PRUEBA DE HABILIDADES PRÁCTICAS CCNA

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UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA (UNAD)
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INGENIERÍA DE SISTEMAS
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Diplomado De Profundización CISCO (Diseño e implementación de soluciones integradas LAN / WAN)

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TABLA DE CONTENIDO

RESUMEN

El presente trabajo trata sobre los fundamentos de redes y los conocimientos adquiridos en el diplomado de profundización de CISCO, específicamente CCNA (Cisco Certified Network Associate).

A partir de un caso propuesto en el que se suministra un problema orientado al manejo de redes, se pretende dar solución a partir del software de simulación de redes CISCO Packet Tracer. Una vez solucionado lo anterior procedemos a explicar en el presente trabajo escrito.

Palabras Clave: CISCO, CCNA, Profundización, Habilidades, Redes, Informática.

ABSTRACT

This paper deals with the fundamentals of networks and the knowledge acquired in the deepening diploma of CISCO, specifically CCNA (Cisco Certified Network Associate).

Based on a proposed case in which a problem oriented to network management is provided, it is intended to provide a solution based on the network simulation software CISCO Packet Tracer. Once solved the previous we proceed to explain in the present written work.

Keywords: CISCO, CCNA, Deepening, Skills, Networks, Informatics.

INTRODUCCION

Actualmente se habla de desarrollo y modernidad y no puede excluirse el tema de la informática, sobre todo de las redes que nos ayudan a interconectarnos y de esta forma romper el paradigma de la distancia y tiempo, puesto que las herramientas telemáticas nos ayudan a mantener una comunicación tanto síncrona como asíncrona.

El funcionamiento de las nuevas tecnologías de la información y comunicación es posible gracias al uso de redes, que cruzan fronteras continentales y nos permiten estar al tanto de lo que sucede al otro lado del mundo.

En el presente trabajo se pretende poner en practica los conocimientos adquiridos en el diplomado de opción de grado de CISCO y de esta forma conocer a profundidad la configuración y ecosistema de una red.

OBJETIVOS

OBJETIVO GENERAL

Poner en practica todo lo aprendido en el transcurso de los módulos en teoría y habilidades, poniendo en evidencia todo lo aprendido en la solución de problemas relacionados con el caso propuesto.

OBJETIVOS ESPECIFIVOS

- Resolver los problemas propuestos en el caso usando las herramientas de simulación.

- Hacer una documentación de todo lo realizado.

- Configurar los dispositivos de redes.

- Usar los comandos de Packet Tracer y aprender sobre su funcionalidad.

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.
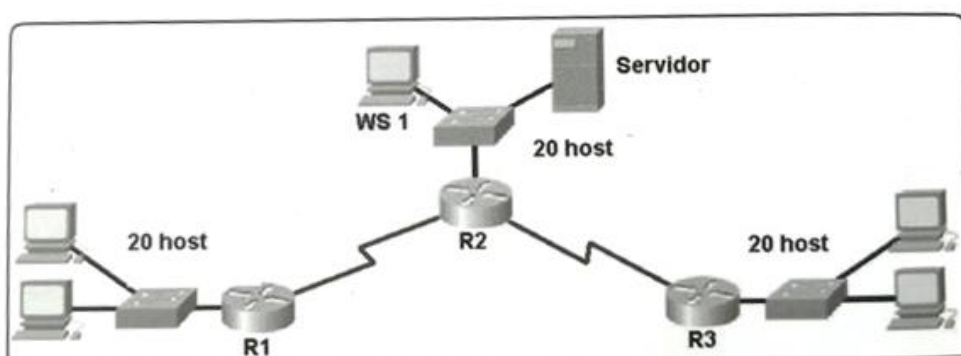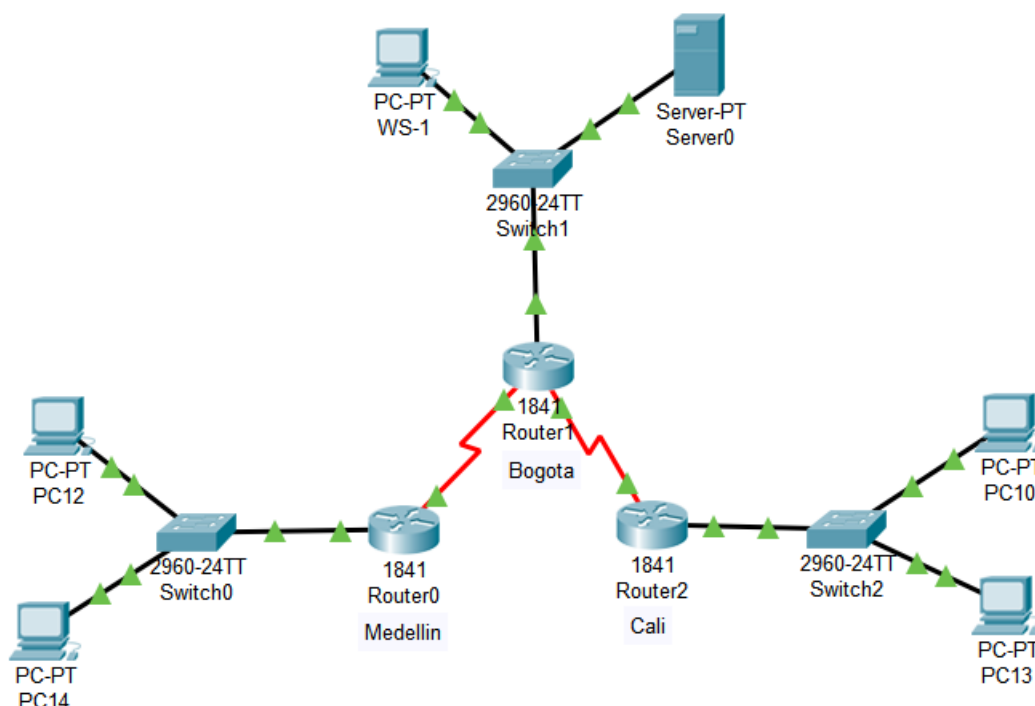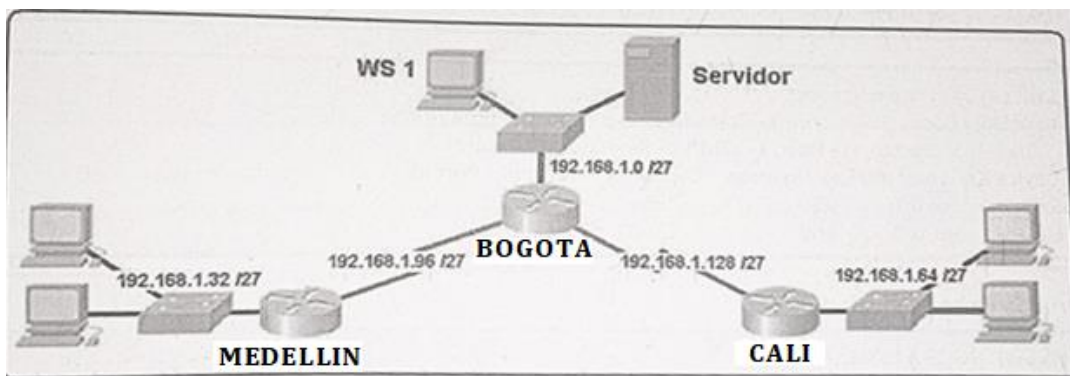
Desarrollo

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).**

```
Router>en
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname bogota
bogota(config)#no ip domain-lookup
bogota(config)#service password-encryption
```

```
bogota(config)#banner motd $El Acceso no autorizado est prohibido$
bogota(config)#enable secret class1
bogota(config)#line console 0
bogota(config-line)#password cisco1
bogota(config-line)#login
bogota(config-line)#line vty 0 15
bogota(config-line)#password cisco1
bogota(config-line)#login
bogota(config-line)#

Router>en
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname medellin
medellin(config)#no ip domain-lookup
medellin(config)#service password-encryption
medellin(config)#banner motd $El Acceso no autorizado est prohibido$
medellin(config)#enable secret class1
medellin(config)#line console 0
medellin(config-line)#password cisco1
medellin(config-line)#login
medellin(config-line)#line vty 0 15
medellin(config-line)#password cisco1
medellin(config-line)#login
medellin(config-line)#

Router>en
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname cali
cali(config)#no ip domain-lookup
cali(config)#service password-encryption
cali(config)#banner motd $El Acceso no autorizado est prohibido$
cali(config)#enable secret class1
cali(config)#line console 0
cali(config-line)#password cisco1
cali(config-line)#login
cali(config-line)#line vty 0 15
cali(config-line)#password cisco1
cali(config-line)#login
cali(config-line)#

Switch>en
Switch#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname switchbogota
switchbogota(config)#no ip domain-lookup
switchbogota(config)#service password-encryption
```

switchbogota(config)#banner motd $El Acceso no autorizado est prohibido$
switchbogota(config)#enable secret class1
switchbogota(config)#line console 0
switchbogota(config-line)#password cisco1
switchbogota(config-line)#login
switchbogota(config-line)#line vty 0 15
switchbogota(config-line)#password cisco1
switchbogota(config-line)#login
switchbogota(config-line)#

Switch>en
Switch#conf term
Enter configuration commands, one per line. End with CNTL/Z.
switchmedellin(config)#hostname switchmedellin
switchmedellin(config)#no ip domain-lookup
switchmedellin(config)#service password-encryption
switchmedellin(config)#banner motd $El Acceso no autorizado est prohibido$
switchmedellin(config)#enable secret class1
switchmedellin(config)#line console 0
switchmedellin(config-line)#password cisco1
switchmedellin(config-line)#login
switchmedellin(config-line)#line vty 0 15
switchmedellin(config-line)#password cisco1
switchmedellin(config-line)#login
switchmedellin(config-line)#

Switch>en
Switch#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname switchcali
switchcali(config)#no ip domain-lookup
switchcali(config)#service password-encryption
switchcali(config)#banner motd $El Acceso no autorizado est prohibido$
switchcali(config)#enable secret class1
switchcali(config)#line console 0
switchcali(config-line)#password cisco1
switchcali(config-line)#login
switchcali(config-line)#line vty 0 15
switchcali(config-line)#password cisco1
switchcali(config-line)#login
switchcali(config-line)#

- **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 creciemiento futuro de la red corporativa.
b. Asignar una dirección IP a la red.

Bogota-LAN	192.168.1.0/27
Medellín-LAN	192.168.1.32/27
Cali-LAN	192.168.1.64/27
Bogota-Medellín	192.168.1.96/27
Bogota-Cali	192.168.1.128/27
Futuro	192.168.1.160/27
Futuro	192.168.1.192/27
Futuro	192.168.1.224/27

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

```
bogota(config)#int s0/0/0
bogota(config-if)#ip address 192.168.1.98 255.255.255.224
bogota(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
bogota(config-if)#
bogota(config-if)#int s0/0/1
bogota(config-if)#ip address 192.168.1.130 255.255.255.224
bogota(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
bogota(config-if)#
```

```
bogota(config-if)#int f0/0
bogota(config-if)#ip address 192.168.1.1 255.255.255.224
bogota(config-if)#no shutdown

bogota(config-if)#
bogota(config-if)#router eigrp 200
bogota(config-router)#no auto-summary
bogota(config-router)#network 192.168.1.0
bogota(config-router)#end
bogota#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

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

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


medellin(config)#int s0/0/0
medellin(config-if)#ip address 192.168.1.99 255.255.255.224
medellin(config-if)#no shutdown

medellin(config-if)#
medellin(config-if)#int f0/0
medellin(config-if)#ip address 192.168.1.33 255.255.255.224
medellin(config-if)#no shutdown

medellin(config-if)#
medellin(config-if)#router eigrp 200
medellin(config-router)#no auto-summary
medellin(config-router)#network 192.168.1.0
medellin(config-router)#end
medellin#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

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

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


cali(config)#int s0/0/0
cali(config-if)#ip address 192.168.1.131 255.255.255.224
cali(config-if)#no shutdown
```

cali(config-if)#int f0/0
cali(config-if)#ip address 192.168.1.65 255.255.255.224
cali(config-if)#no shutdown

cali(config-if)#
cali(config-if)#router eigrp 200
cali(config-router)#no auto-summary
cali(config-router)#network 192.168.1.0
cali(config-router)#end
cali#
cali#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

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

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

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

%DUAL-5-NBRCHANGE: IP-EIGRP 200: Neighbor 192.168.1.130 (Serial0/0/0)
is up: new adjacency

**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: 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, 00:04:34, Serial0/0/0
D 192.168.1.64 [90/2172416] via 192.168.1.131, 00:03:31, Serial0/0/1
C 192.168.1.96 is directly connected, Serial0/0/0
C 192.168.1.128 is directly connected, Serial0/0/1

medellin#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external 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, 00:04:41, 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, 00:03:38, 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, 00:03:44, Serial0/0/0

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

Gateway of last resort is not set

192.168.1.0/27 is subnetted, 5 subnets
D 192.168.1.0 [90/2172416] via 192.168.1.130, 00:03:47, Serial0/0/0
D 192.168.1.32 [90/2684416] via 192.168.1.130, 00:03:47, Serial0/0/0
C 192.168.1.64 is directly connected, FastEthernet0/0
D 192.168.1.96 [90/2681856] via 192.168.1.130, 00:03:47, Serial0/0/0
C 192.168.1.128 is directly connected, Serial0/0/0

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

bogota#show ip eigrp topology
IP-EIGRP Topology Table for AS 200/ID(192.168.1.130)

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

P 192.168.1.0/27, 1 successors, FD is 28160
via Connected, FastEthernet0/0
P 192.168.1.32/27, 1 successors, FD is 2172416
via 192.168.1.99 (2172416/28160), Serial0/0/0
P 192.168.1.64/27, 1 successors, FD is 2172416
via 192.168.1.131 (2172416/28160), Serial0/0/1
P 192.168.1.96/27, 1 successors, FD is 2169856
via Connected, Serial0/0/0
P 192.168.1.128/27, 1 successors, FD is 2169856
via Connected, Serial0/0/1

medellin#show ip eigrp topology
IP-EIGRP Topology Table for AS 200/ID(192.168.1.99)

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

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

cali#show ip eigrp topology
IP-EIGRP Topology Table for AS 200/ID(192.168.1.131)

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

P 192.168.1.0/27, 1 successors, FD is 2172416
via 192.168.1.130 (2172416/28160), Serial0/0/0
P 192.168.1.32/27, 1 successors, FD is 2684416
via 192.168.1.130 (2684416/2172416), Serial0/0/0
P 192.168.1.64/27, 1 successors, FD is 28160
via Connected, FastEthernet0/0
P 192.168.1.96/27, 1 successors, FD is 2681856
via 192.168.1.130 (2681856/2169856), Serial0/0/0
P 192.168.1.128/27, 1 successors, FD is 2169856
via Connected, Serial0/0/0

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

bogota#show cdp neighbor
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
switchbogota
Fas 0/0 176 S 2960 Fas 0/1
medellin Ser 0/0/0 145 R C1841 Ser 0/0/0
cali Ser 0/0/1 148 R C1841 Ser 0/0/0

medellin#show cdp neighbor
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
switchmedellin
Fas 0/0 131 S 2960 Fas 0/1
bogota Ser 0/0/0 136 R C1841 Ser 0/0/0

cali#show cdp neighbor
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
switchcali Fas 0/0 126 S 2960 Fas 0/1
bogota Ser 0/0/0 126 R C1841 Ser 0/0/1

e. Realizar una prueba de conectividad en cada tramo de la ruta usando Ping.
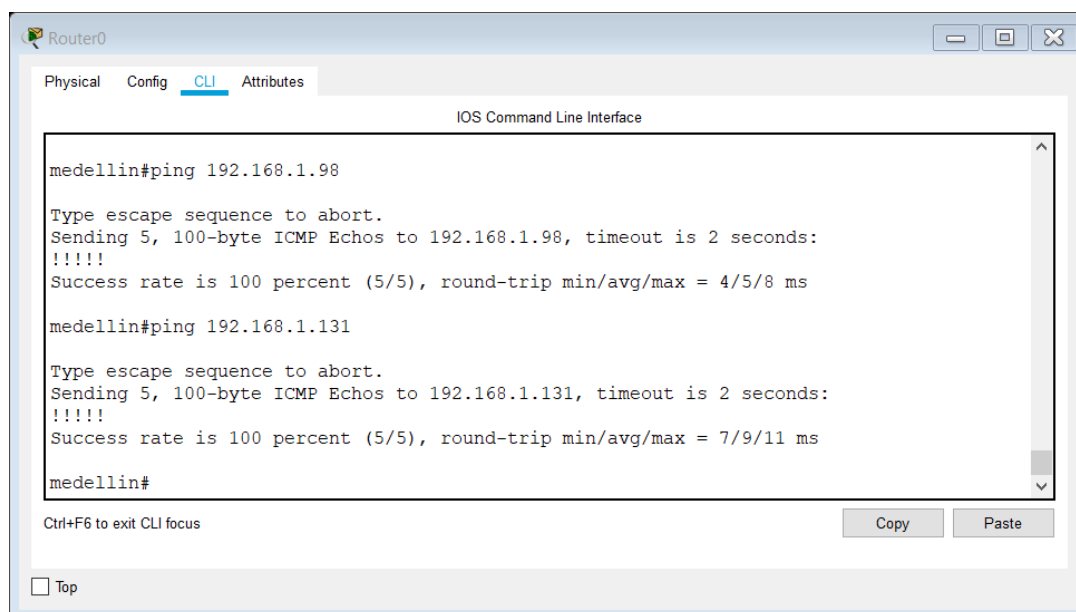
Parte 3: Configuración de Enrutamiento.

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.
SHOW IP EIGRP NEIGHBORS

bogota#show ip eigrp neighbor
IP-EIGRP neighbors for process 200
H Address Interface Hold Uptime SRTT RTO Q Seq
(sec) (ms) Cnt Num
0 192.168.1.99 Se0/0/0 13 00:04:34 40 1000 0 7
1 192.168.1.131 Se0/0/1 12 00:03:31 40 1000 0 7

bogota#

medellin#show ip eigrp neighbor
IP-EIGRP neighbors for process 200
H Address Interface Hold Uptime SRTT RTO Q Seq
(sec) (ms) Cnt Num
0 192.168.1.98 Se0/0/0 11 00:04:40 40 1000 0 7

medellin#

cali#show ip eigrp neighbor
IP-EIGRP neighbors for process 200
H Address Interface Hold Uptime SRTT RTO Q Seq
(sec) (ms) Cnt Num
0 192.168.1.130 Se0/0/0 12 00:03:47 40 1000 0 8

cali#

SHOW IP EIGRP TOPOLOGY

bogota#show ip eigrp topology
IP-EIGRP Topology Table for AS 200/ID(192.168.1.130)

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

P 192.168.1.0/27, 1 successors, FD is 28160
via Connected, FastEthernet0/0
P 192.168.1.32/27, 1 successors, FD is 2172416
via 192.168.1.99 (2172416/28160), Serial0/0/0
P 192.168.1.64/27, 1 successors, FD is 2172416
via 192.168.1.131 (2172416/28160), Serial0/0/1
P 192.168.1.96/27, 1 successors, FD is 2169856

via Connected, Serial0/0/0
P 192.168.1.128/27, 1 successors, FD is 2169856
via Connected, Serial0/0/1

medellin#show ip eigrp topology
IP-EIGRP Topology Table for AS 200/ID(192.168.1.99)

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

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

cali#show ip eigrp topology
IP-EIGRP Topology Table for AS 200/ID(192.168.1.131)

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

P 192.168.1.0/27, 1 successors, FD is 2172416
via 192.168.1.130 (2172416/28160), Serial0/0/0
P 192.168.1.32/27, 1 successors, FD is 2684416
via 192.168.1.130 (2684416/2172416), Serial0/0/0
P 192.168.1.64/27, 1 successors, FD is 28160
via Connected, FastEthernet0/0
P 192.168.1.96/27, 1 successors, FD is 2681856
via 192.168.1.130 (2681856/2169856), Serial0/0/0
P 192.168.1.128/27, 1 successors, FD is 2169856
via Connected, Serial0/0/0

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

bogota#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external 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, 00:04:34, Serial0/0/0
D 192.168.1.64 [90/2172416] via 192.168.1.131, 00:03:31, Serial0/0/1
C 192.168.1.96 is directly connected, Serial0/0/0
C 192.168.1.128 is directly connected, Serial0/0/1

medellin#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external 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, 00:04:41, 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, 00:03:38, 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, 00:03:44, Serial0/0/0
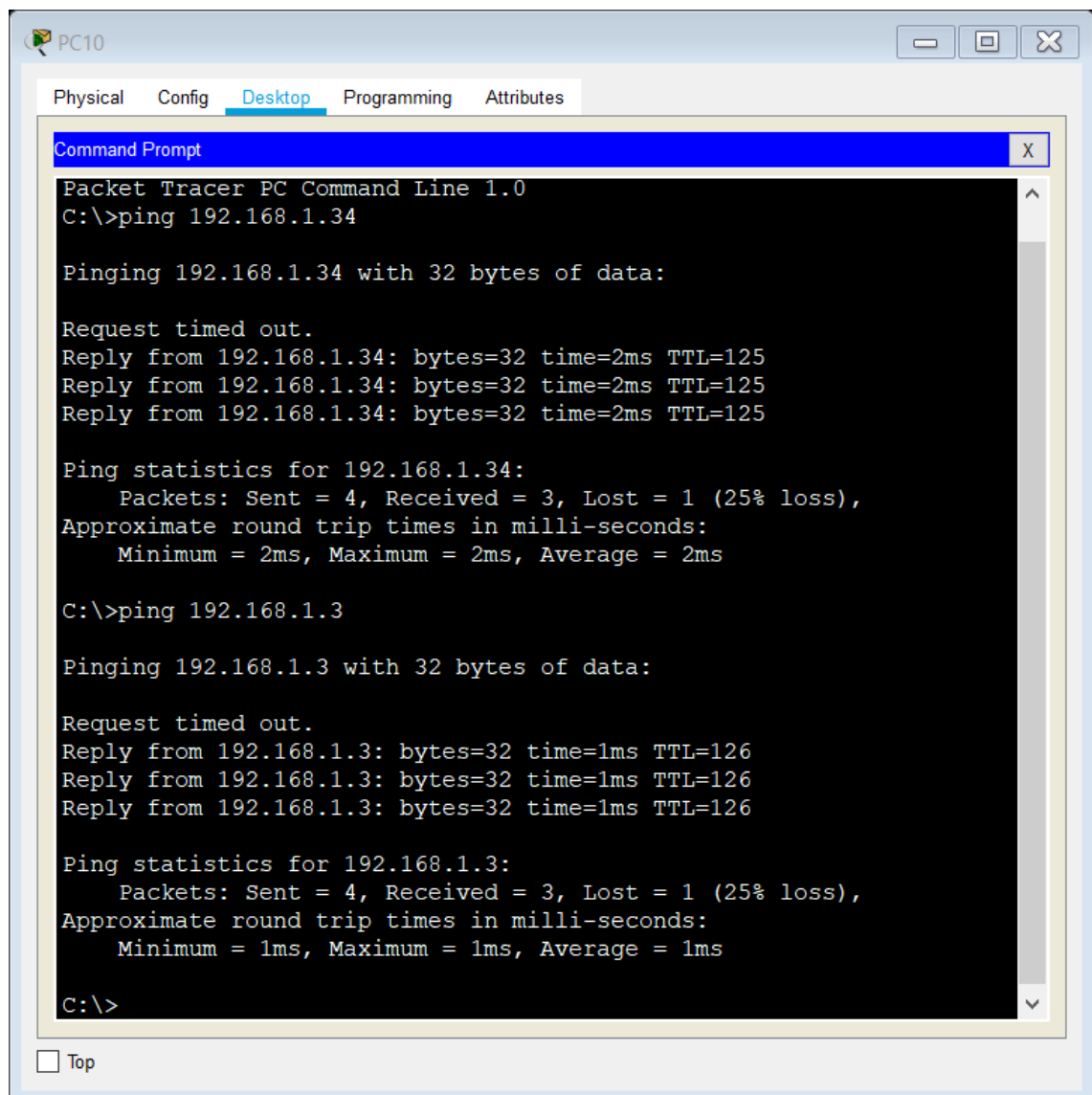
cali#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

192.168.1.0/27 is subnetted, 5 subnets
D 192.168.1.0 [90/2172416] via 192.168.1.130, 00:03:47, Serial0/0/0
D 192.168.1.32 [90/2684416] via 192.168.1.130, 00:03:47, Serial0/0/0
C 192.168.1.64 is directly connected, FastEthernet0/0
D 192.168.1.96 [90/2681856] via 192.168.1.130, 00:03:47, Serial0/0/0

C 192.168.1.128 is directly connected, Serial0/0/0

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.

```
PC10                                                    [_] [□] [X]

 Physical    Config    Desktop    Programming    Attributes

 Command Prompt                                             X

 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.
 Reply from 192.168.1.34: bytes=32 time=2ms TTL=125
 Reply from 192.168.1.34: bytes=32 time=2ms TTL=125
 Reply from 192.168.1.34: bytes=32 time=2ms TTL=125

 Ping statistics for 192.168.1.34:
     Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
 Approximate round trip times in milli-seconds:
     Minimum = 2ms, Maximum = 2ms, Average = 2ms

 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=1ms TTL=126
 Reply from 192.168.1.3: bytes=32 time=1ms 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 = 1ms, Average = 1ms

 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:

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

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.

bogota(config)#access-list 131 permit ip host 192.168.1.30 any
bogota(config)#int f0/0
bogota(config-if)#ip access-group 131 in
bogota(config-if)#

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.

medellin(config)#access-list 131 permit ip 192.168.1.32 0.0.0.31 host 192.168.1.30
medellin(config)#int f0/0
medellin(config-if)#ip access-group 131 in
medellin(config-if)#

cali(config)#access-list 131 permit ip 192.168.1.64 0.0.0.31 host 192.168.1.30
cali(config)#int f0/0
cali(config-if)#ip access-group 131 in
cali(config-if)#

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
	Router MEDELLIN	Router CALI	Éxito
TELNET	WS_1	Router BOGOTA	Falla
	Servidor	Router CALI	Éxito
	Servidor	Router MEDELLIN	Éxito
TELNET	LAN del Router MEDELLIN	Router CALI	Falla

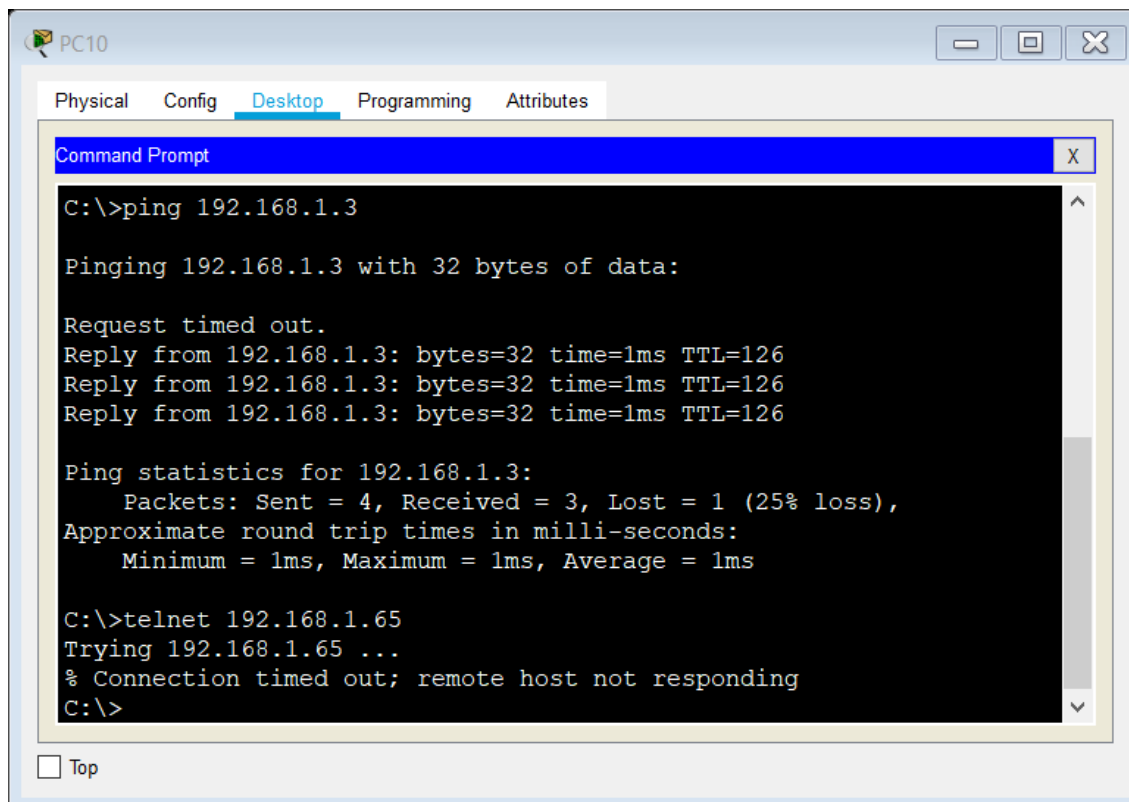|			
	LAN del Router CALI	Router CALI	Falla
	LAN del Router MEDELLIN	Router MEDELLIN	Falla
	LAN del Router CALI	Router MEDELLIN	Falla
PING	LAN del Router CALI	WS_1	Falla
	LAN del Router MEDELLIN	WS_1	Falla
	LAN del Router MEDELLIN	LAN del Router CALI	Falla
	LAN del Router CALI	Servidor	Éxito
	LAN del Router MEDELLIN	Servidor	Éxito
PING	Servidor	LAN del Router MEDELLIN	Éxito
	Servidor	LAN del Router CALI	Éxito
	Router CALI	LAN del Router MEDELLIN	Falla
	Router MEDELLIN	LAN del Router CALI	Falla

Router0

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
medellin(config-if)#
medellin(config-if)#
medellin(config-if)#end
medellin#
%SYS-5-CONFIG_I: Configured from console by console

medellin#telnet 192.168.1.131
Trying 192.168.1.131 ...OpenEl Acceso no autorizado est prohibido


User Access Verification

Password:
cali>en
Password:
cali#
```

Ctrl+F6 to exit CLI focus   Copy   Paste
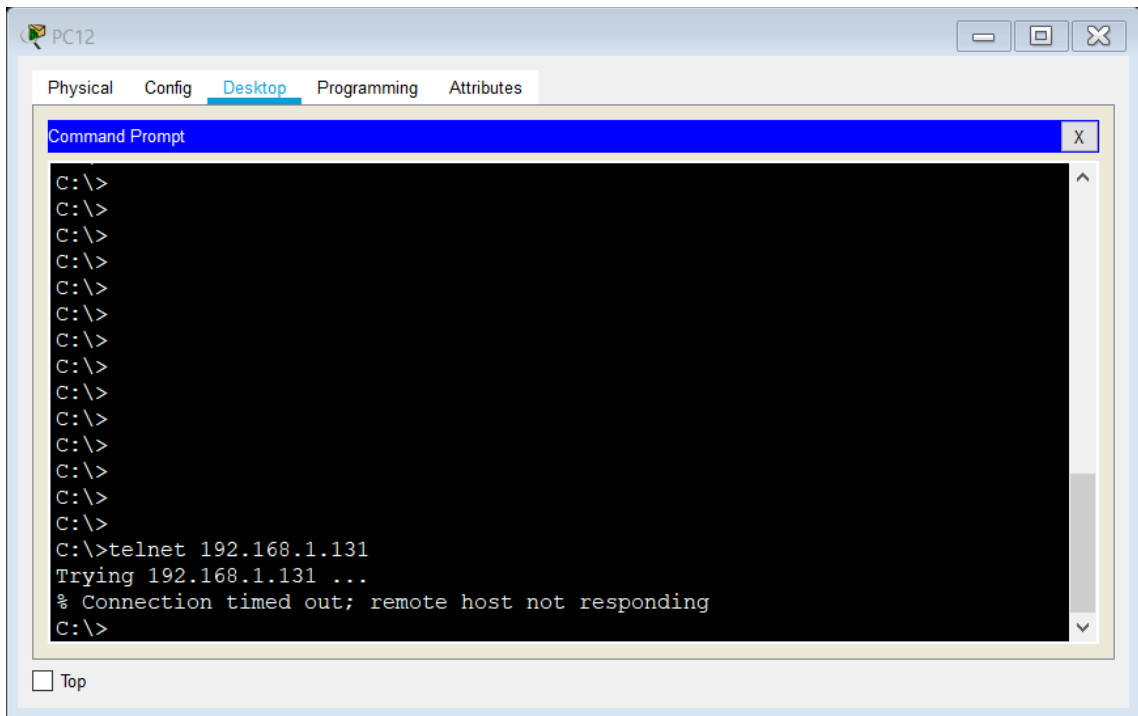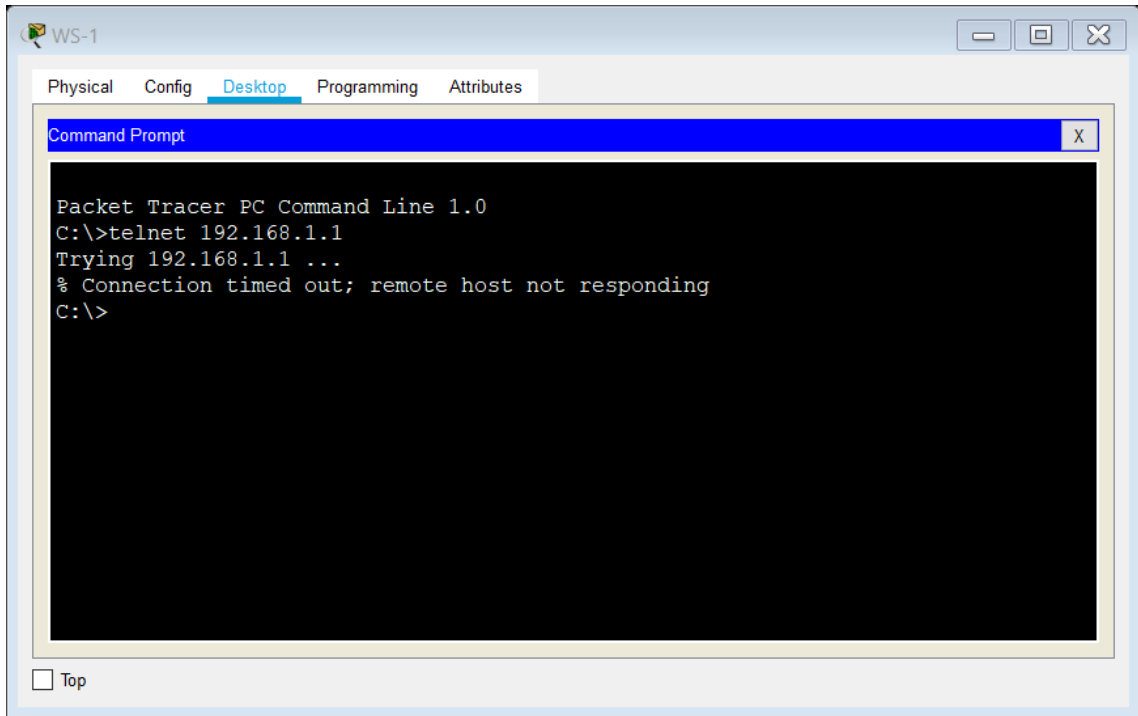
☐ Top

WS-1

Physical   Config   Desktop   Programming   Attributes

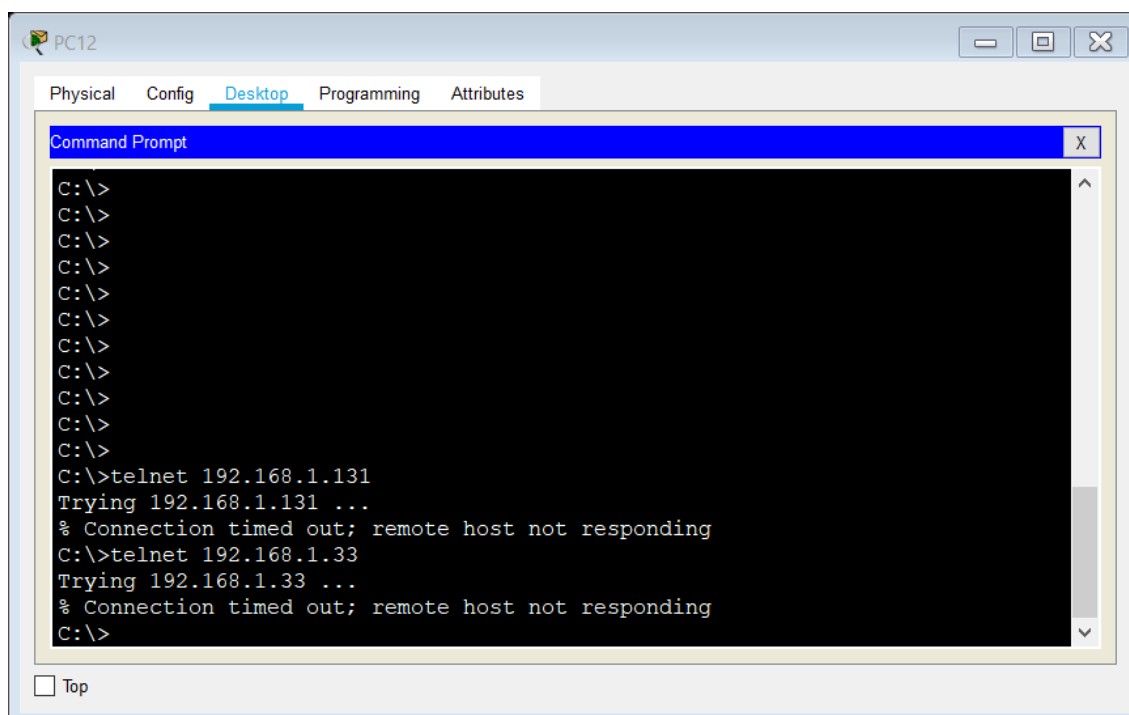Command Prompt   X

```
Packet Tracer PC Command Line 1.0
C:\>telnet 192.168.1.1
Trying 192.168.1.1 ...
% Connection timed out; remote host not responding
C:\>
```

☐ Top

PC12

Physical   Config   Desktop   Programming   Attributes

Command Prompt   X

```
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>telnet 192.168.1.131
Trying 192.168.1.131 ...
% Connection timed out; remote host not responding
C:\>
```

☐ Top

PC10

Physical   Config   **Desktop**   Programming   Attributes

Command Prompt   X

```
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=1ms TTL=126
Reply from 192.168.1.3: bytes=32 time=1ms 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 = 1ms, Average = 1ms

C:\>telnet 192.168.1.65
Trying 192.168.1.65 ...
% Connection timed out; remote host not responding
C:\>
```

☐ Top

PC12

Physical   Config   **Desktop**   Programming   Attributes

Command Prompt   X

```
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>telnet 192.168.1.131
Trying 192.168.1.131 ...
% Connection timed out; remote host not responding
C:\>telnet 192.168.1.33
Trying 192.168.1.33 ...
% Connection timed out; remote host not responding
C:\>
```

☐ Top

```
PC12
Physical   Config   Desktop   Programming   Attributes

Command Prompt                                                          X

Trying 192.168.1.33 ...
% Connection timed out; remote host not responding
C:\>telnet 192.168.1.2
Trying 192.168.1.2 ...
% Connection timed out; remote host not responding
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.33: Destination host unreachable.
Reply from 192.168.1.33: Destination host unreachable.
Reply from 192.168.1.33: Destination host unreachable.
Reply from 192.168.1.33: Destination host unreachable.

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>

Top
```
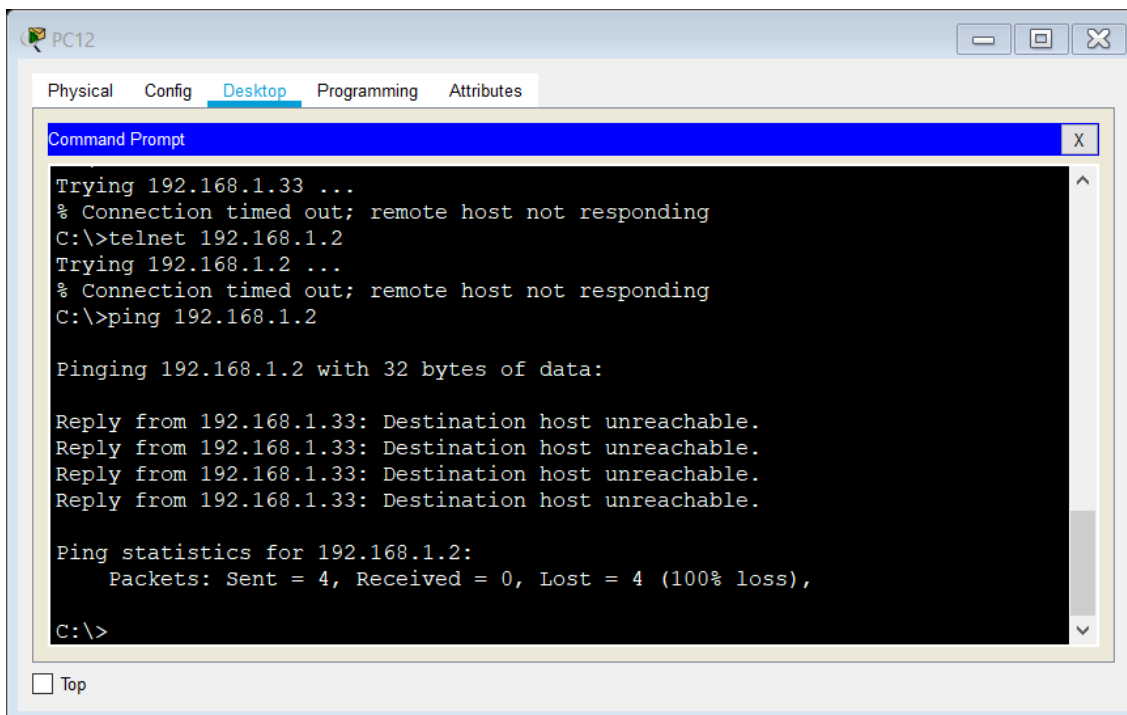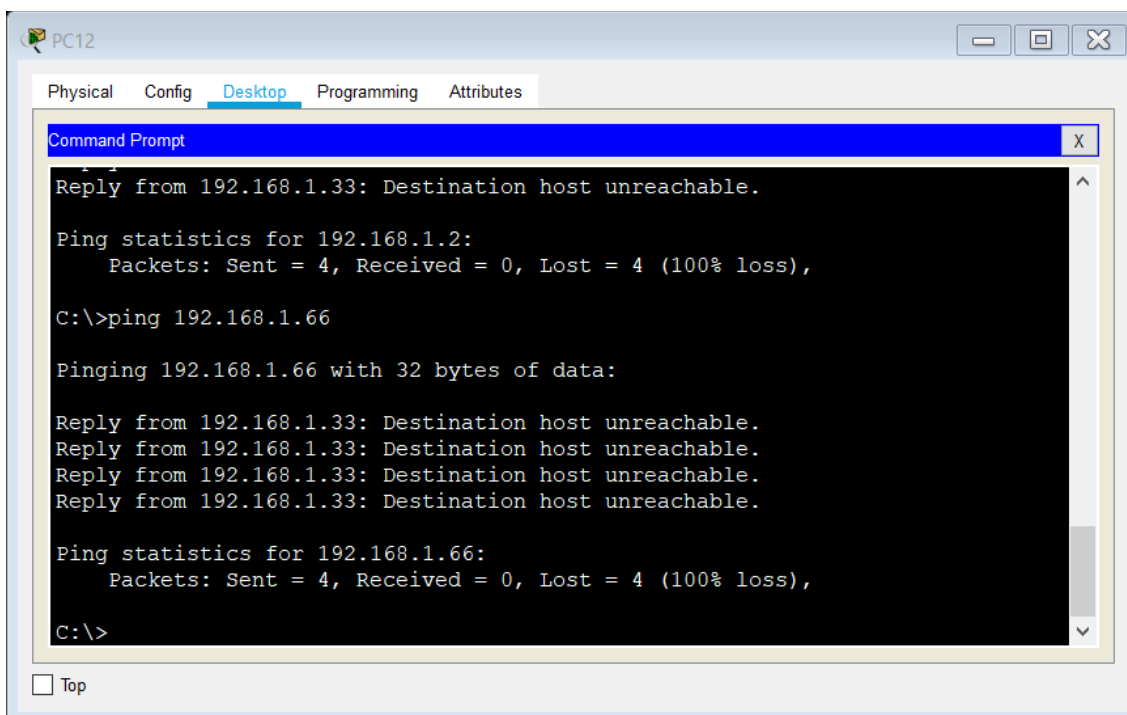


```
PC12
Physical   Config   Desktop   Programming   Attributes

Command Prompt                                                          X

Reply from 192.168.1.33: Destination host unreachable.

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 192.168.1.66

Pinging 192.168.1.66 with 32 bytes of data:

Reply from 192.168.1.33: Destination host unreachable.
Reply from 192.168.1.33: Destination host unreachable.
Reply from 192.168.1.33: Destination host unreachable.
Reply from 192.168.1.33: Destination host unreachable.

Ping statistics for 192.168.1.66:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>

Top
```
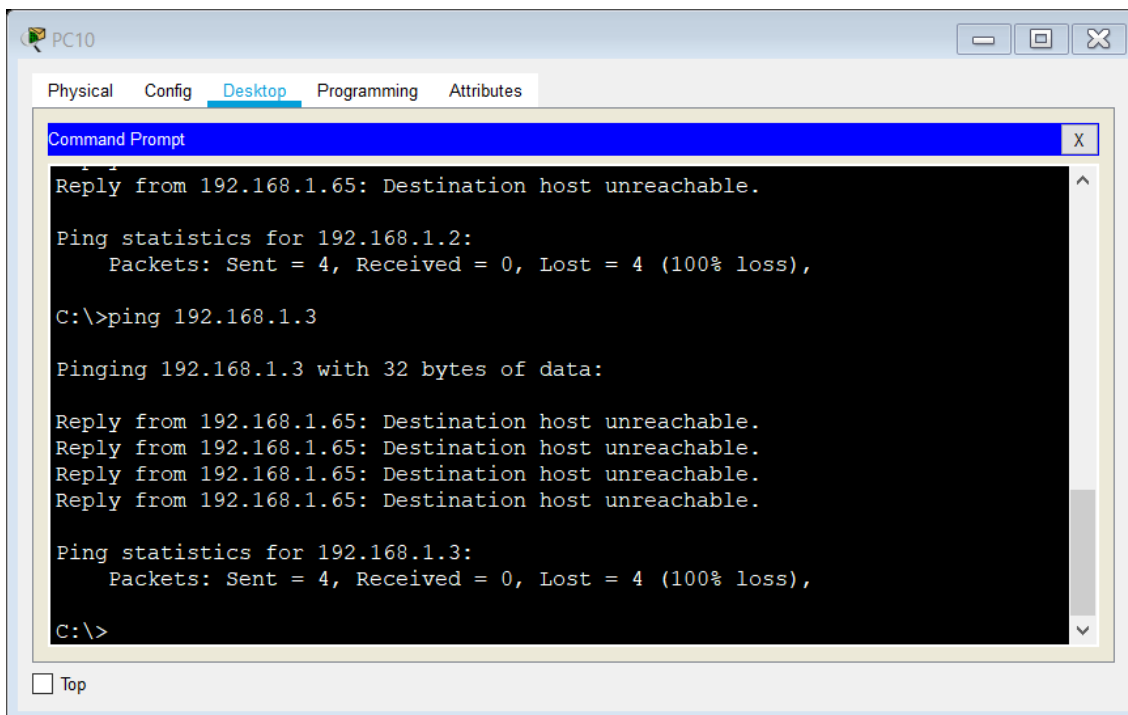
PC10

Physical   Config   **Desktop**   Programming   Attributes

Command Prompt   X

```
Reply from 192.168.1.65: Destination host unreachable.

Ping statistics for 192.168.1.2:
    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:

Reply from 192.168.1.65: Destination host unreachable.
Reply from 192.168.1.65: Destination host unreachable.
Reply from 192.168.1.65: Destination host unreachable.
Reply from 192.168.1.65: Destination host unreachable.

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

☐ Top

PC12

Physical   Config   **Desktop**   Programming   Attributes

Command Prompt   X

```
Reply from 192.168.1.33: Destination host unreachable.

Ping statistics for 192.168.1.66:
    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:

Reply from 192.168.1.33: Destination host unreachable.
Reply from 192.168.1.33: Destination host unreachable.
Reply from 192.168.1.33: Destination host unreachable.
Reply from 192.168.1.33: Destination host unreachable.

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```
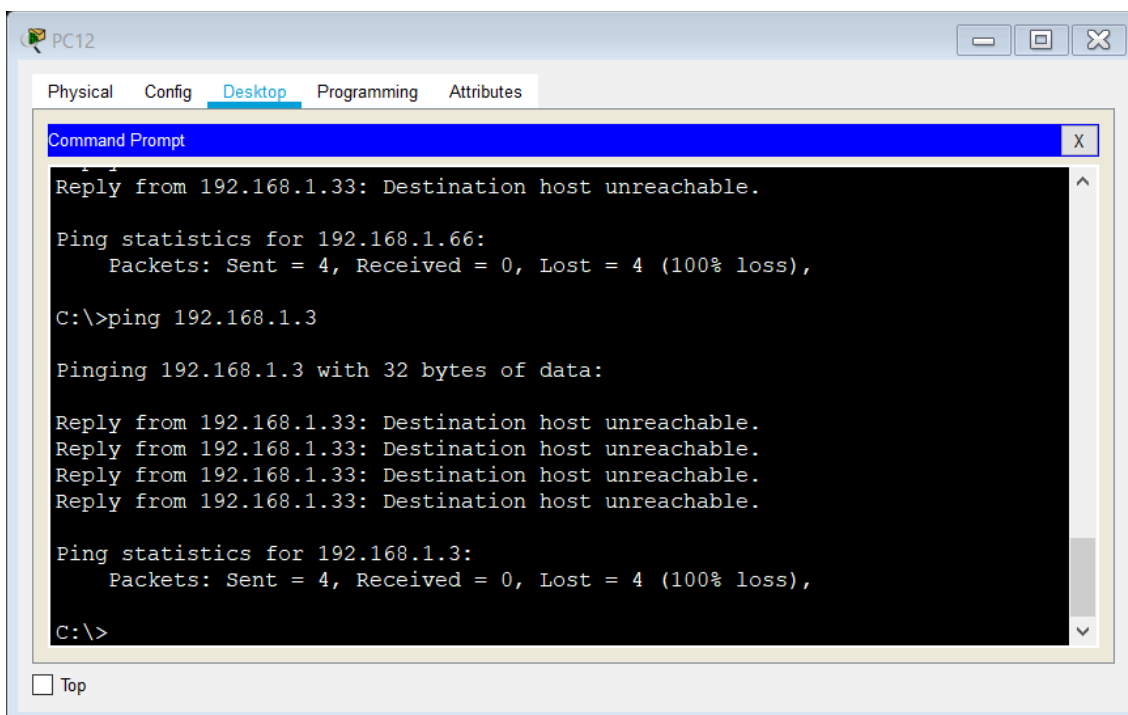
☐ Top

Server0

Physical Config Services Desktop Programming Attributes

Command Prompt   X

```
Trying 192.168.1.131 ...
% Connection timed out; remote host not responding
C:\>telnet 192.168.1.99
Trying 192.168.1.99 ...
% Connection timed out; remote host not responding
C:\>ping 192.168.1.66

Pinging 192.168.1.66 with 32 bytes of data:

Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.

Ping statistics for 192.168.1.66:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```
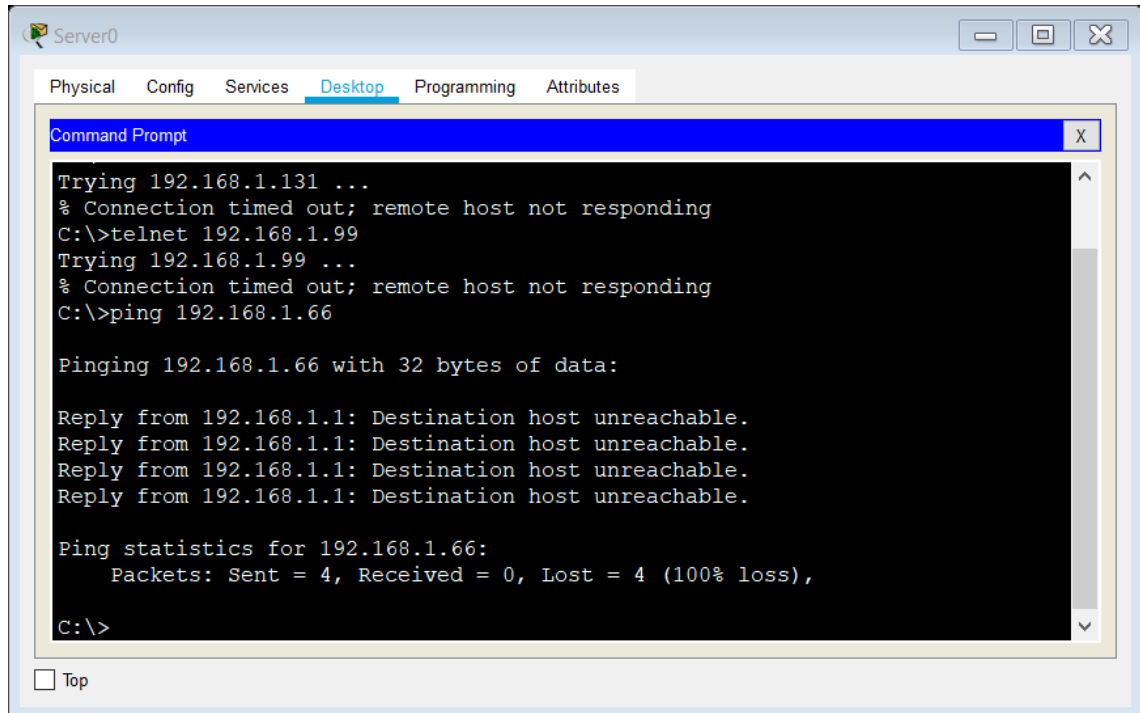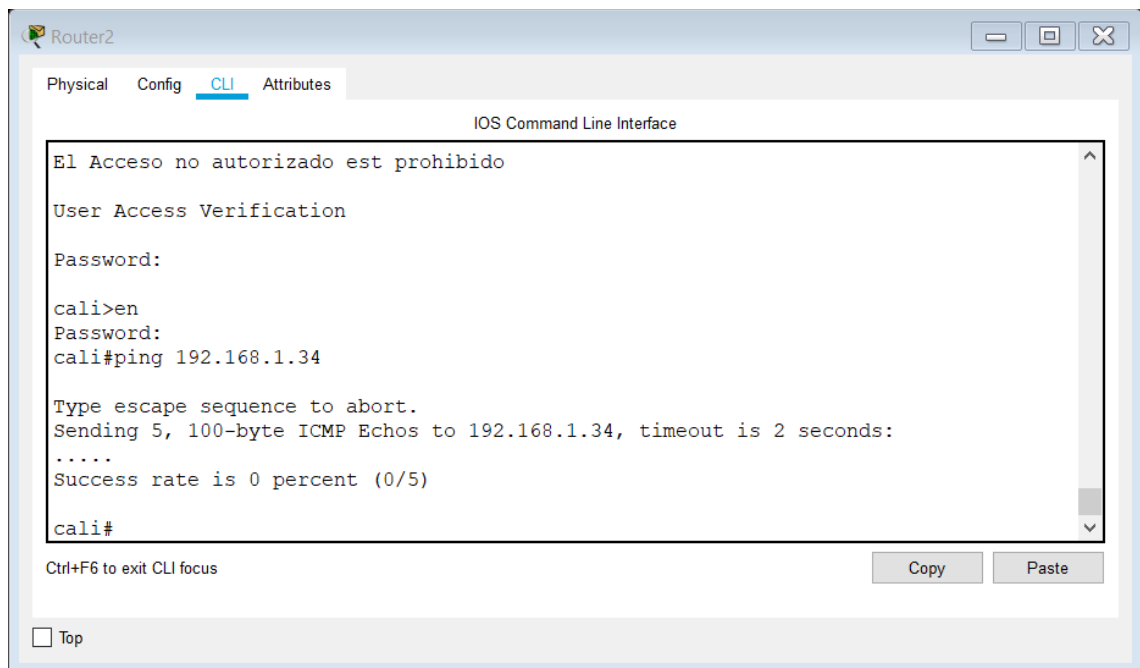
☐ Top

Router2

Physical Config CLI Attributes

IOS Command Line Interface

```
El Acceso no autorizado est prohibido

User Access Verification

Password:

cali>en
Password:
cali#ping 192.168.1.34

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.34, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)

cali#
```
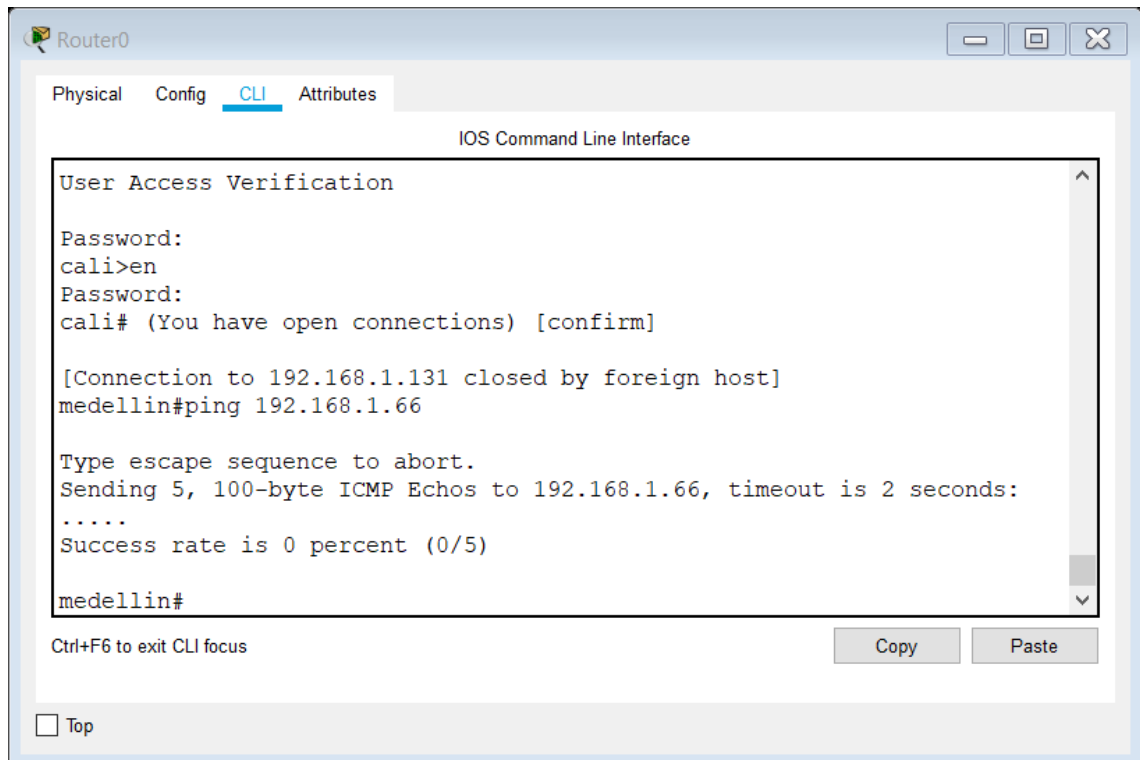
Ctrl+F6 to exit CLI focus   Copy   Paste

☐ Top

```
Router0                                              [ — ] [ ▢ ] [ ✕ ]

Physical   Config   CLI   Attributes

                    IOS Command Line Interface

User Access Verification

Password:
cali>en
Password:
cali# (You have open connections) [confirm]

[Connection to 192.168.1.131 closed by foreign host]
medellin#ping 192.168.1.66

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.66, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)

medellin#

Ctrl+F6 to exit CLI focus                          Copy      Paste

☐ Top
```

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.
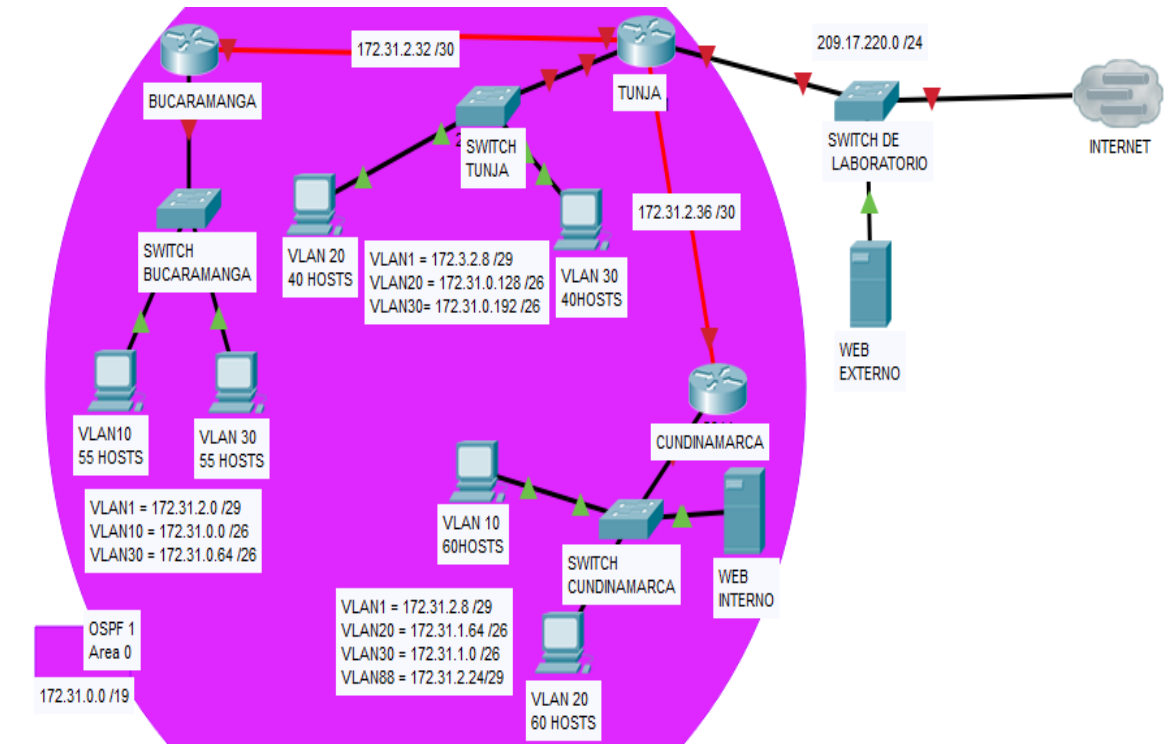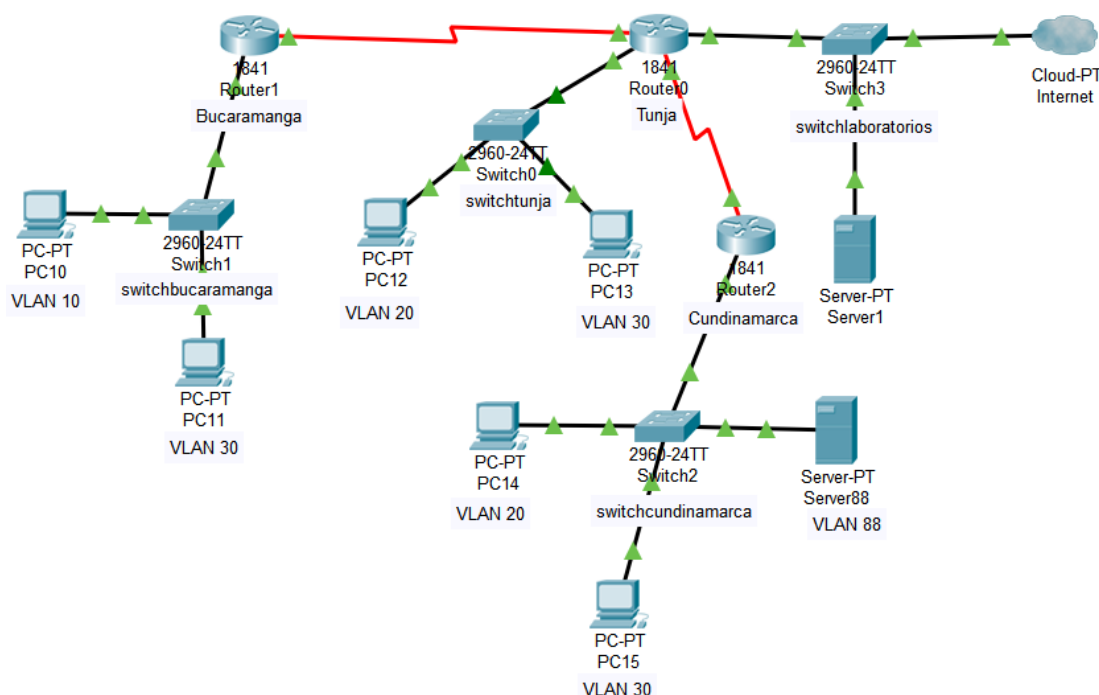
Desarrollo

Los siguientes son los requerimientos necesarios:

1. **Todos los routers deberán tener los siguiente:**
   - **Configuración básica.**

```
Router>en
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname bucaramanga
bucaramanga(config)#no ip domain-lookup
bucaramanga(config)#banner motd $El Acceso no autorizado est prohibido$
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 15
bucaramanga(config-line)#password cisco1
bucaramanga(config-line)#login
bucaramanga(config)#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)#
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 shutdown

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

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

bucaramanga#

```
Router>en
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname tunja
tunja(config)#no ip domain-lookup
tunja(config)#banner motd $El Acceso no autorizado est prohibido$
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 15
tunja(config-line)#password cisco1
tunja(config-line)#login
tunja(config)#int f0/0.1
tunja(config-subif)#encapsulation dot1q 1
tunja(config-subif)#ip address 172.3.2.9 255.255.255.248
tunja(config-subif)#int f0/0.20
tunja(config-subif)#encapsulation dot1q 20
tunja(config-subif)#ip address 172.31.0.129 255.255.255.192
tunja(config-subif)#int f0/0.30
tunja(config-subif)#encapsulation dot1q 30
tunja(config-subif)#ip address 172.31.0.193 255.255.255.192
tunja(config-subif)#int f0/0
tunja(config-if)#no shutdown

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

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

tunja(config-if)#
tunja(config-if)#router ospf 1
tunja(config-router)#network 172.3.2.8 0.0.0.7 area 0
tunja(config-router)#network 172.31.0.128 0.0.0.63 area 0
tunja(config-router)#network 172.31.0.192 0.0.0.63 area 0
tunja(config-router)#network 172.31.2.32 0.0.0.3 area 0
tunja(config-router)#network 172.31.2.36 0.0.0.3 area 0
tunja(config-router)#end
```

```
tunja#
tunja#
%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 Serial0/0/0, changed state to up

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

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

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

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

00:15:19: %OSPF-5-ADJCHG: Process 1, Nbr 172.31.2.34 on Serial0/0/0 from
LOADING to FULL, Loading Done




Router>en
Router#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname cundinamarca
cundinamarca(config)#no ip domain-lookup
cundinamarca(config)#banner motd $El Acceso no autorizado est prohibido$
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 15
cundinamarca(config-line)#password cisco1
cundinamarca(config-line)#login
cundinamarca(config)#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)#
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)#router ospf 1
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
cundinamarca#
%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

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

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

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

00:16:24: %OSPF-5-ADJCHG: Process 1, Nbr 209.165.220.1 on Serial0/0/0 from LOADING to FULL, Loading Done

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

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

switchbucaramanga(config-if)#ip default-gateway 172.31.2.1
switchbucaramanga(config)#
switchbucaramanga(config)#
%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

%LINK-5-CHANGED: Interface Vlan1, changed state to up

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

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

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

swtichtunja(config-if)#
swtichtunja(config-if)#ip default-gateway 172.3.2.9
swtichtunja(config)#
swtichtunja(config)#
```

%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

%LINK-5-CHANGED: Interface Vlan1, changed state to up

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

```
Switch>en
```

Switch#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname swithccundinamarca
swithccundinamarca(config)#vlan 1
swithccundinamarca(config-vlan)#vlan 20
swithccundinamarca(config-vlan)#vlan 30
swithccundinamarca(config-vlan)#vlan 88
swithccundinamarca(config-vlan)#exit
swithccundinamarca(config)#int f0/10
swithccundinamarca(config-if)#switchport mode access
swithccundinamarca(config-if)#switchport access vlan 20
swithccundinamarca(config-if)#int f0/14
swithccundinamarca(config-if)#switchport mode access
swithccundinamarca(config-if)#switchport access vlan 30
swithccundinamarca(config-if)#int f0/20
swithccundinamarca(config-if)#switchport mode access
swithccundinamarca(config-if)#switchport access vlan 88
swithccundinamarca(config-if)#int f0/1
swithccundinamarca(config-if)#switchport mode trunk

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

swithccundinamarca(config-if)#
swithccundinamarca(config-if)#ip default-gateway 172.31.2.9
swithccundinamarca(config)#
%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

%LINK-5-CHANGED: Interface Vlan1, changed state to up

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

- **Autenticación local con AAA.**

bucaramanga(config-line)#username admin01 secret admin01pass
bucaramanga(config)#aaa new-model
bucaramanga(config)#aaa authentication login aaalocal local
bucaramanga(config)#line console 0
bucaramanga(config-line)#login authentication aaalocal
bucaramanga(config-line)#line vty 0 15

```
bucaramanga(config-line)#login authentication aaalocal

tunja(config-line)#username admin01 secret admin01pass
tunja(config)#aaa new-model
tunja(config)#aaa authentication login aaalocal local
tunja(config)#line console 0
tunja(config-line)#login authentication aaalocal
tunja(config-line)#line vty 0 15
tunja(config-line)#login authentication aaalocal


cundinamarca(config-line)#username admin01 secret admin01pass
cundinamarca(config)#aaa new-model
cundinamarca(config)#aaa authentication login aaalocal local
cundinamarca(config)#line console 0
cundinamarca(config-line)#login authentication aaalocal
cundinamarca(config-line)#line vty 0 15
cundinamarca(config-line)#login authentication aaalocal
```

- **Cifrado de contraseñas.**

```
bucaramanga(config)#service password-encryption
tunja(config)#service password-encryption
cundinamarca(config)#service password-encryption
```

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

```
bucaramanga(config-line)#login block-for 20 attempts 10 within 60
tunja(config-line)#login block-for 20 attempts 10 within 60
cundinamarca(config-line)#login block-for 20 attempts 10 within 60
```
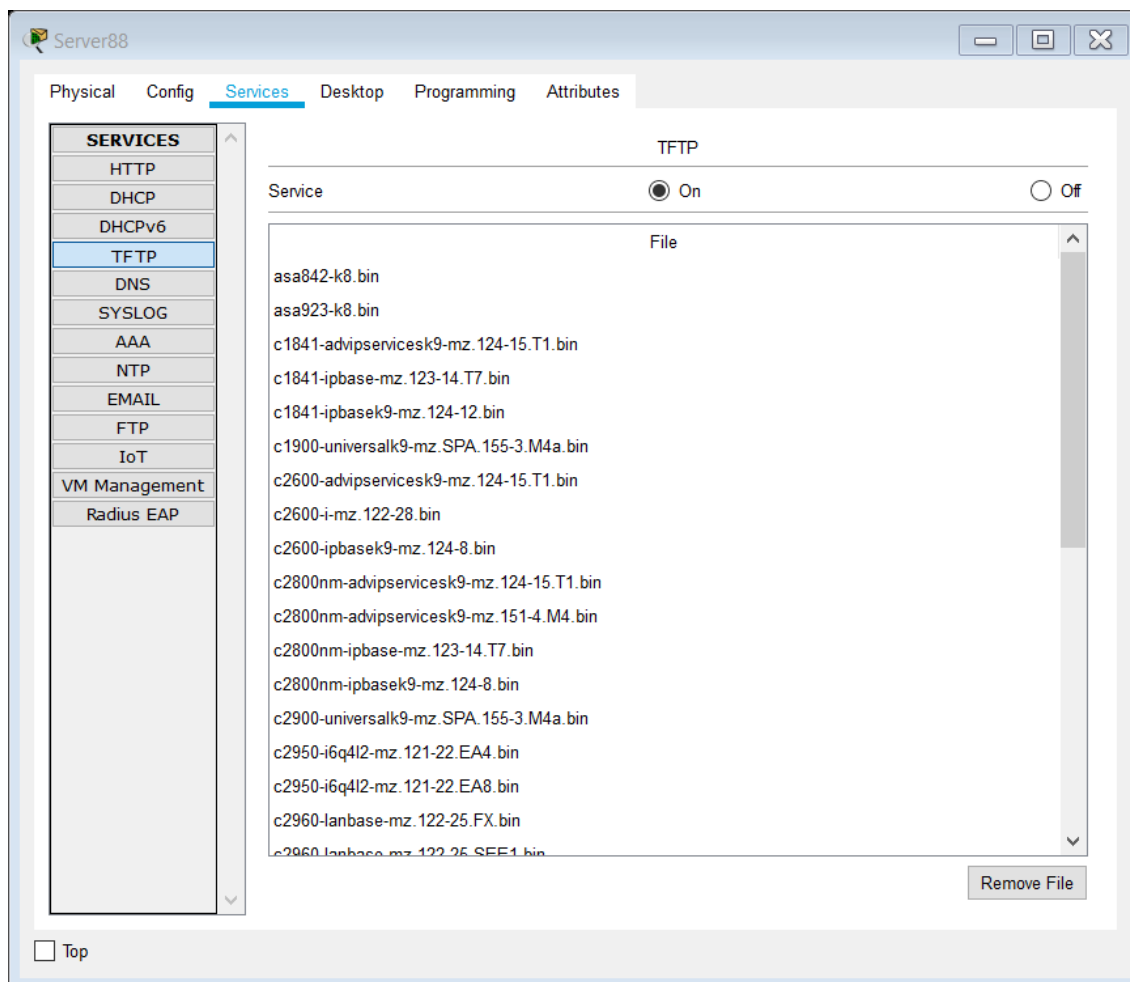
- **Máximo tiempo de acceso al detectar ataques.**

```
bucaramanga(config-line)#login block-for 20 attempts 10 within 60
tunja(config-line)#login block-for 20 attempts 10 within 60
cundinamarca(config-line)#login block-for 20 attempts 10 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(config)#ip dhcp excluded-address 172.31.0.1 172.31.0.3
tunja(config)#ip dhcp excluded-address 172.31.0.65 172.31.0.67
tunja(config)#ip dhcp excluded-address 172.31.1.65 172.31.1.67
tunja(config)#ip dhcp excluded-address 172.31.1.1 172.31.1.3
tunja(config)#ip dhcp pool vlan10buc
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 8.8.8.8
tunja(dhcp-config)#ip dhcp pool lan30buc
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 8.8.8.8
tunja(dhcp-config)#ip dhcp pool vlan20cal

```
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 8.8.8.8
tunja(dhcp-config)#ip dhcp pool vlan30cal
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 8.8.8.8
tunja(dhcp-config)#

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#

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#
```
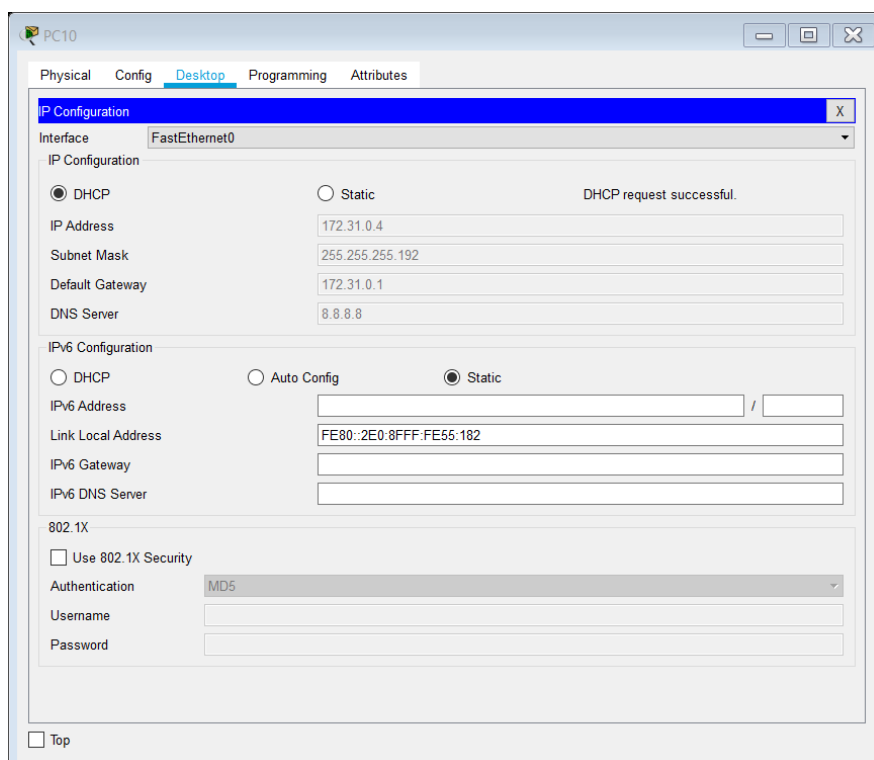
PC11

Physical | **Config** | **Desktop** | **Programming** | **Attributes**

IP Configuration [X]

Interface	FastEthernet0

IP Configuration

(●) DHCP   (○) Static

IP Address	172.31.0.68
Subnet Mask	255.255.255.192
Default Gateway	172.31.0.65
DNS Server	8.8.8.8

IPv6 Configuration

(○) DHCP   (○) Auto Config   (●) Static

IPv6 Address		/
Link Local Address	FE80::260:2FFF:FE31:C4B6	
IPv6 Gateway		
IPv6 DNS Server		

802.1X

[ ] Use 802.1X Security

Authentication	MD5
Username	
Password	

[ ] Top

PC14

Physical | **Config** | **Desktop** | **Programming** | **Attributes**

IP Configuration [X]

Interface	FastEthernet0

IP Configuration

(●) DHCP   (○) Static

IP Address	172.31.1.68
Subnet Mask	255.255.255.192
Default Gateway	172.31.1.65
DNS Server	8.8.8.8

IPv6 Configuration

(○) DHCP   (○) Auto Config   (●) Static

IPv6 Address		/
Link Local Address	FE80::201:42FF:FE16:70E1	
IPv6 Gateway		
IPv6 DNS Server		

802.1X

[ ] Use 802.1X Security

Authentication	MD5
Username	
Password	

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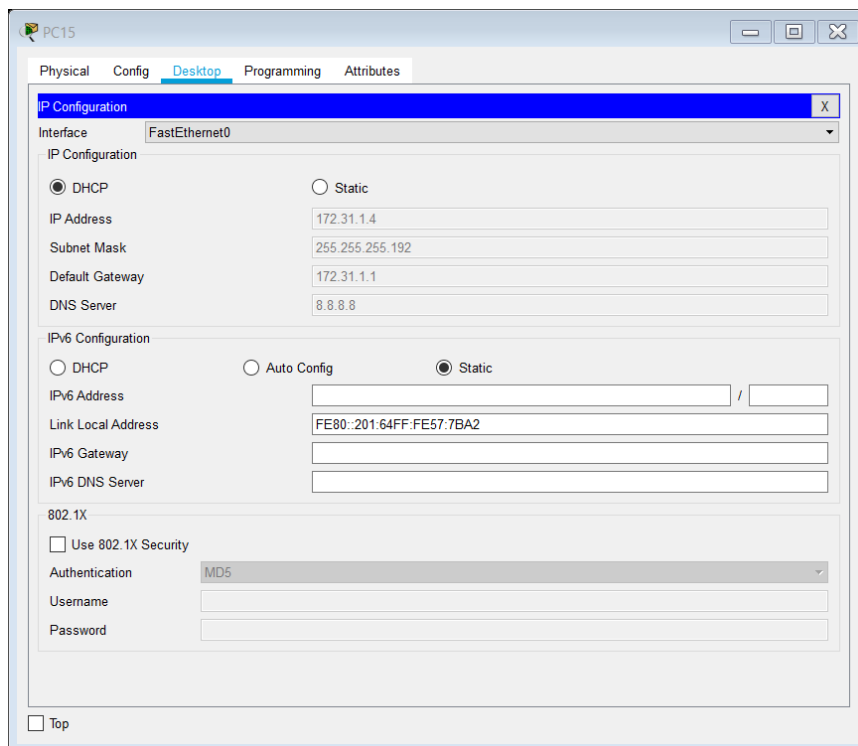
3. El web server deberá tener NAT estático y el resto de los equipos de la topología emplearan NAT de sobrecarga (PAT).

```
tunja(config)#ip nat inside source static 172.31.2.28 209.165.220.10
tunja(config)#access-list 11 permit 172.0.0.0 0.255.255.255
tunja(config)#ip nat inside source list 11 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 0.0.0.0 209.165.220.4
tunja(config)#router ospf 1
tunja(config-router)#default-information originate
tunja(config-router)#end
tunja#
```

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

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 209.165.220.4 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, 00:10:47, Serial0/0/0
O 172.31.0.64/26 [110/65] via 172.31.2.34, 00:10:47, 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, 00:10:47, Serial0/0/1
O 172.31.1.64/26 [110/65] via 172.31.2.38, 00:10:47, Serial0/0/1
O 172.31.2.0/29 [110/65] via 172.31.2.34, 00:10:47, Serial0/0/0
O 172.31.2.8/29 [110/65] via 172.31.2.38, 00:10:47, Serial0/0/1
O 172.31.2.24/29 [110/65] via 172.31.2.38, 00:10:47, Serial0/0/1
C 172.31.2.32/30 is directly connected, Serial0/0/0
C 172.31.2.36/30 is directly connected, Serial0/0/1
C 209.165.220.0/24 is directly connected, FastEthernet0/1
S* 0.0.0.0/0 [1/0] via 209.165.220.4

tunja#

bucaramanga#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 172.31.2.33 to network 0.0.0.0

172.3.0.0/29 is subnetted, 1 subnets
O 172.3.2.8 [110/65] via 172.31.2.33, 00:11:18, Serial0/0/0
172.31.0.0/16 is variably subnetted, 11 subnets, 3 masks
C 172.31.0.0/26 is directly connected, FastEthernet0/0.10
C 172.31.0.64/26 is directly connected, FastEthernet0/0.30

O 172.31.0.128/26 [110/65] via 172.31.2.33, 00:11:18, Serial0/0/0
O 172.31.0.192/26 [110/65] via 172.31.2.33, 00:11:18, Serial0/0/0
O 172.31.1.0/26 [110/129] via 172.31.2.33, 00:11:18, Serial0/0/0
O 172.31.1.64/26 [110/129] via 172.31.2.33, 00:11:18, Serial0/0/0
C 172.31.2.0/29 is directly connected, FastEthernet0/0.1
O 172.31.2.8/29 [110/129] via 172.31.2.33, 00:11:18, Serial0/0/0
O 172.31.2.24/29 [110/129] via 172.31.2.33, 00:11:18, Serial0/0/0
C 172.31.2.32/30 is directly connected, Serial0/0/0
O 172.31.2.36/30 [110/128] via 172.31.2.33, 00:11:18, Serial0/0/0
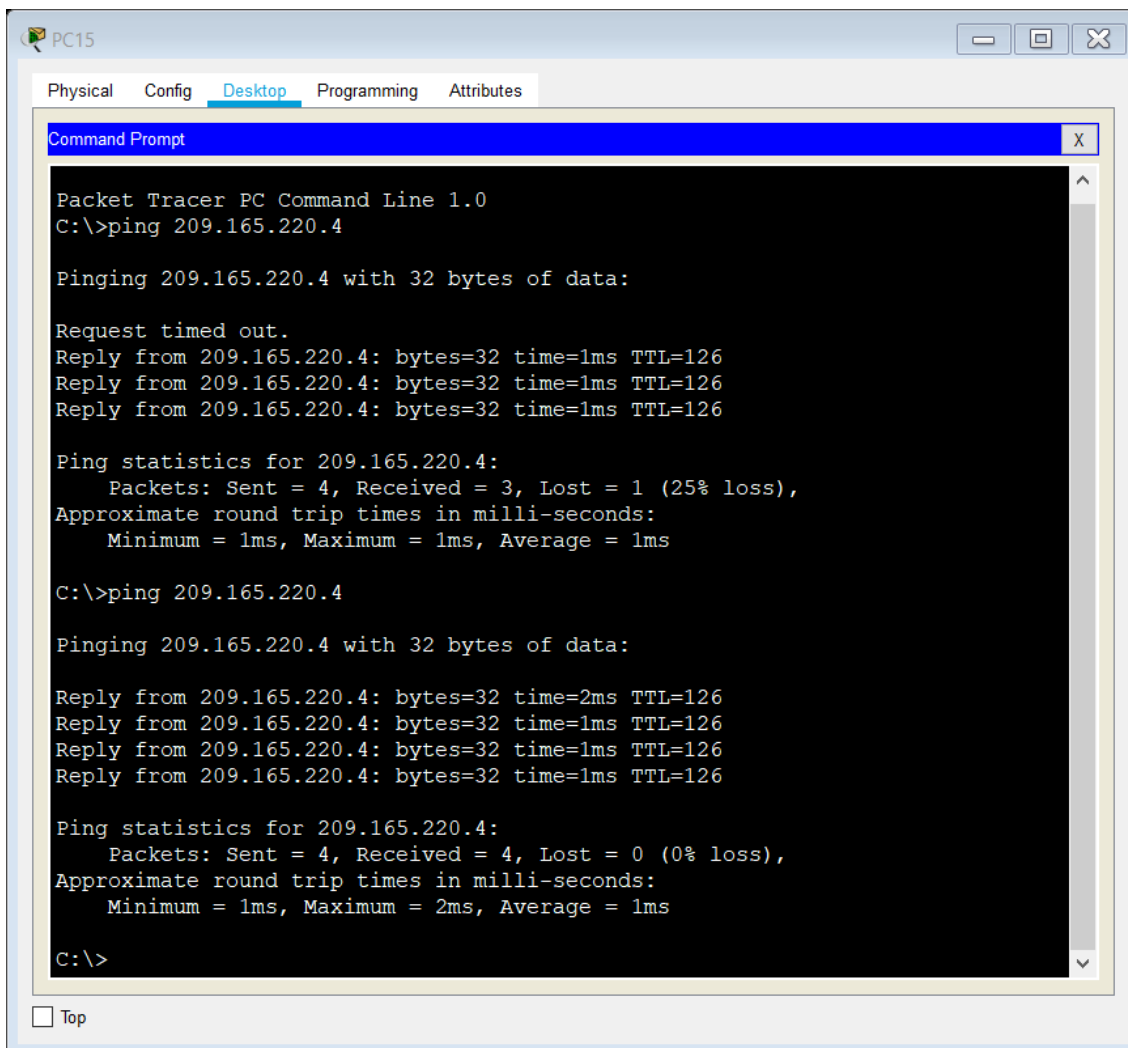O*E2 0.0.0.0/0 [110/1] via 172.31.2.33, 00:00:51, Serial0/0/0

bucaramanga#

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

Gateway of last resort is 172.31.2.37 to network 0.0.0.0

172.3.0.0/29 is subnetted, 1 subnets
O 172.3.2.8 [110/65] via 172.31.2.37, 00:12:02, Serial0/0/0
172.31.0.0/16 is variably subnetted, 11 subnets, 3 masks
O 172.31.0.0/26 [110/129] via 172.31.2.37, 00:11:52, Serial0/0/0
O 172.31.0.64/26 [110/129] via 172.31.2.37, 00:11:52, Serial0/0/0
O 172.31.0.128/26 [110/65] via 172.31.2.37, 00:12:02, Serial0/0/0
O 172.31.0.192/26 [110/65] via 172.31.2.37, 00:12:02, Serial0/0/0
C 172.31.1.0/26 is directly connected, FastEthernet0/0.30
C 172.31.1.64/26 is directly connected, FastEthernet0/0.20
O 172.31.2.0/29 [110/129] via 172.31.2.37, 00:11:52, Serial0/0/0
C 172.31.2.8/29 is directly connected, FastEthernet0/0.1
C 172.31.2.24/29 is directly connected, FastEthernet0/0.88
O 172.31.2.32/30 [110/128] via 172.31.2.37, 00:12:02, Serial0/0/0
C 172.31.2.36/30 is directly connected, Serial0/0/0
O*E2 0.0.0.0/0 [110/1] via 172.31.2.37, 00:01:34, Serial0/0/0

cundinamarca#

```
Router0                                                    ⬜ ◻ ✖

 Physical   Config   CLI   Attributes

                      IOS Command Line Interface

 tunja#
 tunja#show ip nat translations
 Pro  Inside global      Inside local       Outside local      Outside
 global
 icmp 209.165.220.1:1   172.31.1.4:1       209.165.220.4:1
 209.165.220.4:1
 icmp 209.165.220.1:2   172.31.1.4:2       209.165.220.4:2
 209.165.220.4:2
 icmp 209.165.220.1:3   172.31.1.4:3       209.165.220.4:3
 209.165.220.4:3
 icmp 209.165.220.1:4   172.31.1.4:4       209.165.220.4:4
 209.165.220.4:4
 icmp 209.165.220.1:5   172.31.1.4:5       209.165.220.4:5
 209.165.220.4:5
 icmp 209.165.220.1:6   172.31.1.4:6       209.165.220.4:6
 209.165.220.4:6
 icmp 209.165.220.1:7   172.31.1.4:7       209.165.220.4:7
 209.165.220.4:7
 icmp 209.165.220.1:8   172.31.1.4:8       209.165.220.4:8
 209.165.220.4:8
 ---  209.165.220.10    172.31.2.28        ---                ---

 tunja#

 Ctrl+F6 to exit CLI focus                        Copy      Paste

 ⬜ Top
```

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 ospfpass
bucaramanga(config-if)#

tunja(config)#int s0/0/0
tunja(config-if)#ip ospf authentication message-digest
tunja(config-if)#ip ospf message-digest-key 1 md5 ospfpass
tunja(config-if)#int s0/0/1
tunja(config-if)#ip ospf authentication message-digest
tunja(config-if)#ip ospf message-digest-key 1 md5 ospfpass
tunja(config-if)#

cundinamarca(config)#int s0/0/0
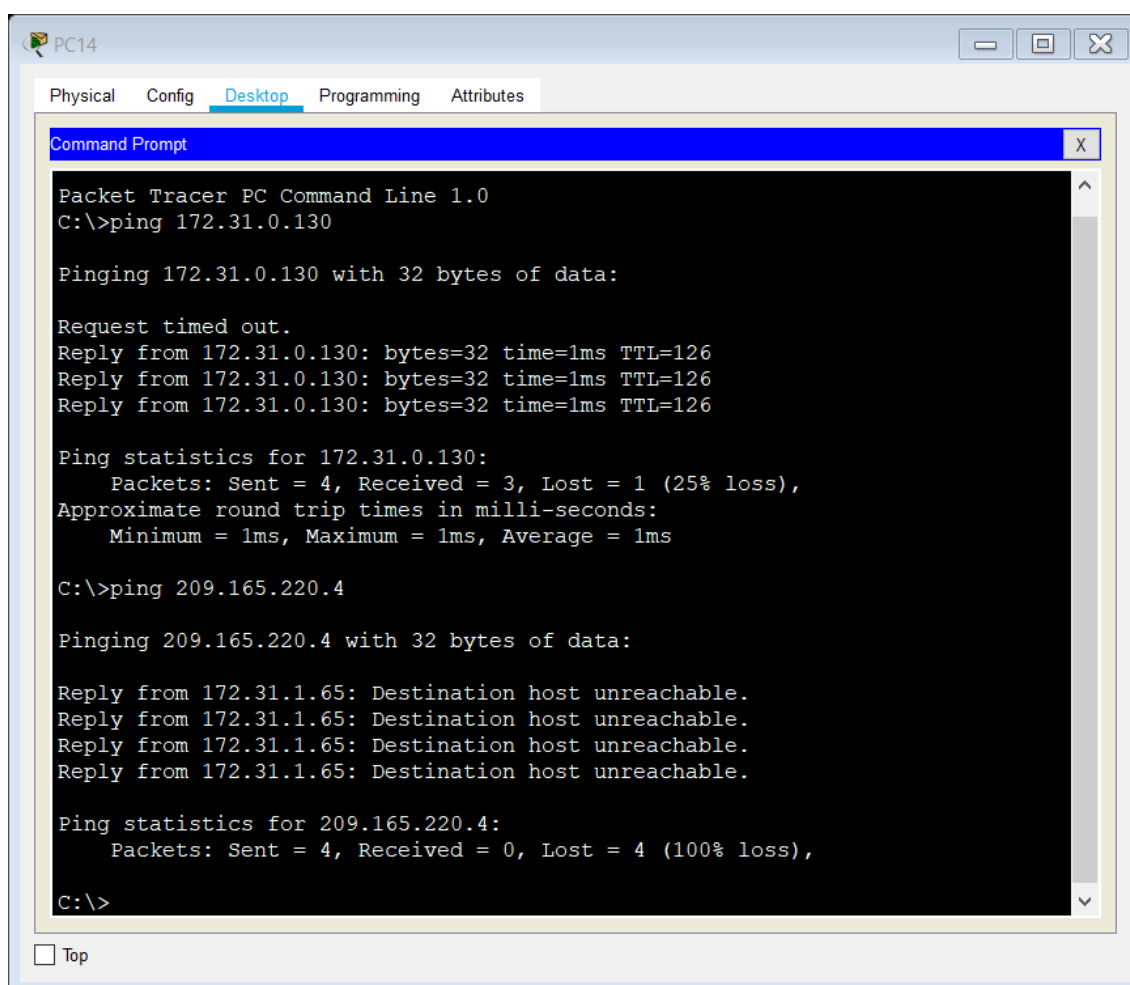cundinamarca(config-if)#ip ospf authentication message-digest
cundinamarca(config-if)#ip ospf message-digest-key 1 md5 ospfpass

cundinamarca(config-if)#

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(config-if)#access-list 131 deny ip 172.31.1.64 0.0.0.63
209.165.220.0 0.0.0.255
cundinamarca(config)#access-list 131 permit ip any any
cundinamarca(config)#int f0/0.20
cundinamarca(config-subif)#ip access-group 131 in
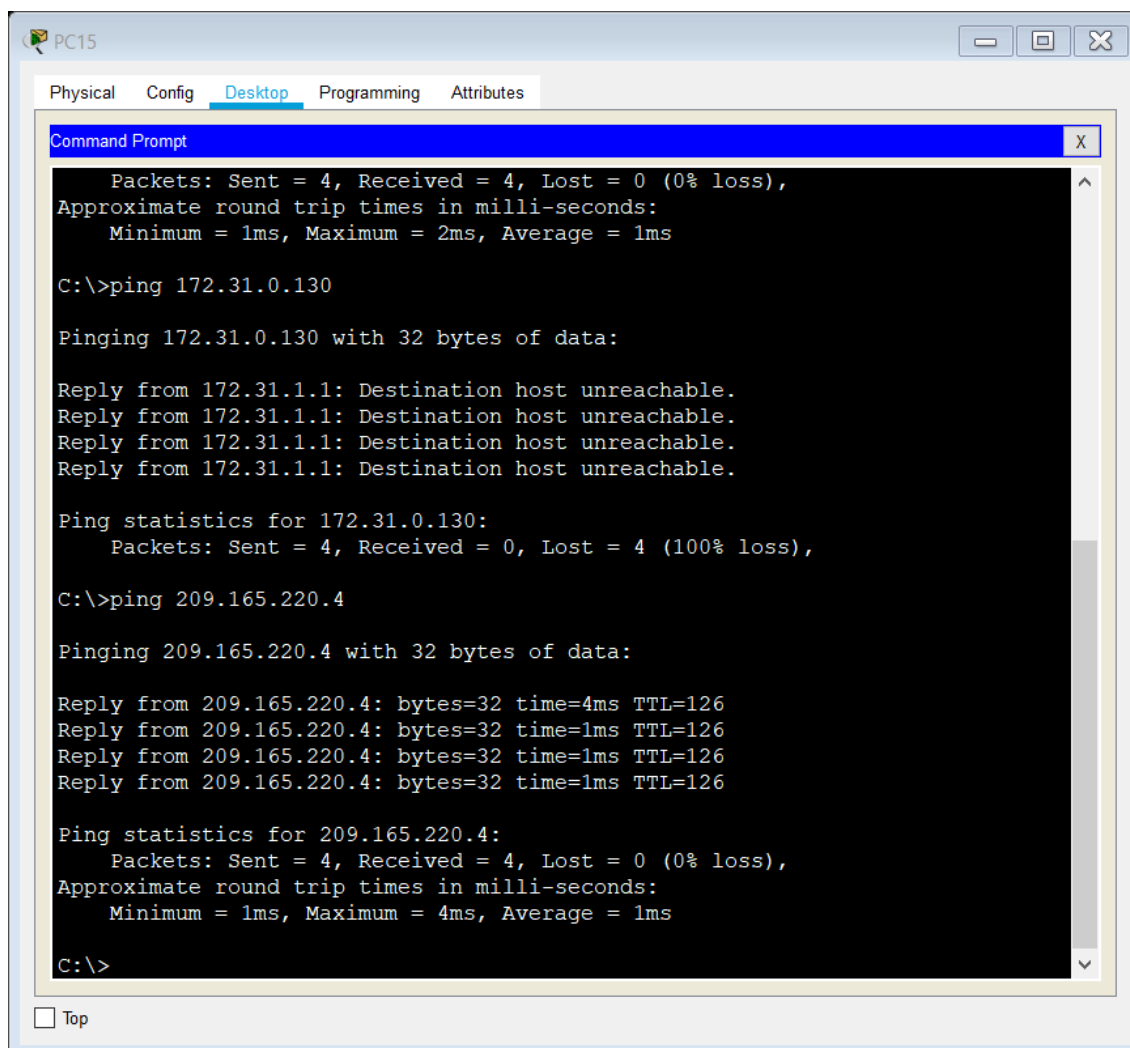cundinamarca(config-subif)#

```
PC14

Physical   Config   Desktop   Programming   Attributes

Command Prompt                                              X

 Packet Tracer PC Command Line 1.0
 C:\>ping 172.31.0.130

 Pinging 172.31.0.130 with 32 bytes of data:

 Request timed out.
 Reply from 172.31.0.130: bytes=32 time=1ms TTL=126
 Reply from 172.31.0.130: bytes=32 time=1ms TTL=126
 Reply from 172.31.0.130: bytes=32 time=1ms TTL=126

 Ping statistics for 172.31.0.130:
     Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
 Approximate round trip times in milli-seconds:
     Minimum = 1ms, Maximum = 1ms, Average = 1ms

 C:\>ping 209.165.220.4

 Pinging 209.165.220.4 with 32 bytes of data:

 Reply from 172.31.1.65: Destination host unreachable.
 Reply from 172.31.1.65: Destination host unreachable.
 Reply from 172.31.1.65: Destination host unreachable.
 Reply from 172.31.1.65: Destination host unreachable.

 Ping statistics for 209.165.220.4:
     Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

 C:\>

Top
```

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

cundinamarca(config-subif)#access-list 132 permit ip 172.31.1.0 0.0.0.63
209.165.220.0 0.0.0.255
cundinamarca(config)#access-list 132 deny ip any any
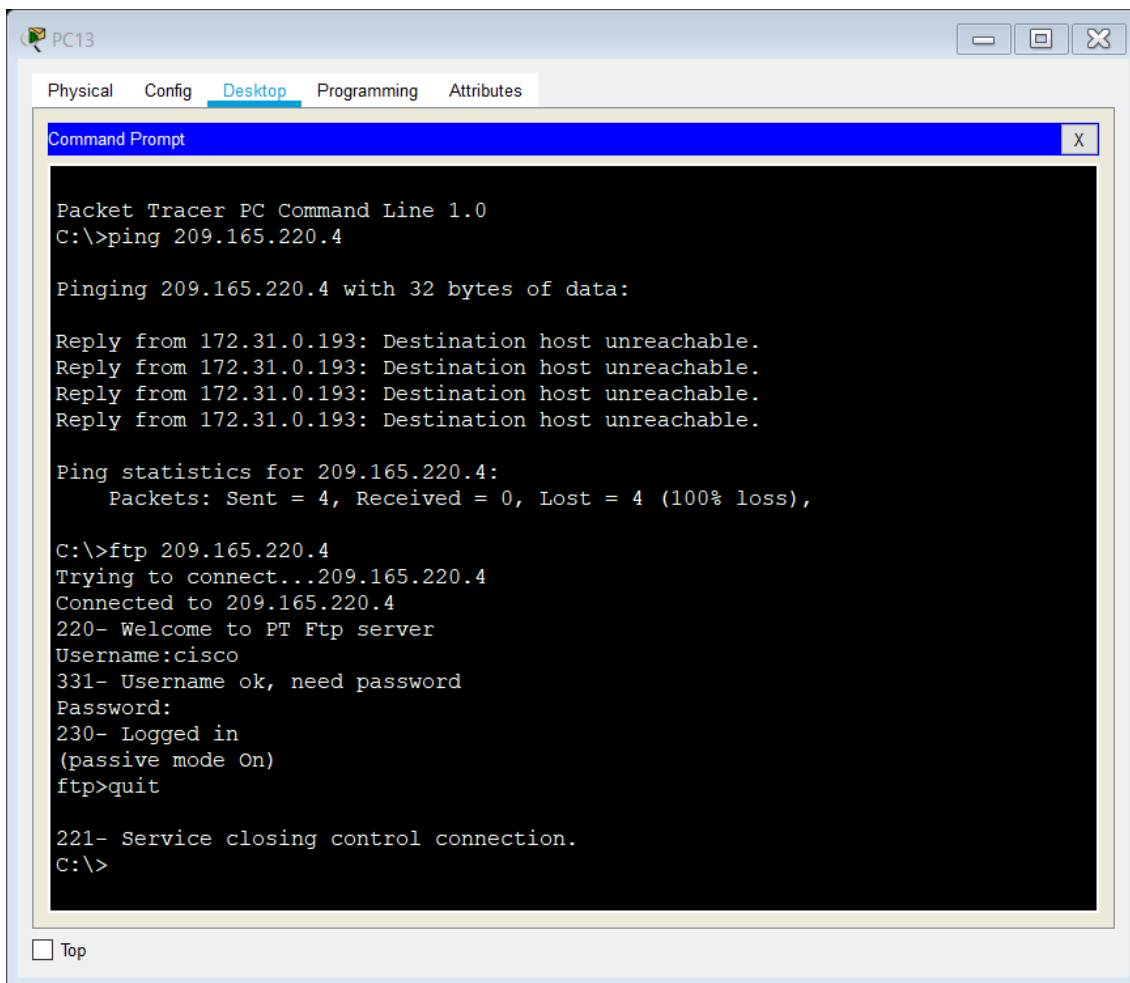cundinamarca(config)#int f0/0.30

cundinamarca(config-subif)#ip access-group 132 in
cundinamarca(config-subif)#

```
PC15                                                    [_] [□] [✕]

 Physical   Config   Desktop   Programming   Attributes

 Command Prompt                                              X

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

 C:\>ping 172.31.0.130

 Pinging 172.31.0.130 with 32 bytes of data:

 Reply from 172.31.1.1: Destination host unreachable.
 Reply from 172.31.1.1: Destination host unreachable.
 Reply from 172.31.1.1: Destination host unreachable.
 Reply from 172.31.1.1: Destination host unreachable.

 Ping statistics for 172.31.0.130:
      Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

 C:\>ping 209.165.220.4

 Pinging 209.165.220.4 with 32 bytes of data:

 Reply from 209.165.220.4: bytes=32 time=4ms TTL=126
 Reply from 209.165.220.4: bytes=32 time=1ms TTL=126
 Reply from 209.165.220.4: bytes=32 time=1ms TTL=126
 Reply from 209.165.220.4: bytes=32 time=1ms TTL=126

 Ping statistics for 209.165.220.4:
      Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
 Approximate round trip times in milli-seconds:
      Minimum = 1ms, Maximum = 4ms, Average = 1ms

 C:\>

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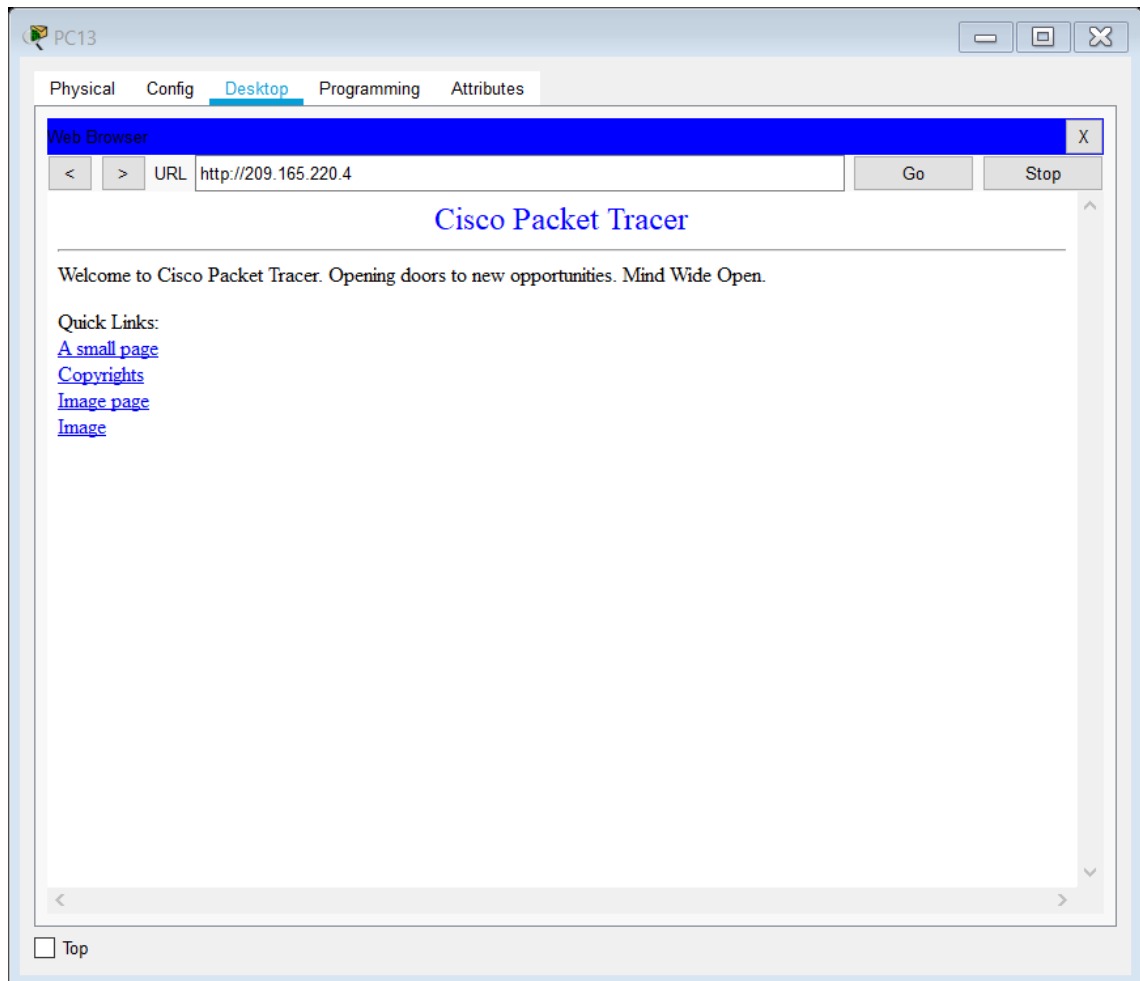
- **Los hosts de VLAN 30 en Tunja solo acceden a servidores web y ftp de internet.**

tunja(config)#access-list 131 permit tcp 172.31.0.192 0.0.0.63 209.165.220.0 0.0.0.255 eq www
tunja(config)#access-list 131 permit tcp 172.31.0.192 0.0.0.63 209.165.220.0 0.0.0.255 eq ftp
tunja(config)#int f0/0.30
tunja(config-subif)#ip access-group 131 in
tunja(config-subif)#

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

tunja(config-subif)#access-list 132 permit ip 172.31.0.128 0.0.0.63 172.31.1.64 0.0.0.63
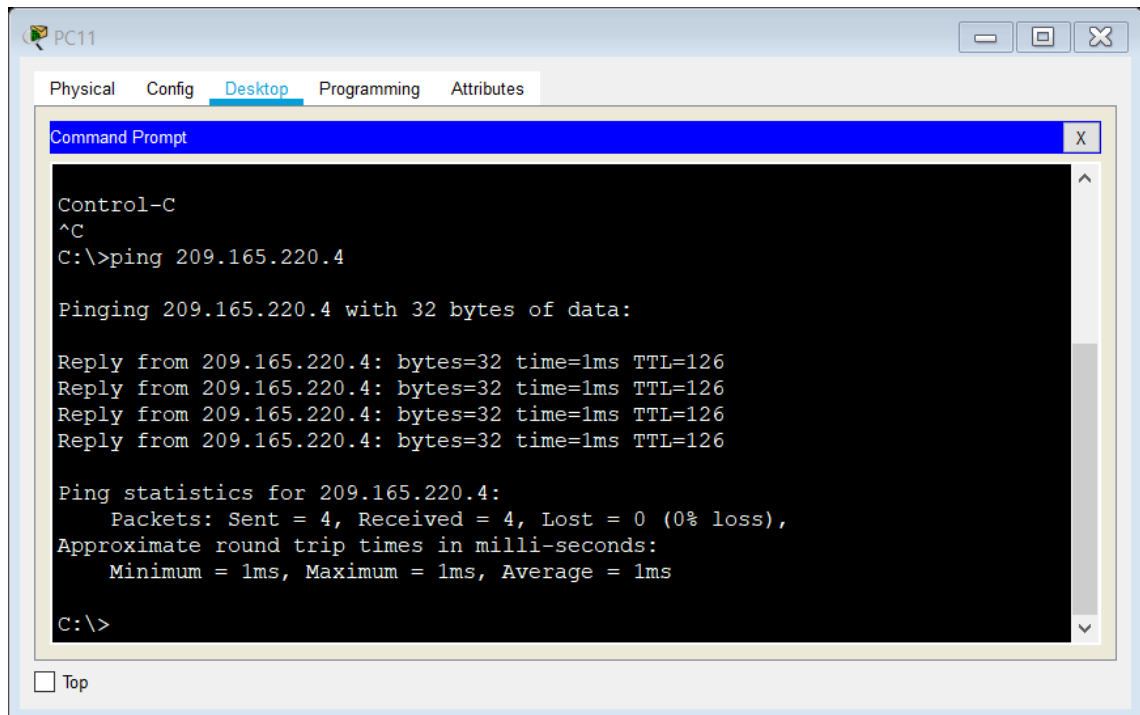tunja(config)#access-list 132 permit ip 172.31.0.128 0.0.0.63 172.31.0.0 0.0.0.63
tunja(config)#int f0/0.20
tunja(config-subif)#ip access-group 132 in
tunja(config-subif)#

Terminal output:

```
        Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 172.31.1.68

Pinging 172.31.1.68 with 32 bytes of data:

Reply from 172.31.1.68: bytes=32 time=2ms TTL=126
Reply from 172.31.1.68: bytes=32 time=1ms TTL=126
Reply from 172.31.1.68: bytes=32 time=1ms TTL=126
Reply from 172.31.1.68: bytes=32 time=1ms TTL=126

Ping statistics for 172.31.1.68:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\>ping 172.31.0.4

Pinging 172.31.0.4 with 32 bytes of data:

Request timed out.
Reply from 172.31.0.4: bytes=32 time=1ms TTL=126
Reply from 172.31.0.4: bytes=32 time=1ms TTL=126
Reply from 172.31.0.4: bytes=32 time=1ms TTL=126

Ping statistics for 172.31.0.4:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>
```

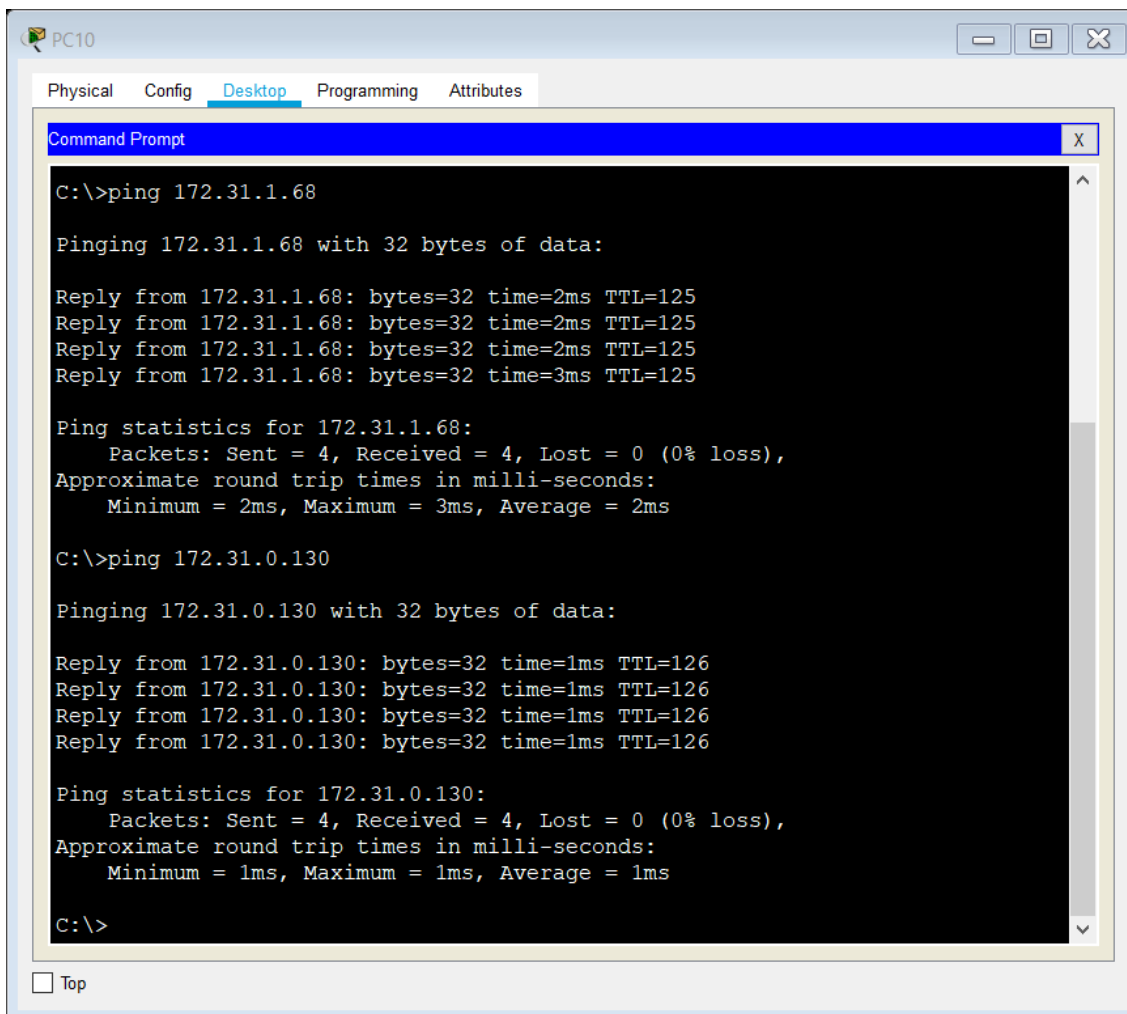- **Los hosts de VLAN 30 de Bucaramanga acceden a internet y a cualquier equipo de VLAN 10.**

bucaramanga(config)#access-list 131 permit ip 172.31.0.64 0.0.0.63 209.165.220.0 0.0.0.255
bucaramanga(config)#int f0/0.30
bucaramanga(config-subif)#ip access-group 131 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 132 permit ip 172.31.0.0 0.0.0.63 172.31.1.64 0.0.0.63
bucaramanga(config)#access-list 132 permit ip 172.31.0.0 0.0.0.63 172.31.0.128 0.0.0.63
bucaramanga(config)#int f0/0.10
bucaramanga(config-subif)#ip access-group 132 in
bucaramanga(config-subif)#

PC10 — Physical | Config | Desktop | Programming | Attributes

Command Prompt [X]

```
C:\>ping 172.31.1.68

Pinging 172.31.1.68 with 32 bytes of data:

Reply from 172.31.1.68: bytes=32 time=2ms TTL=125
Reply from 172.31.1.68: bytes=32 time=2ms TTL=125
Reply from 172.31.1.68: bytes=32 time=2ms TTL=125
Reply from 172.31.1.68: bytes=32 time=3ms TTL=125

Ping statistics for 172.31.1.68:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 3ms, Average = 2ms

C:\>ping 172.31.0.130

Pinging 172.31.0.130 with 32 bytes of data:

Reply from 172.31.0.130: bytes=32 time=1ms TTL=126
Reply from 172.31.0.130: bytes=32 time=1ms TTL=126
Reply from 172.31.0.130: bytes=32 time=1ms TTL=126
Reply from 172.31.0.130: bytes=32 time=1ms TTL=126

Ping statistics for 172.31.0.130:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>
```
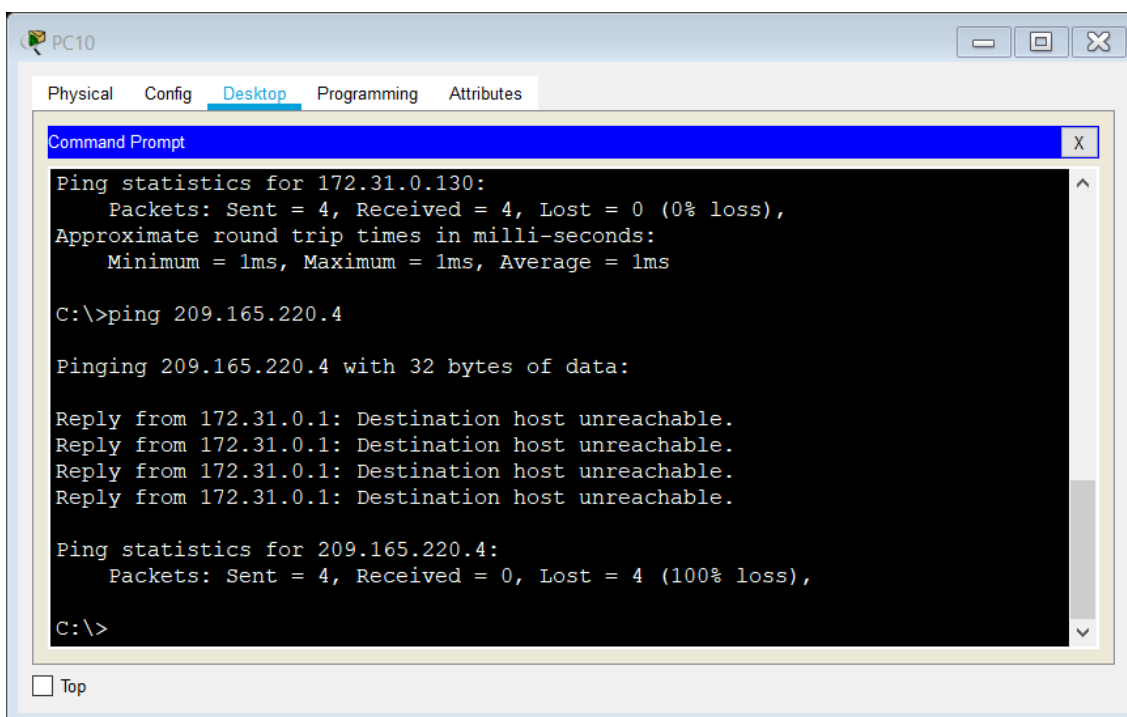
☐ Top

PC10 — Physical | Config | Desktop | Programming | Attributes

Command Prompt [X]

```
Ping statistics for 172.31.0.130:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>ping 209.165.220.4

Pinging 209.165.220.4 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 209.165.220.4:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

☐ Top

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

bucaramanga(config-subif)#access-list 133 deny ip 172.31.2.0 0.0.0.7 172.31.0.0 0.0.0.63
bucaramanga(config)#access-list 133 deny ip 172.31.0.64 0.0.0.63 172.31.0.0 0.0.0.63
bucaramanga(config)#access-list 133 permit ip any any
bucaramanga(config)#int f0/0.10
bucaramanga(config-subif)#ip access-group 133 out
bucaramanga(config-subif)#

tunja(config)#access-list 133 deny ip **172.3.2.8 0.0.0.7** 172.31.0.128 0.0.0.63
tunja(config)#access-list 133 deny ip **172.3.0.192 0.0.0.63** 172.31.0.128 0.0.0.63
tunja(config)#access-list 133 permit ip any any
tunja(config)#int f0/0.20
tunja(config-subif)#ip access-group 133 out
tunja(config-subif)#

cundinamarca(config)#access-list 133 deny ip 172.31.2.8 0.0.0.7 172.31.1.64 0.0.0.63
cundinamarca(config)#access-list 133 deny ip 172.31.1.0 0.0.0.63 172.31.1.64 0.0.0.63
cundinamarca(config)#access-list 133 deny ip 172.31.2.24 0.0.0.7 172.31.1.64 0.0.0.63
cundinamarca(config)#access-list 133 permit ip any any
cundinamarca(config)#int f0/0.20
cundinamarca(config-subif)#ip access-group 133 out
cundinamarca(config-subif)#
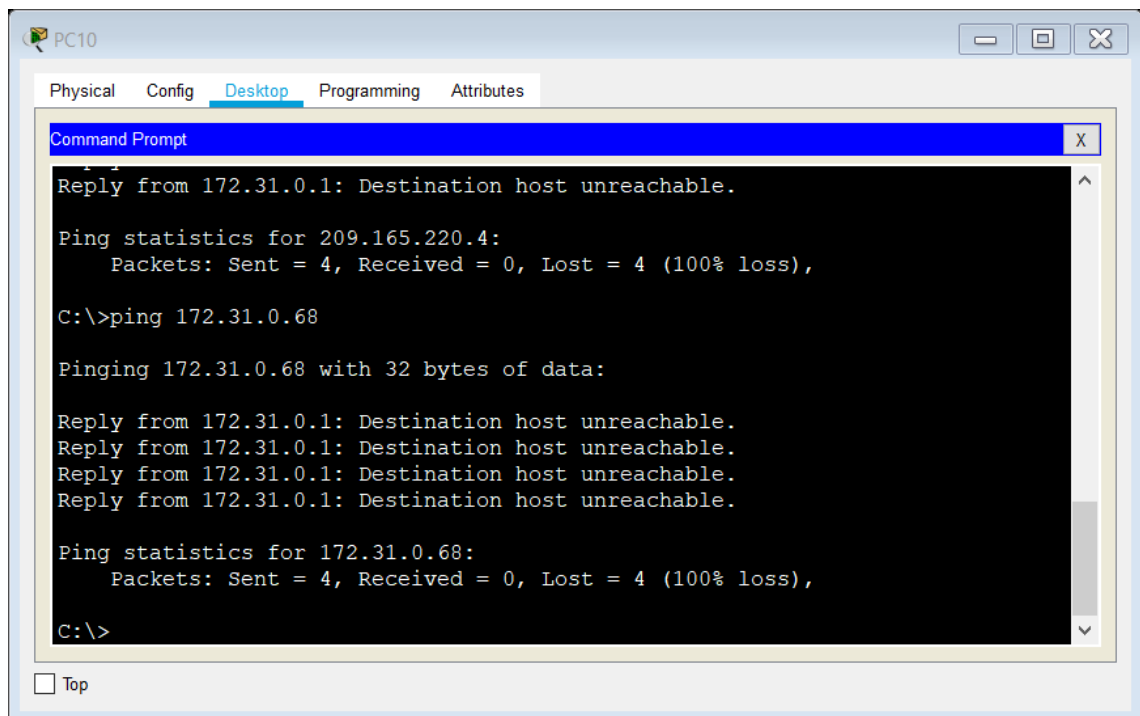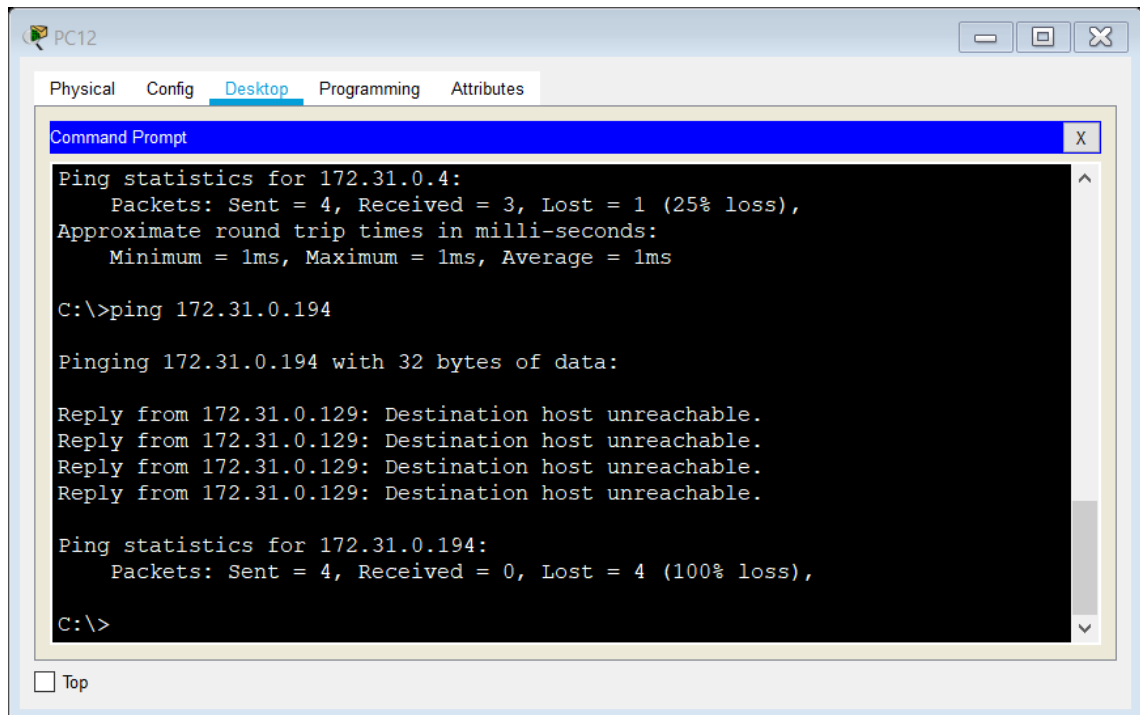
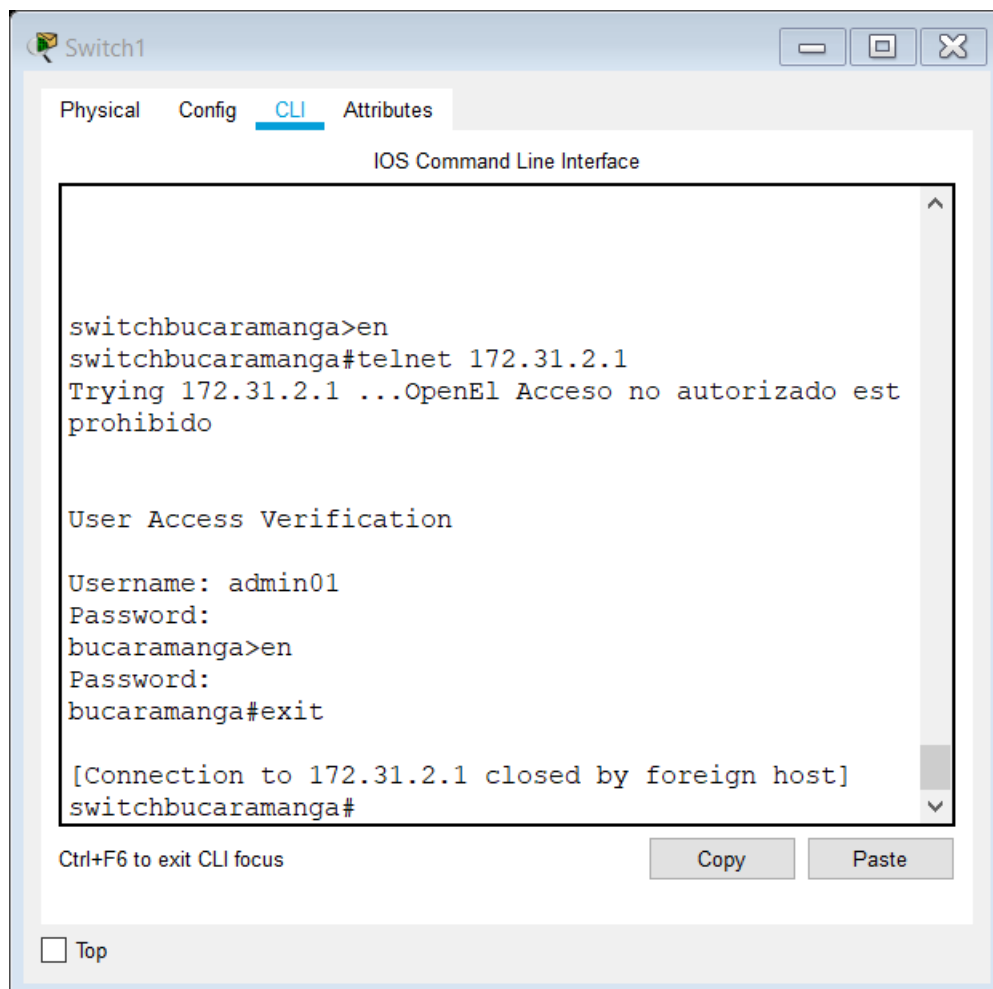- **Solo los hosts de las VLAN administrativas y de la VLAN de servidores tienen accedo a los routers e internet.**
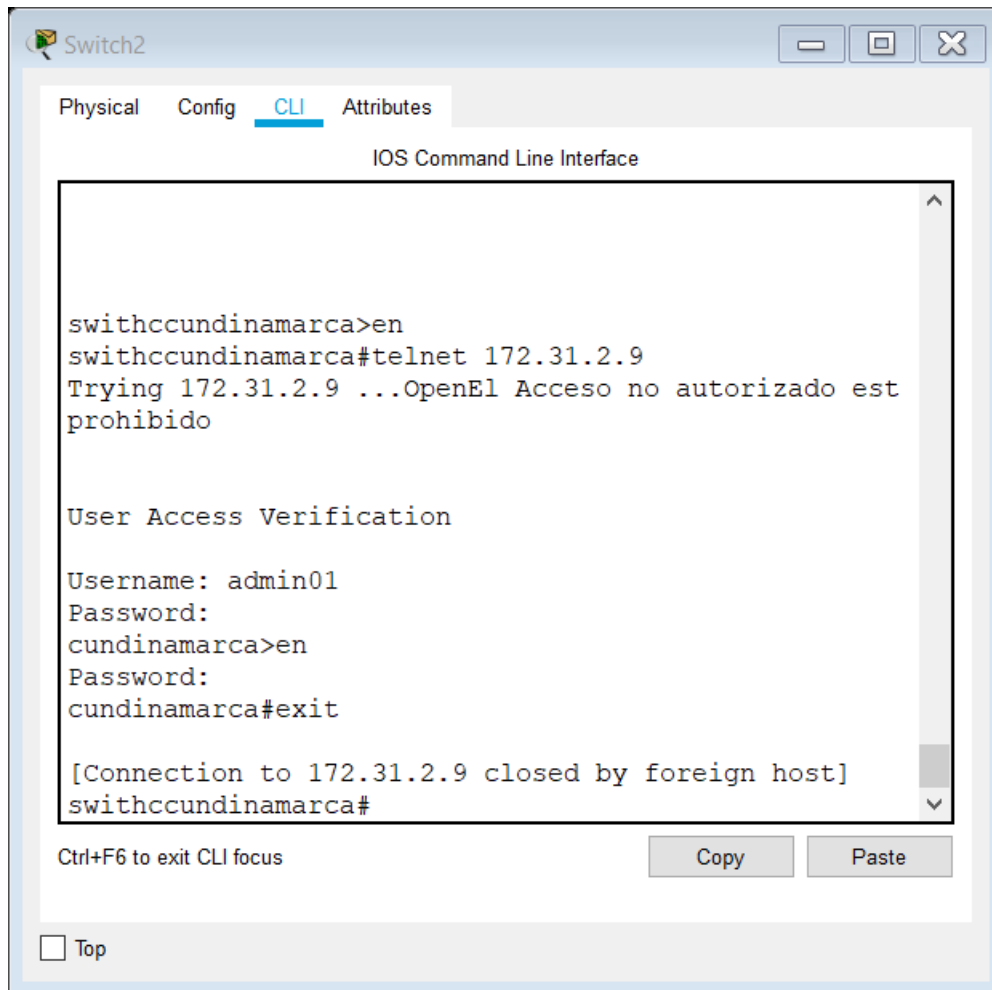
bucaramanga(config-subif)#access-list 10 permit 172.31.2.0 0.0.0.7
bucaramanga(config)#access-list 10 permit 172.3.2.8 0.0.0.7

bucaramanga(config)#access-list 10 permit 172.31.2.8 0.0.0.7
bucaramanga(config)#line vty 0 15
bucaramanga(config-line)#access-class 10 in
bucaramanga(config-line)#

tunja(config-subif)#access-list 10 permit 172.31.2.0 0.0.0.7
tunja(config)#access-list 10 permit 172.3.2.8 0.0.0.7
tunja(config)#access-list 10 permit 172.31.2.8 0.0.0.7
tunja(config)#line vty 0 15
tunja(config-line)#access-class 10 in
tunja(config-line)#

cundinamarca(config-subif)#access-list 10 permit 172.31.2.0 0.0.0.7
cundinamarca(config)#access-list 10 permit 172.3.2.8 0.0.0.7
cundinamarca(config)#access-list 10 permit 172.31.2.8 0.0.0.7
cundinamarca(config)#line vty 0 15
cundinamarca(config-line)#access-class 10 in
cundinamarca(config-line)#

Switch1 — Physical | Config | CLI | Attributes

IOS Command Line Interface

```
switchbucaramanga>en
switchbucaramanga#telnet 172.31.2.1
Trying 172.31.2.1 ...OpenEl Acceso no autorizado est
prohibido


User Access Verification

Username: admin01
Password:
bucaramanga>en
Password:
bucaramanga#exit

[Connection to 172.31.2.1 closed by foreign host]
switchbucaramanga#
```

Ctrl+F6 to exit CLI focus   Copy   Paste

☐ Top

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

Aspectos a tener en cuenta

- Habilitar VLAN en cada switch y permitir su enrutamiento.
- Enrutamiento OSPF con autenticación en cada router.
- Servicio DHCP en el router Tunja, mediante el helper address, para los routers Bucaramanga y Cundinamarca.
- Configuración de NAT estático y de sobrecarga.
- Establecer una lista de control de acceso de acuerdo con los criterios señalados.
- Habilitar las opciones en puerto consola y terminal virtual

CONCLUSIONES

En la realización y respectiva solución de la actividad propuesta, se ejecutaron a cabalidad los 2 escenarios propuestos como prueba hacia todos los temas abarcados durante el presente diplomado de profundización CCNA CISCO, y a la vez, se escatimaron refuerzos sobre lo aprendido dentro de las diversas fases correspondientes, tales como configuración, configuraciones básicas en dispositivos dentro de una topología LAN, configuración de VLANs, entorno DHCP, direccionamiento dinámico y estático, pruebas de conectividad, entre otros.

Se procedió a sustentar todos y cada uno de los pasos y procesos requeridos para la realización de la actividad, tales como validación de comandos y capturas de pantalla.

La prueba de habilidades prácticas desarrollada se presenta como una gran oportunidad para definir futuros procesos de apropiación y configuración de dispositivos dentro de una topología LAN, en un ambiente real hacia optimizaciones de tipo profesional.

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