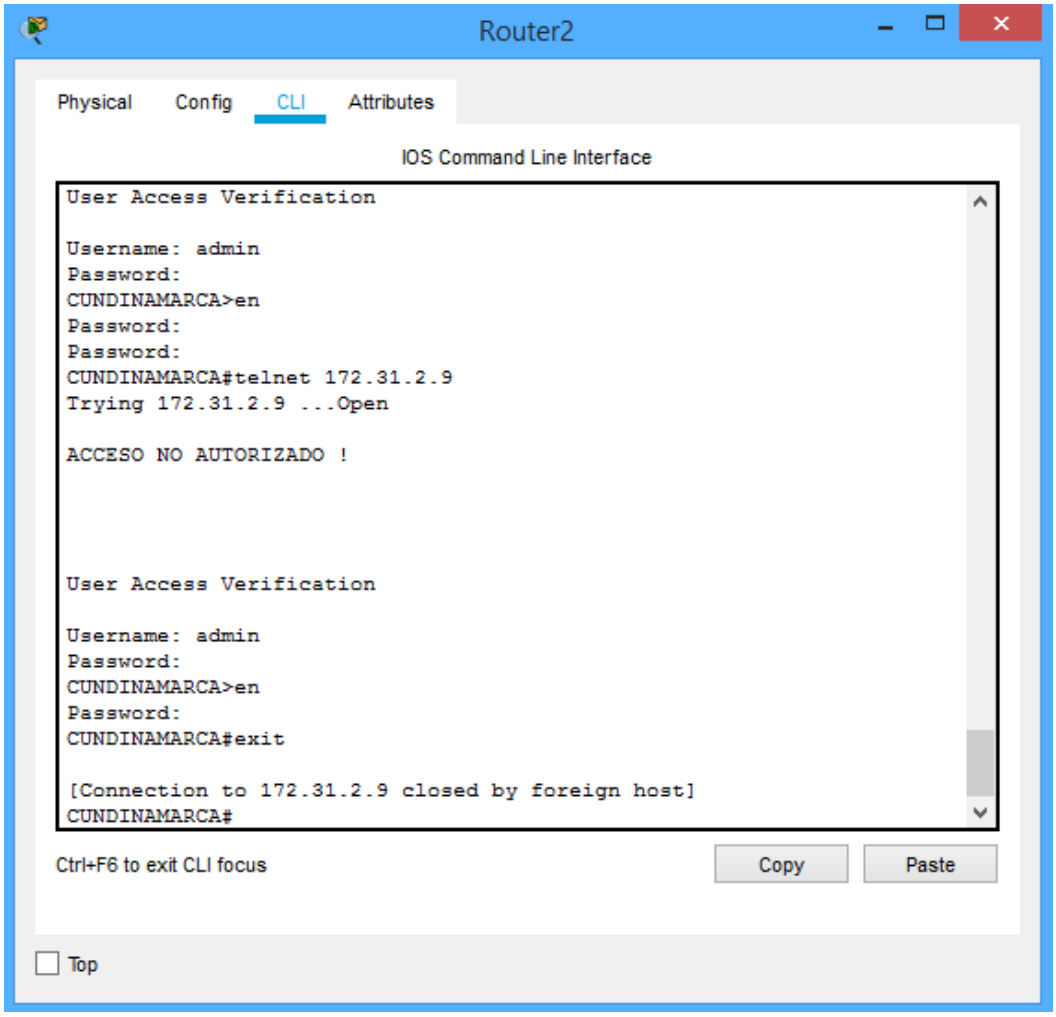


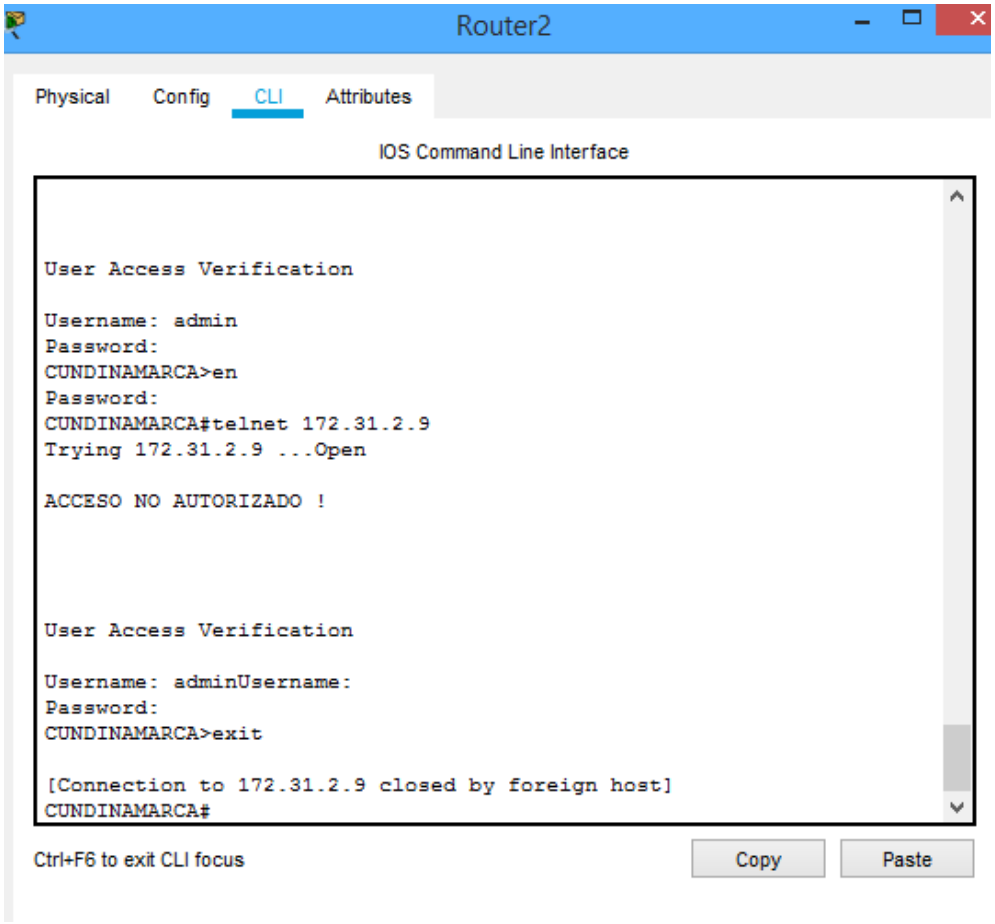
- **Solo los hosts de las VLAN administrativas y de la VLAN de servidores tienen accedo a los routers e internet.**

BUCARAMANGA(config)#access-list 9 permit 172.31.2.0 0.0.0.7
BUCARAMANGA(config)#access-list 9 permit 172.3.2.8 0.0.0.7
BUCARAMANGA(config)#access-list 9 permit 172.31.2.8 0.0.0.7
BUCARAMANGA(config)#line vty 0 4
BUCARAMANGA(config-line)#access-class 9 in

Enter configuration commands, one per line. End with CNTL/Z.
TUNJA(config)#access-list 9 permit 172.31.2.0 0.0.0.7
TUNJA(config)#access-list 9 permit 172.3.2.8 0.0.0.7
TUNJA(config)#access-list 9 permit 172.31.2.8 0.0.0.7
TUNJA(config)#line vty 0 4
TUNJA(config-line)#access-class 9 in
TUNJA(config-line)#

```
CUNDINAMARCA(config-subif)#access-list 9 permit 172.31.2.0 0.0.0.7
CUNDINAMARCA(config)#access-list 9 permit 172.3.2.8 0.0.0.7
CUNDINAMARCA(config)#access-list 9 permit 172.31.2.8 0.0.0.7
CUNDINAMARCA(config)#line vty 0 4
CUNDINAMARCA(config-line)#access-class 9 in
CUNDINAMARCA(config-line)#
```





6. VLSM: utilizar la dirección 172.31.0.0 /18 para el direccionamiento.

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

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)#

00:25:02: %OSPF-5-ADJCHG: Process 1, Nbr 209.165.220.1 on Serial0/0/0 from LOADING to FULL, Loading Done

CUNDINAMARCA(config-router)#end

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)#
00:19:40: %OSPF-5-ADJCHG: Process 1, Nbr 172.31.2.34 on Serial0/0/0 from LOADING to FULL, Loading Done

TUNJA(config-router)#network 172.31.2.36 0.0.0.3 area 0
TUNJA(config-router)#end

Conclusión

Mediante la prueba de habilidades prácticas CCNA, se logró demostrar los conocimientos adquiridos durante el proceso del diplomado cisco, lo más importante es que se logró adquirir la destrezas necesarias al momento que utilizamos cada una de configuración.

En el desarrollo de esta actividad nos llevó mucho ya que embargan grandes cuestiones como la conectividad de los dispositivos, la verificación de los saltos y destinos en concreto.

Cada escenario expuesto fue desarrollado en la herramienta packet tracer, utilizando comandos para la configuraciones básicas y las configuraciones de red implementada en estos escenarios.

Para concluir es muy importante que a la vez con este desarrollo de esta práctica se ve el reflejado el objetivo logrado, el cual era la solución de los escenarios y la habilidad adquirida a partir de este proceso del diplomado.

Referencias Bibliográficas

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