



## **TAREA 11 - PRUEBA DE HABILIDADES PRÁCTICAS**

### **ACTIVIDAD INDIVIDUAL**

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**GRUPO: 19**

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## Resumen

Comprender el funcionamiento de conexión de las redes nos permite satisfacer una necesidad en la comunidad, pues este tipo de conexiones son unas de las más utilizadas tanto a nivel nacional como mundial. En la actualidad estas conectividades y funcionalidades de los datos que se trasmite de un lugar a otro son muy empleadas, haciendo el trabajo más fácil y ágil. La práctica de este trabajo nos da las bases necesarias para poder organizar y distribuir una red en nuestros campos de trabajo.

Con la CISCO Networking Academy la implementación de plataforma CISCO nos mostró todo el contenido y potencial de comandos a utilizar para su poder ejecutar una buena configuración dentro de una red. Por medio de los ejercicios realizados mediante la implementación de las redes LAN\_WAN se estudió todos los conceptos hasta haber logrado hacer la configuración en todos los ejercicios prácticos durante el curso. De esta manera logramos resolver problemas que se presentaba en la red durante su ejecución. Como administradores tenemos grandes retos de encontrar problemas y llegar su respectiva solución.

## Abstract

Understanding the network connection operation allows us to satisfy a need in the community, as these types of connections are one of those used both nationally and worldwide. Nowadays these connectivity and the functionality of the data that is transmitted from one place to another are very used, making the work easier and more agile. The practice of this work gives us the necessary bases to organize and distribute a network in our fields of work.

With the CISCO Networking Academy the platform implementation did not give the full potential of the commands to be used for later configuration. From the exercises carried out through the implementation of the LAN\_WAN networks, all the concepts were studied until the configuration was achieved in all the practical exercises during the course. In this way we managed to solve problems that arose during its execution. As administrators we have great challenges to find problems and reach their possible solution.

## Objetivos

### General

Desarrollar las habilidades prácticas mediante la configuración de red dinámica. Manejando adecuadamente el uso de los comandos y su respectiva verificación y solución de problemas presentadas en la red configurada.

### Específicos

- Organizar una topología para la red dinámica.
- Designar una configuración básica en cada uno de los dispositivos como switch, Routers y servidores.
- Gestionar los comandos de seguridad para las redes cisco123 y secret class123 para los accesos restringidos
- Definir la configuración para la implementación de OSPFv2 y los protocolos de red dinámica de Router.
- Establecer los DHCP y las NAT en dispositivos de comunicación
- Establecer la configuración y verificación de control de ACL
- Realizar la verificación de conectividad entre los dispositivos de la topología



## Introducción

En el presente trabajo de habilidades prácticas CCNA se trata hacer una configuración dinámica RIPv2 OSPF donde debemos hacer la respectiva configuración en los servers DHCP junto con la realización de las translaciones que genera la configuración. Estas configuraciones poseen muchas características de seguridad tanto en la entrada como la salida de datos. Los DHCP son servidores dinámicos que utiliza una dirección IP utilizando sus protocolos predeterminados que hacen que datos sea o no posible el paso debido a su enrutamiento. La importancia de realizar las conectividades de red en diferentes routers para poder compartir información desde diferentes lugares y espacios son muy útiles generando confianza y buena navegabilidad. Se a utilizando los protocolos IP de enrutamiento para la topología de la red. Para poder desarrollar una buena configuración se debe realizar la ejecución de los comandos de las direcciones y IP en los router y en los Swich y en los terminales DCHP. Cada configuración maneja unos comandos que funciona para realizar la verificación de la configuración en cada dispositivo.

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## Evaluación –Prueba de habilidades prácticas CCNA

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### 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:

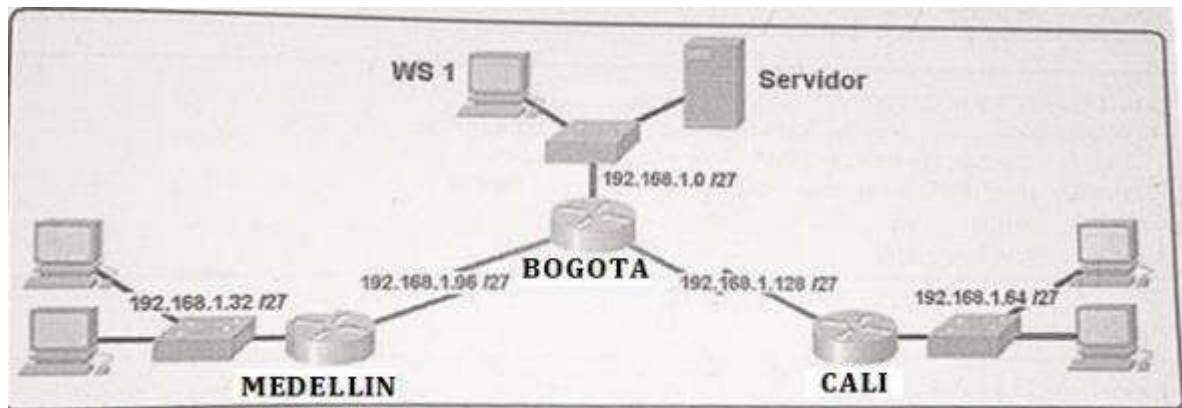
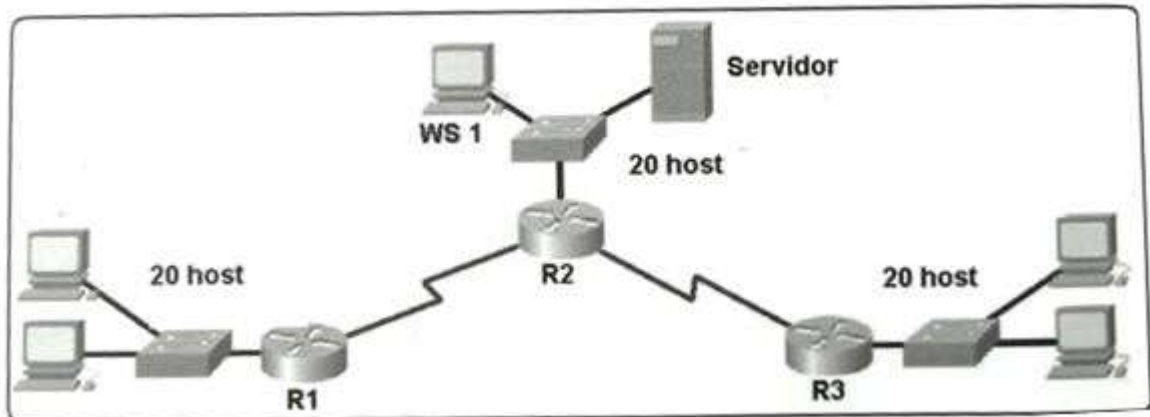
Parte 1: Para el direccionamiento IP debe definirse una dirección de acuerdo con el número de hosts requeridos.

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 #Cuidado Acceso Restringido#
BOGOTA(config)#enable secret class123
BOGOTA(config)#line console 0
    
```

```
BOGOTA(config-line)#password cisco123
BOGOTA(config-line)#login
BOGOTA(config-line)#logging synchronous
BOGOTA(config-line)#line vty 0 15
BOGOTA(config-line)#password cisco123
BOGOTA(config-line)#login
BOGOTA(config-line)#logging synchronous
BOGOTA(config-line)#
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 #Cuidado Acceso Restringido#
MEDELLIN(config)#enable secret class123
MEDELLIN(config)#line console 0
MEDELLIN(config-line)#password cisco123
MEDELLIN(config-line)#login
MEDELLIN(config-line)#logging synchronous
MEDELLIN(config-line)#line vty 0 15
MEDELLIN(config-line)#password cisco123
MEDELLIN(config-line)#login
MEDELLIN(config-line)#logging synchronous
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 #Cuidado Acceso Restringido#
CALI(config)#enable secret class123
CALI(config)#line console 0
CALI(config-line)#password cisco123
CALI(config-line)#login
CALI(config-line)#logging synchronous
CALI(config-line)#line vty 0 15
CALI(config-line)#password cisco123
CALI(config-line)#login
CALI(config-line)#logging synchronous
CALI(config-line)#
```

```
Switch>en
Switch#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname BOGOTASW
BOGOTASW(config)#no ip domain-lookup
BOGOTASW(config)#service password-encryption
BOGOTASW(config)#banner motd #Cuidado Acceso Restringido#
BOGOTASW(config)#enable secret class123
BOGOTASW(config)#line console 0
BOGOTASW(config-line)#password cisco123
BOGOTASW(config-line)#login
BOGOTASW(config-line)#logging synchronous
BOGOTASW(config-line)#line vty 0 15
BOGOTASW(config-line)#password cisco123
BOGOTASW(config-line)#login
BOGOTASW(config-line)#logging synchronous
BOGOTASW(config-line)#
BOGOTASW(config-line)#
```

```
Switch>en
Switch>en
Switch#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname MEDELLINSW
MEDELLINSW(config)#no ip domain-lookup
MEDELLINSW(config)#service password-encryption
MEDELLINSW(config)#banner motd #Cuidado Acceso Restringido#
MEDELLINSW(config)#enable secret class123
MEDELLINSW(config)#line console 0
MEDELLINSW(config-line)#password cisco123
MEDELLINSW(config-line)#login
MEDELLINSW(config-line)#logging synchronous
MEDELLINSW(config-line)#line vty 0 15
MEDELLINSW(config-line)#password cisco123
MEDELLINSW(config-line)#login
MEDELLINSW(config-line)#logging synchronous
MEDELLINSW(config-line)#
MEDELLINSW(config-line)#
```

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

```

CALISW(config)#service password-encryption
CALISW(config)#banner motd #Cuidado Acceso Restringido#
CALISW(config)#enable secret class123
CALISW(config)#line console 0
CALISW(config-line)#password cisco123
CALISW(config-line)#login
CALISW(config-line)#logging synchronous
CALISW(config-line)#line vty 0 15
CALISW(config-line)#password cisco123
CALISW(config-line)#login
CALISW(config-line)#logging synchronous
CALISW(config-line)#
    
```

**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:**

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

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

Red Corporativa	Dirección IP
LAN Bogota	192.168.1.0/27
LAN Medellín	192.168.1.32/27
LAN Cali	192.168.1.64/27
Bogota - Medellín	192.168.1.96/27
Bogota - Cali	192.168.1.128/27
Red Futura	192.168.1.160/27
Red Futura	192.168.1.192/27
Red Futura	192.168.1.224/27

Tabla 1: *Direcciones IP de la Red.*

**Parte 2: Configuración Básica.**

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

	R1	R 2	R 3
Nombre de Host	<b>MEDELLIN</b>	<b>BOGOTA</b>	<b>CALI</b>
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	<b>Eigrp</b>	<b>Eigrp</b>	<b>Eigrp</b>
Sistema Autónomo	200	200	200
Afirmaciones de red	192.168.1.0	192.168.1.0	192.168.1.0

Tabla 2: configuración básica de los routers

```
BOGOTA(config-line)#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 0.0.0.31
BOGOTA(config-router)#network 192.168.1.96 0.0.0.31
BOGOTA(config-router)#network 192.168.1.128 0.0.0.31
BOGOTA(config-router)#
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
```

```
BOGOTA#
```

```
MEDELLIN(config-line)#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 192.168.1.32 0.0.0.31
MEDELLIN(config-router)#network 192.168.1.96 0.0.0.31
MEDELLIN(config-router)#end
MEDELLIN#
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

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

%DUAL-5-NBRCHANGE: IP-EIGRP 200: Neighbor 192.168.1.98 (Serial0/0/0) is
up: new adjacency

MEDELLIN#

CALI(config-line)#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 192.168.1.64 0.0.0.31
CALI(config-router)#network 192.168.1.128 0.0.0.31
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

CALI#

%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

CALI#

**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, 00:02:57, Serial0/0/0  
 D 192.168.1.64 [90/2172416] via 192.168.1.131, 00:02:10, 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

BOGOTA#

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, 00:04:09, 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, 00:03:22, 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, 00:03:29, 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, 00:04:10, Serial0/0/0  
 D 192.168.1.32 [90/2684416] via 192.168.1.130, 00:04:10, 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, 00:04:10, Serial0/0/0  
 C 192.168.1.128 is directly connected, Serial0/0/0

**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
```

### **Realizar un diagnóstico de vecinos usando 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 Infrfce Holdtme Capability Platform Port ID
BOGOTASW Fas 0/0 124 S 2960 Fas 0/1
MEDELLIN Ser 0/0/0 123 R C1841 Ser 0/0/0
CALI Ser 0/0/1 170 R C1841 Ser 0/0/0
BOGOTA#
```

```
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 Infrfce Holdtme Capability Platform Port ID
MEDELLINSW Fas 0/0 166 S 2960 Fas 0/1
BOGOTA Ser 0/0/0 151 R C1841 Ser 0/0/0
MEDELLIN#
```

```
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 Infrfce Holdtme Capability Platform Port ID
CALISW Fas 0/0 162 S 2960 Fas 0/1
BOGOTA Ser 0/0/0 163 R C1841 Ser 0/0/1
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 00:04:10 40 1000 0 8
```

```
CALI#
```

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

```
CALI#ping 192.168.1.130
```

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.130, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 2/4/9 ms
```

```
CALI#ping 192.168.1.99
```

```
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.99, timeout is 2 seconds:
!!!!
```

Success rate is 100 percent (5/5), round-trip min/avg/max = 3/4/6 ms

CALI#

BOGOTA#ping 192.168.1.99

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.168.1.99, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/6 ms

BOGOTA#ping 192.168.1.131

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.168.1.131, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 2/3/7 ms

BOGOTA#

### Parte 3: Configuración de Enrutamiento.

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

**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 12 00:02:56 40 1000 0 7
1 192.168.1.131 Se0/0/1 14 00:02:09 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 12 00:10:34 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 10 00:10:07 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
```

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

```
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, 00:02:57, Serial0/0/0
D 192.168.1.64 [90/2172416] via 192.168.1.131, 00:02:10, 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
```

BOGOTA#



```
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, 00:04:09, 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, 00:03:22, 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, 00:03:29, 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, 00:04:10, Serial0/0/0  
D 192.168.1.32 [90/2684416] via 192.168.1.130, 00:04:10, 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, 00:04:10, Serial0/0/0  
C 192.168.1.128 is directly connected, Serial0/0/0
```

**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.**

Code: C - connected, S - static, I - IGRP, R - RIP, D - EIGRP, EX - EIGRP external, O - OSPF, IA - IA, N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2, E1 - OSPF external type 1, E2 - OSPF external type 2, IS IS, L1 - IS IS level 1, L2 - IS IS level 2, S - candidate default, U - per user static route, O - gateway downloaded, outer route

Gateway of last resort is not set

192.168.1.0/24 is subnetted, 5 subnets

O 192.168.1.0 [90/110] via 192.168.1.130, 0

O 192.168.1.32 [90/2684116] via 192.168.1.130, 0

C 192.168.1.64 is directly connected, 1 subinterface

D 192.168.1.56 [90/2681656] via 192.168.1.130, 0

C 192.168.1.136 is directly connected, Serial0/0/0

d. Realizar un diagnóstico para comprobar que las conectividad entre sí. Realizar esta prueba desde el de MEDELLIN y luego al servidor.

```

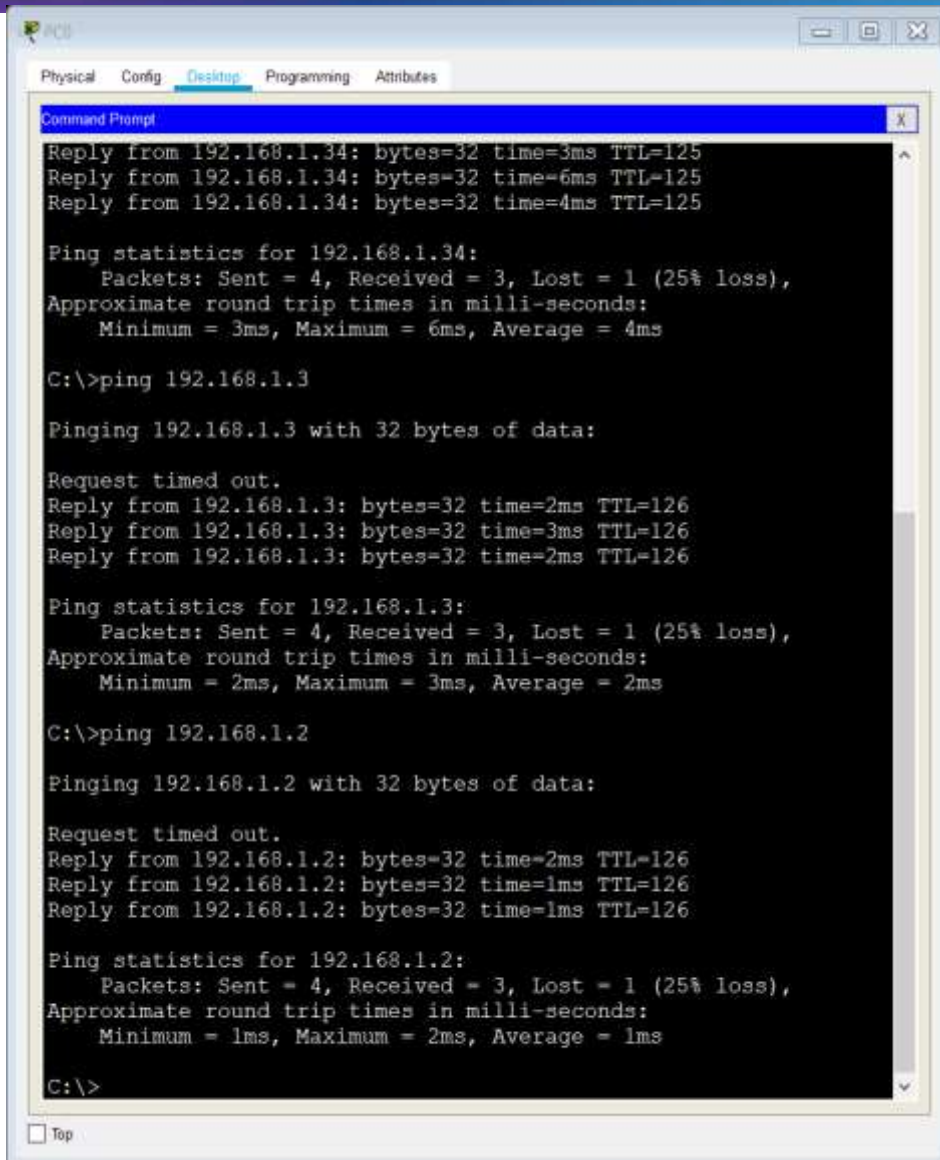
OSPF-Detailed Neighbor
-----
Name: C4500-01 (ip: 192.168.1.64)
Neighbor: 192.168.1.130
Priority: 1
Type: N/A
State: Down
Last Seen: 00:00:00
Hold Time: 180
Neighbor is not established
OSPF-Detailed Neighbor
-----

```

```

OSPF-Detailed Neighbor
-----
Name: S29-01 (ip: 192.168.1.130)
Neighbor: 192.168.1.64
Priority: 1
Type: N/A
State: Down
Last Seen: 00:00:00
Hold Time: 180
Neighbor is not established
OSPF-Detailed Neighbor
-----

```



```

Physical  Config  Desktop  Programming  Attributes
Command Prompt
Reply from 192.168.1.34: bytes=32 time=3ms TTL=125
Reply from 192.168.1.34: bytes=32 time=6ms TTL=125
Reply from 192.168.1.34: bytes=32 time=4ms 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 = 3ms, Maximum = 6ms, Average = 4ms

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=2ms TTL=126
Reply from 192.168.1.3: bytes=32 time=3ms TTL=126
Reply from 192.168.1.3: bytes=32 time=2ms 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 = 2ms, Maximum = 3ms, Average = 2ms

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

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\>
  
```

#### 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.**

**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#conf term
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#access-list 111 permit ip host 192.168.1.30 any
BOGOTA(config)#int f0/0
BOGOTA(config-if)#ip access-group 111 in
BOGOTA(config-if)#
```

**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#conf t
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN(config)#access-list 111 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 111 in
MEDELLIN(config-if)#
```

```
CALI#conf t
Enter configuration commands, one per line. End with CNTL/Z.
CALI(config)#access-list 111 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 111 in
CALI(config-if)#
```

### **Parte 5: Comprobación de la red instalada.**

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

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

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

	ORIGEN	DESTINO	RESULTADO
TELNET	Router MEDELLIN	Router CALI	Éxito
	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
PING	LAN del Router CALI	Servidor	Éxito
	LAN del Router MEDELLIN	Servidor	Éxito
	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

Tabla 3: Condiciones de prueba.

```
MEDELLIN(config)#access-list 111 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 111 in
MEDELLIN(config-if)#
```

```
CALI#conf t
Enter configuration commands, one per line. End with CNTL/Z.
CALI(config)#access-list 111 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 111 in
CALI(config-if)#
```

### Parte 5: Comprobación de la red instalada.

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

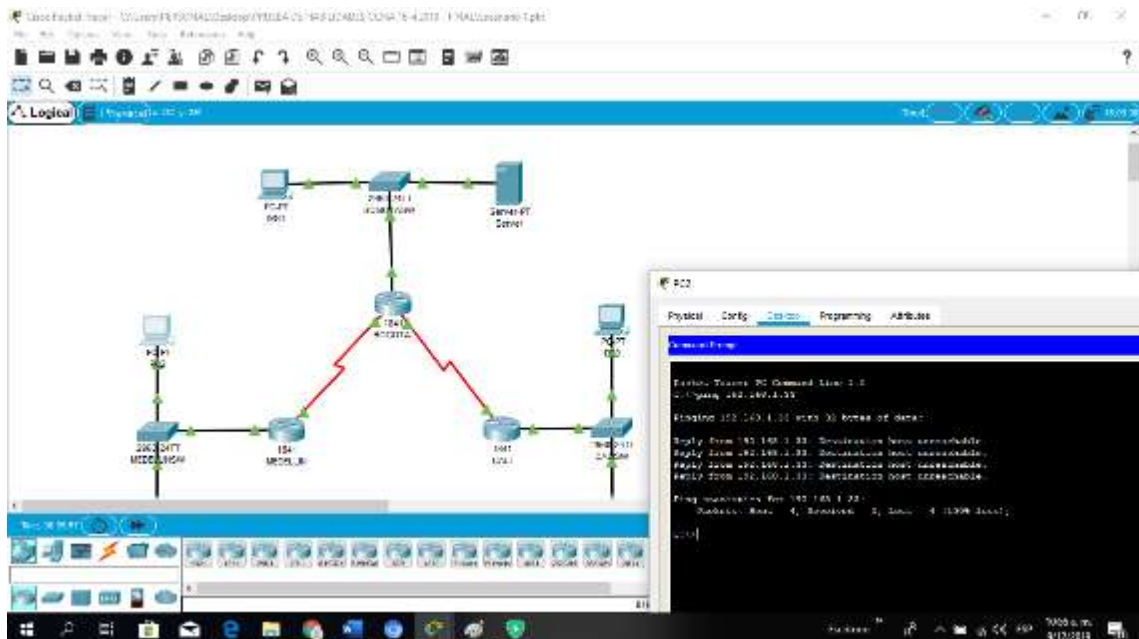
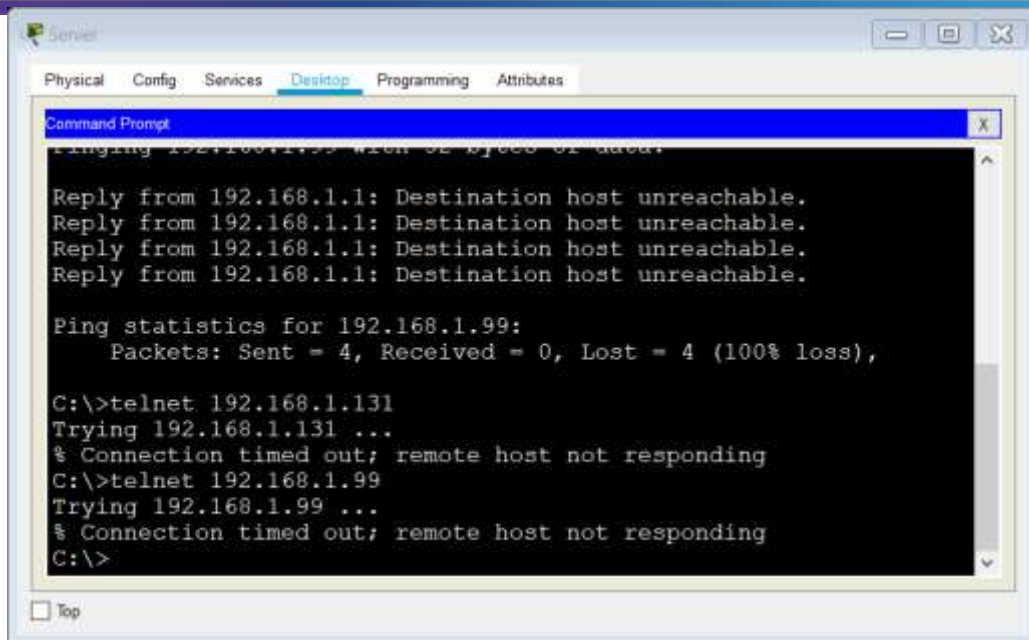
**Comprobar y Completar la siguiente tabla de condiciones de prueba para confirmar el óptimo funcionamiento de la red e.**

The top screenshot shows the configuration of an access list on a 1941 ISR router. The configuration is as follows:

```
1941#configure terminal
1941(config)#access-list 100 permit ip host 192.168.1.100 any
1941(config)#access-list 100 deny ip any any
1941(config)#interface GigabitEthernet0/0
1941(config-if)#ip access-group 100 out
1941(config-if)#exit
1941#
```

The bottom screenshot shows the testing of that access list using the CLI:

```
1941#show access-lists
Extended IP access list 100:
100 permit ip host 192.168.1.100 any
100 deny ip any any
1941#ping 192.168.1.100
Pinging 192.168.1.100: [54 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 192.168.1.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
    0ms
```





```

PC0
Physical Config Desktop Programming Attributes
Command Prompt
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.34

Pinging 192.168.1.34 with 32 bytes of data:

Reply from 192.168.1.65: 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 192.168.1.34:
    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:

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:\>ping 192.168.1.99

Pinging 192.168.1.99 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 192.168.1.99:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
    
```

```

PC2
Physical Config Desktop Programming Attributes
Command Prompt
Pinging 192.168.1.33 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 192.168.1.33:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

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:\>
    
```

The screenshot displays a Packet Tracer environment. At the top, a PC window titled 'PC0' shows a Command Prompt with the following text:

```

Packet Tracer PC Command Line 1.0
C:\>telnet 192.168.1.99
Trying 192.168.1.99 ...
% Connection timed out; remote host not responding
C:\>
    
```

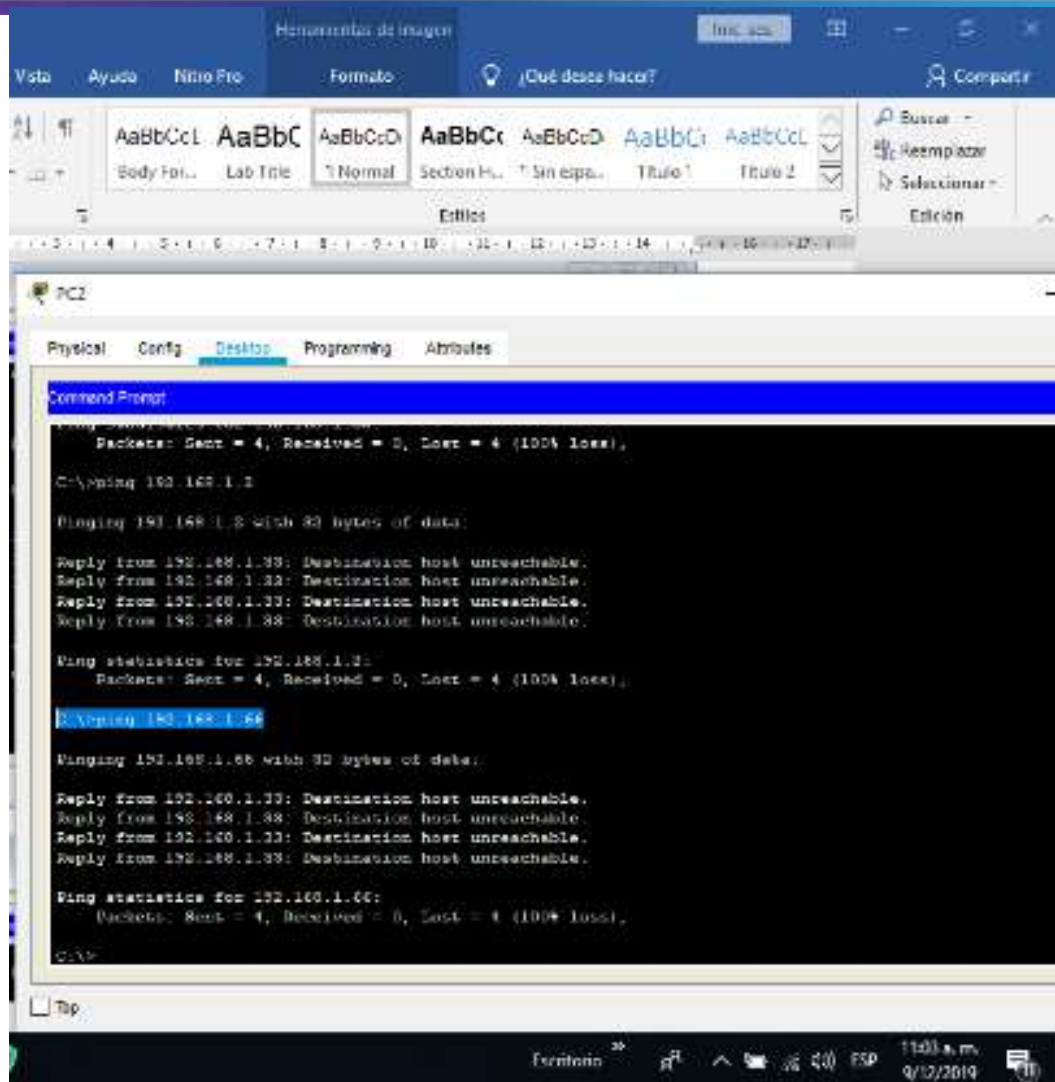
Below the PC window, a network diagram is visible. It features a central router labeled 'R1' (2950) connected to two other routers, 'R2' (2950) and 'R3' (2950). R2 is connected to a PC labeled 'PC1' (192.168.1.10) and a server labeled 'SERVER1' (192.168.1.20). R3 is connected to a PC labeled 'PC2' (192.168.2.10) and a server labeled 'SERVER2' (192.168.2.20). The diagram also shows various switches and interconnections between the routers.

On the right side of the screenshot, another PC window titled 'PC0' is open, showing a 'General Tab' with a Command Prompt. The text in this window is partially obscured but appears to be a continuation of the telnet attempt or related network commands.

The screenshot displays the Cisco Packet Tracer interface. On the left, a network diagram shows a central router (R1) connected to two other routers (R2 and R3), which are in turn connected to various devices like PCs and servers. On the right, a terminal window shows the configuration of a Cisco switch (S1) in user EXEC mode.

```

S1>
S1>enable
S1#
S1#configure terminal
S1(config)#hostname S1
S1(config)#
S1(config)#interface gigabitEthernet 1/24
S1(config-if)#ip address 192.168.1.25 255.255.255.0
S1(config-if)#no shutdown
S1(config-if)#exit
S1(config)#interface gigabitEthernet 1/25
S1(config-if)#ip address 192.168.1.26 255.255.255.0
S1(config-if)#no shutdown
S1(config-if)#exit
S1(config)#end
S1#
  
```



Packet Tracer - Cisco Packet Tracer (194.0.0.0/24) - 194.0.0.0/24 - 194.0.0.0/24

Command Terminal

```

R1>ping 192.168.1.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.1: timeout is 2 seconds:
!!!!!
5/0/0

```

Packet Tracer - Cisco Packet Tracer (194.0.0.0/24) - 194.0.0.0/24 - 194.0.0.0/24

Command Terminal

```

R1>ping 192.168.1.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.1: timeout is 2 seconds:
.....
5/0/0

```

The screenshot displays the Cisco Packet Tracer interface. The main window shows a network topology with several routers and servers. A central router, MEDR101, is highlighted with a red lightning bolt icon, indicating a configuration error. To the right, a terminal window for MEDR101 is open, showing the following output:

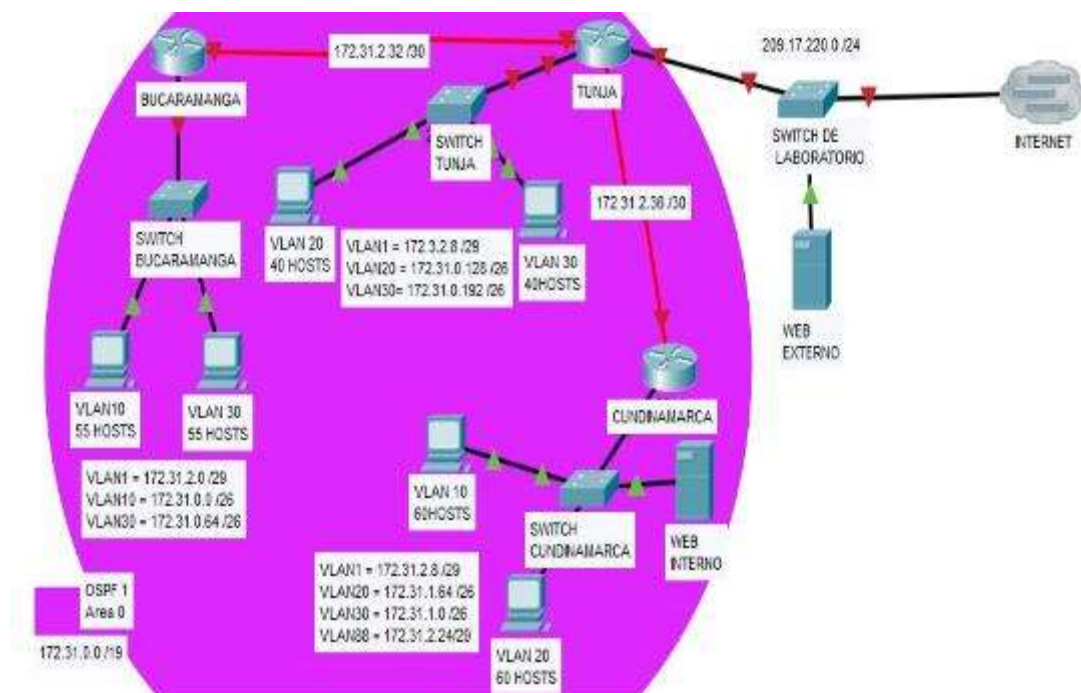
```
IOS Embedded Linux Shell

Press RETURN to get started.

Outdated Access Configuration
New Access Configuration
Password:
100011010101
Password:
1000110101
Link's to 100011010101
```

## 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:  
 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 #Cuidado Acceso Restringido#
BUCARAMANGA(config)#enable secret class123
BUCARAMANGA(config)#line console 0
BUCARAMANGA(config-line)#password cisco123
BUCARAMANGA(config-line)#login
BUCARAMANGA(config-line)#logging synchronous
BUCARAMANGA(config-line)#line vty 0 15
BUCARAMANGA(config-line)#password cisco123
BUCARAMANGA(config-line)#login
BUCARAMANGA(config-line)#logging synchronous
BUCARAMANGA(config)#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#
%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 #Cuidado Acceso Restringido#
TUNJA(config)#enable secret class123
TUNJA(config)#line console 0
TUNJA(config-line)#password cisco123
TUNJA(config-line)#login
TUNJA(config-line)#logging synchronous
TUNJA(config-line)#line vty 0 15
TUNJA(config-line)#password cisco123
TUNJA(config-line)#login

```

```
TUNJA(config-line)#logging synchronous
TUNJA(config)#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

**TUNJA#**

```

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 #Cuidado Acceso Restringido#
CUNDINAMARCA(config)#enable secret class123
CUNDINAMARCA(config)#line console 0
CUNDINAMARCA(config-line)#password cisco123
CUNDINAMARCA(config-line)#login
CUNDINAMARCA(config-line)#logging synchronous
CUNDINAMARCA(config-line)#line vty 0 15
CUNDINAMARCA(config-line)#password cisco123
CUNDINAMARCA(config-line)#login
CUNDINAMARCA(config-line)#logging synchronous
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

CUNDINAMARCA#

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

CUNDINAMARCA#

00:14:55: %OSPF-5-ADJCHG: Process 1, Nbr 209.165.220.1 on Serial0/0/0 from LOADING to FULL, Loading Done

**CUNDINAMARCA#**

Switch>en

Switch#conf term

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

Switch(config)#hostname BUCARAMANGASW

BUCARAMANGASW(config)#vlan 1

BUCARAMANGASW(config-vlan)#vlan 10

BUCARAMANGASW(config-vlan)#vlan 30

BUCARAMANGASW(config-vlan)#int f0/20

BUCARAMANGASW(config-if)#switchport mode access

BUCARAMANGASW(config-if)#switchport access vlan 10

BUCARAMANGASW(config-if)#int f0/24

BUCARAMANGASW(config-if)#switchport mode access

BUCARAMANGASW(config-if)#switchport access vlan 30

BUCARAMANGASW(config-if)#int f0/1

BUCARAMANGASW(config-if)#switchport mode trunk

BUCARAMANGASW(config-if)#int vlan 1

BUCARAMANGASW(config-if)#ip address 172.31.2.3 255.255.255.248

BUCARAMANGASW(config-if)#no shutdown

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

BUCARAMANGASW(config)#

BUCARAMANGASW(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 TUNJASW
```

```
TUNJASW(config)#vlan 1
```

```
TUNJASW(config-vlan)#vlan 20
```

```
TUNJASW(config-vlan)#vlan 30
```

```
TUNJASW(config-vlan)#int f0/20
```

```
TUNJASW(config-if)#switchport mode access
```

```
TUNJASW(config-if)#switchport access vlan 20
```

```
TUNJASW(config-if)#int f0/24
```

```
TUNJASW(config-if)#switchport mode access
```

```
TUNJASW(config-if)#switchport access vlan 30
```

```
TUNJASW(config-if)#int f0/1
```

```
TUNJASW(config-if)#switchport mode trunk
```

```
TUNJASW(config-if)#
```

```
TUNJASW(config-if)#int vlan 1
```

```
TUNJASW(config-if)#ip address 172.3.2.11 255.255.255.248
```

```
TUNJASW(config-if)#no shutdown
```

```
TUNJASW(config-if)#
```

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

```
TUNJASW(config)#
```

```
TUNJASW(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
```

```
TUNJASW(config)#
```

```

Switch>en
Switch#conf term
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname CUNDINAMARCASW
CUNDINAMARCASW(config)#vlan 1
CUNDINAMARCASW(config-vlan)#vlan 20
CUNDINAMARCASW(config-vlan)#vlan 30
CUNDINAMARCASW(config-vlan)#vlan 88
CUNDINAMARCASW(config-vlan)#exit
CUNDINAMARCASW(config)#int f0/20
CUNDINAMARCASW(config-if)#switchport mode access
CUNDINAMARCASW(config-if)#switchport access vlan 20
CUNDINAMARCASW(config-if)#int f0/24
CUNDINAMARCASW(config-if)#switchport mode access
CUNDINAMARCASW(config-if)#switchport access vlan 30
CUNDINAMARCASW(config-if)#int f0/10
CUNDINAMARCASW(config-if)#switchport mode access
CUNDINAMARCASW(config-if)#switchport access vlan 88
CUNDINAMARCASW(config-if)#int f0/1
CUNDINAMARCASW(config-if)#switchport mode trunk

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

CUNDINAMARCASW(config-if)#
CUNDINAMARCASW(config-if)#ip default-gateway 172.31.2.9
CUNDINAMARCASW(config)#
CUNDINAMARCASW(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

CUNDINAMARCASW(config)#

```

## Autenticación local con AAA.

```
BUCARAMANGA(config-line)#username administrador secret cisco12345
BUCARAMANGA(config)#aaa new-model
BUCARAMANGA(config)#aaa authentication login AUTH local
BUCARAMANGA(config)#line console 0
BUCARAMANGA(config-line)#login authentication AUTH
BUCARAMANGA(config-line)#line vty 0 15
BUCARAMANGA(config-line)#login authentication AUTH
```

```
TUNJA(config-line)#username administrador secret cisco12345
TUNJA(config)#aaa new-model
TUNJA(config)#aaa authentication login AUTH local
TUNJA(config)#line console 0
TUNJA(config-line)#login authentication AUTH
TUNJA(config-line)#line vty 0 15
TUNJA(config-line)#login authentication AUTH
```

```
CUNDINAMARCA(config-line)#username administrador secret cisco12345
CUNDINAMARCA(config)#aaa new-model
CUNDINAMARCA(config)#aaa authentication login AUTH local
CUNDINAMARCA(config)#line console 0
CUNDINAMARCA(config-line)#login authentication AUTH
CUNDINAMARCA(config-line)#line vty 0 15
CUNDINAMARCA(config-line)#login authentication AUTH
```

## 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 5 attempts 4 within 60
```

```
TUNJA(config-line)#login block-for 5 attempts 4 within 60
```

```
CUNDINAMARCA(config-line)#login block-for 5 attempts 4 within 60
```



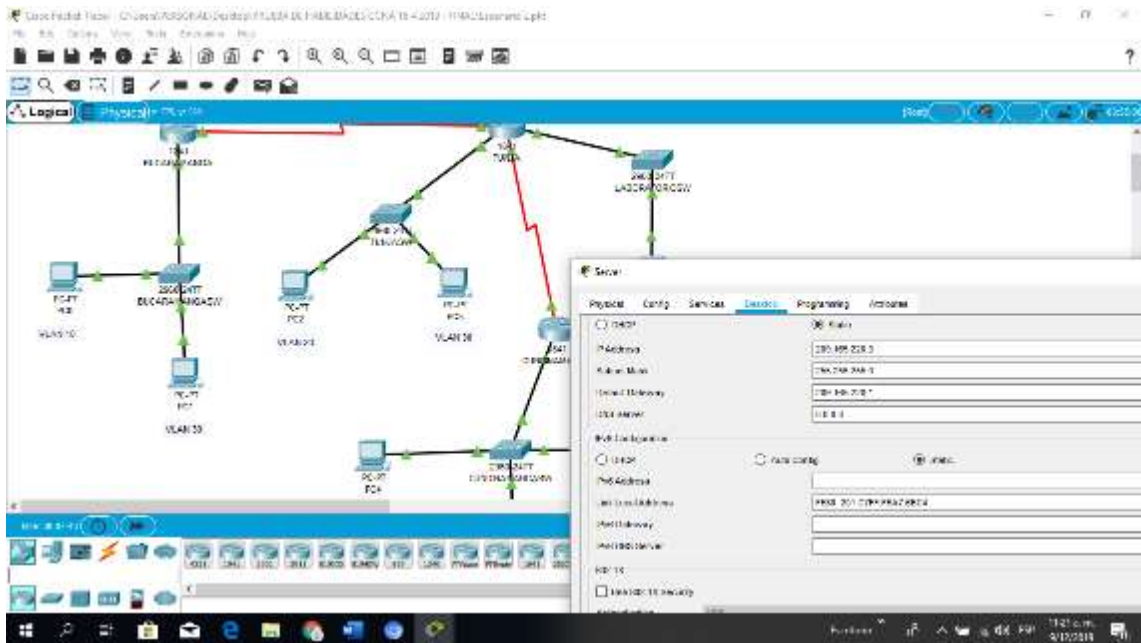
**Máximo tiempo de acceso al detectar ataques.**

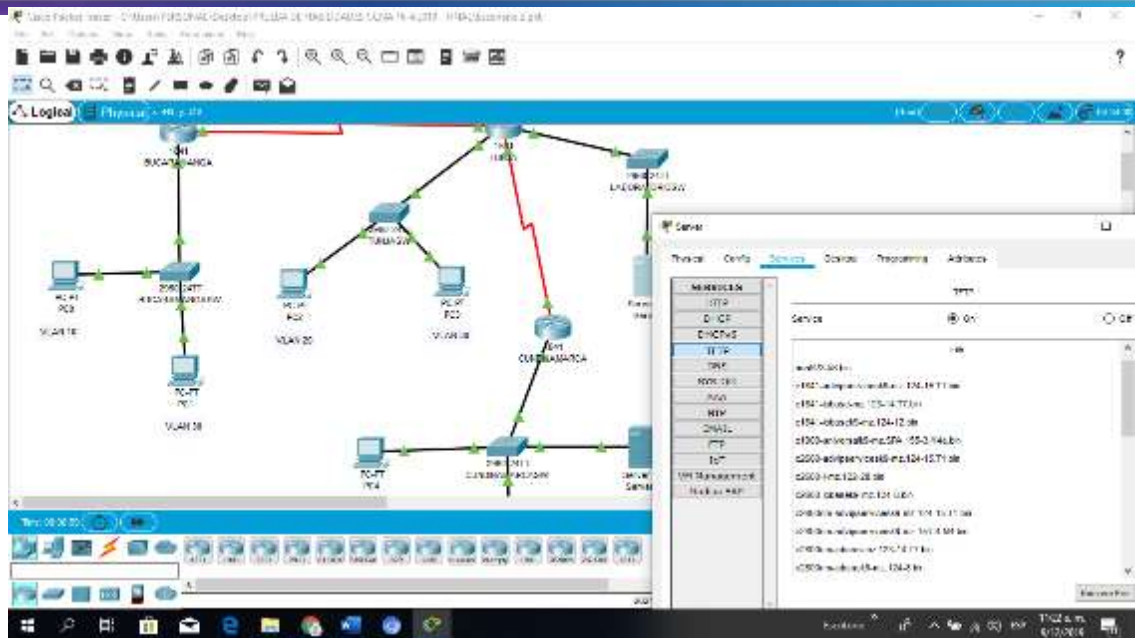
BUCARAMANGA(config-line)#login block-for 5 attempts 4 within 60

TUNJA(config-line)#login block-for 5 attempts 4 within 60

CUNDINAMARCA(config-line)#login block-for 5 attempts 4 within 60

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





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

```
TUNJA(config)#ip dhcp excluded-address 172.31.0.1
TUNJA(config)#ip dhcp excluded-address 172.31.0.65
TUNJA(config)#ip dhcp excluded-address 172.31.1.65
TUNJA(config)#ip dhcp excluded-address 172.31.1.1
TUNJA(config)#ip dhcp pool V10B
TUNJA(dhcp-config)#network 172.31.0.0 255.255.255.192
TUNJA(dhcp-config)#default-router 172.31.0.1
TUNJA(dhcp-config)#dns-server 172.31.2.28
TUNJA(dhcp-config)#ip dhcp pool V30B
TUNJA(dhcp-config)#network 172.31.0.64 255.255.255.192
TUNJA(dhcp-config)#default-router 172.31.0.65
TUNJA(dhcp-config)#dns-server 172.31.2.28
TUNJA(dhcp-config)#ip dhcp pool V20C
TUNJA(dhcp-config)#network 172.31.1.64 255.255.255.192
TUNJA(dhcp-config)#default-router 172.31.1.65
TUNJA(dhcp-config)#dns-server 172.31.2.28
TUNJA(dhcp-config)#ip dhcp pool V30C
TUNJA(dhcp-config)#network 172.31.1.0 255.255.255.192
TUNJA(dhcp-config)#default-router 172.31.1.1
TUNJA(dhcp-config)#dns-server 172.31.2.28
TUNJA(dhcp-config)#
```

```

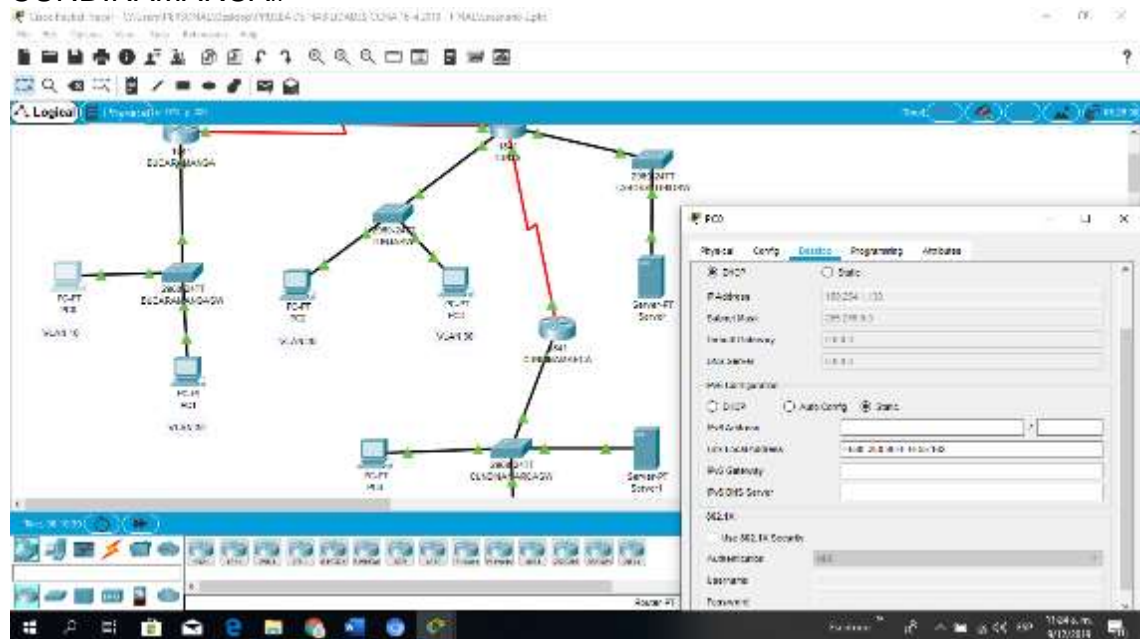
BUCARAMANGA(config)#int f0/0.10
BUCARAMANGA(config-subif)#ip helper-address 172.31.2.33
BUCARAMANGA(config-subif)#int f0/0.30
BUCARAMANGA(config-subif)#ip helper-address 172.31.2.33
BUCARAMANGA(config-subif)#end
BUCARAMANGA#
BUCARAMANGA#
%SYS-5-CONFIG_I: Configured from console by console
    
```

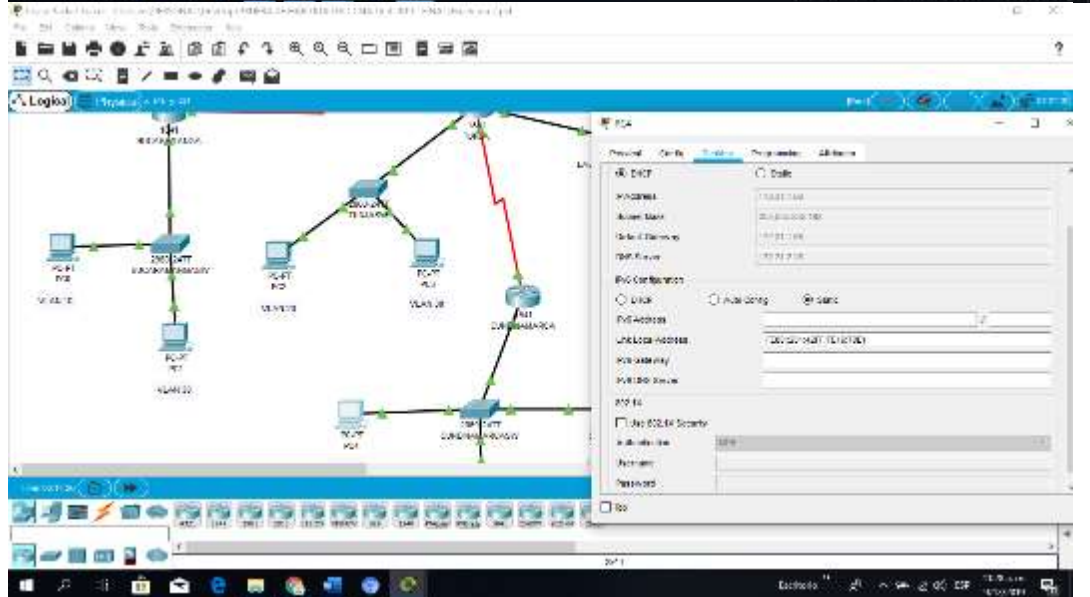
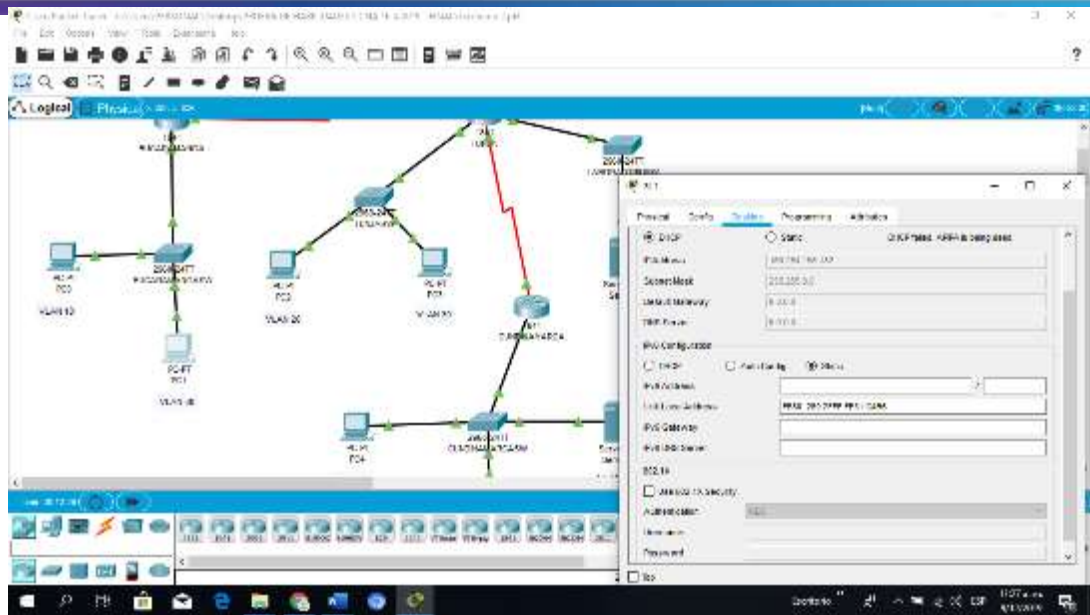
BUCARAMANGA#

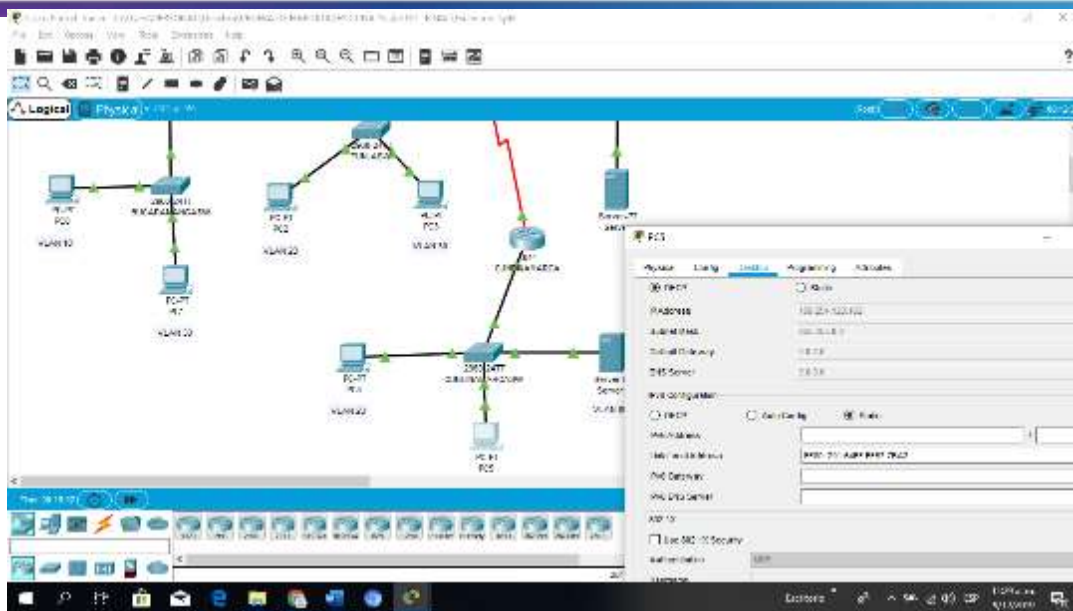
```

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

CUNDINAMARCA#







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

```
TUNJA(dhcp-config)#ip nat inside source static 172.31.2.28 209.165.220.4
TUNJA(config)#access-list 1 permit 172.0.0.0 0.255.255.255
TUNJA(config)#ip nat inside source list 1 interface f0/1 overload
TUNJA(config)#int f0/1
TUNJA(config-if)#ip nat outside
TUNJA(config-if)#int f0/0.1
TUNJA(config-subif)#ip nat inside
TUNJA(config-subif)#int f0/0.20
TUNJA(config-subif)#ip nat inside
TUNJA(config-subif)#int f0/0.30
TUNJA(config-subif)#ip nat inside
TUNJA(config-subif)#int s0/0/0
TUNJA(config-if)#ip nat inside
TUNJA(config-if)#int s0/0/1
TUNJA(config-if)#ip nat inside
TUNJA(config-if)#exit
TUNJA(config)#ip route 0.0.0.0 0.0.0.0 209.165.220.3
TUNJA(config)#router ospf 1
TUNJA(config-router)#default-information originate
TUNJA(config-router)#
```

```
TUNJA#show ip route
```

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

Gateway of last resort is 209.165.220.3 to network 0.0.0.0

172.3.0.0/29 is subnetted, 1 subnets  
 C 172.3.2.8 is directly connected, FastEthernet0/0.1  
 172.31.0.0/16 is variably subnetted, 11 subnets, 3 masks  
 O 172.31.0.0/26 [110/65] via 172.31.2.34, 00:24:49, Serial0/0/0  
 O 172.31.0.64/26 [110/65] via 172.31.2.34, 00:24:49, 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, 00:23:33, Serial0/0/1  
 O 172.31.1.64/26 [110/65] via 172.31.2.38, 00:23:33, Serial0/0/1  
 O 172.31.2.0/29 [110/65] via 172.31.2.34, 00:24:49, Serial0/0/0  
 O 172.31.2.8/29 [110/65] via 172.31.2.38, 00:23:33, Serial0/0/1  
 O 172.31.2.24/29 [110/65] via 172.31.2.38, 00:23:33, 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 209.165.220.3

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, 00:25:08, 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, 00:25:08, Serial0/0/0

```
O 172.31.0.192/26 [110/65] via 172.31.2.33, 00:25:08, Serial0/0/0
O 172.31.1.0/26 [110/129] via 172.31.2.33, 00:23:42, Serial0/0/0
O 172.31.1.64/26 [110/129] via 172.31.2.33, 00:23:42, 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, 00:23:42, Serial0/0/0
O 172.31.2.24/29 [110/129] via 172.31.2.33, 00:23:42, 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, 00:24:02, Serial0/0/0
O*E2 0.0.0.0/0 [110/1] via 172.31.2.33, 00:02:01, Serial0/0/0
```

BUCARAMANGA#

CUNDINAMARCA#show ip route

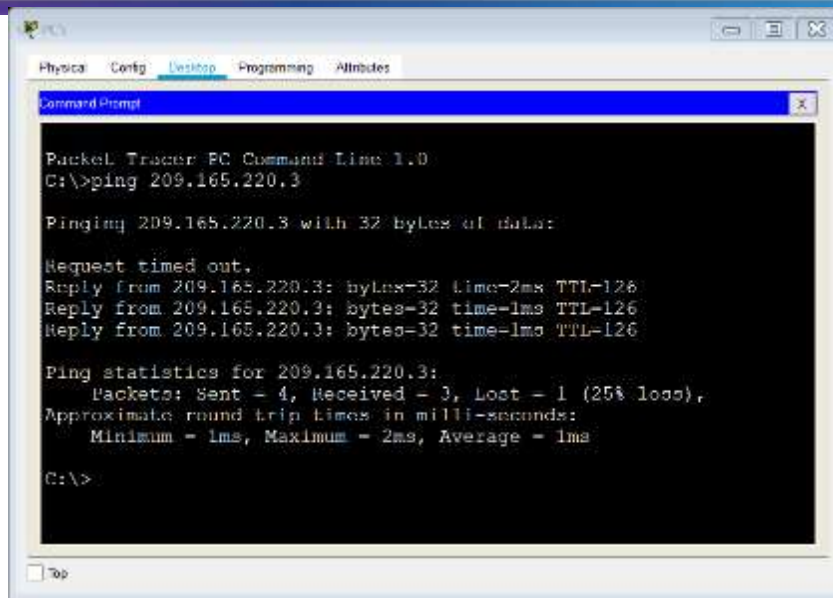
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP  
 D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area  
 N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2  
 E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP  
 i - IS-IS, L1 - IS-IS level-1, 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, 00:24:15, 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, 00:24:15, Serial0/0/0
O 172.31.0.64/26 [110/129] via 172.31.2.37, 00:24:15, Serial0/0/0
O 172.31.0.128/26 [110/65] via 172.31.2.37, 00:24:15, Serial0/0/0
O 172.31.0.192/26 [110/65] via 172.31.2.37, 00:24:15, 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, 00:24:15, 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, 00:24:15, 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, 00:02:24, Serial0/0/0
```

CUNDINAMARCA#



TUNJA#show ip nat translation

```

Pro Inside global Inside local Outside local Outside global
icmp 209.165.220.1:1 172.31.1.2:1 209.165.220.3:1 209.165.220.3:1
icmp 209.165.220.1:2 172.31.1.2:2 209.165.220.3:2 209.165.220.3:2
icmp 209.165.220.1:3 172.31.1.2:3 209.165.220.3:3 209.165.220.3:3
icmp 209.165.220.1:4 172.31.1.2:4 209.165.220.3:4 209.165.220.3:4
--- 209.165.220.4 172.31.2.28 --- ---
    
```

TUNJA#

**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 cisco123

BUCARAMANGA(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 cisco123

CUNDINAMARCA(config-if)#

TUNJA#



```
00:30:20: %OSPF-5-ADJCHG: Process 1, Nbr 172.31.2.34 on Serial0/0/0 from
FULL to DOWN, Neighbor Down: Dead timer expired
```

```
00:30:20: %OSPF-5-ADJCHG: Process 1, Nbr 172.31.2.34 on Serial0/0/0 from
FULL to DOWN, Neighbor Down: Interface down or detached
```

```
TUNJA#
```

```
00:31:32: %OSPF-5-ADJCHG: Process 1, Nbr 172.31.2.38 on Serial0/0/1 from
FULL to DOWN, Neighbor Down: Dead timer expired
```

```
00:31:32: %OSPF-5-ADJCHG: Process 1, Nbr 172.31.2.38 on Serial0/0/1 from
FULL to DOWN, Neighbor Down: Interface down or detached
```

```
TUNJA#conf t
```

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

```
TUNJA(config)#int s0/0/0
```

```
TUNJA(config-if)#ip ospf authentication message-digest
```

```
TUNJA(config-if)#ip ospf message-digest-key 1 md5 cisco123
```

```
TUNJA(config-if)#int s0/0/1
```

```
TUNJA(config-if)#ip ospf authentication message-digest
```

```
TUNJA(config-if)#ip ospf message-digest-key 1 md5 cisco123
```

```
TUNJA(config-if)#
```

```
00:31:40: %OSPF-5-ADJCHG: Process 1, Nbr 172.31.2.34 on Serial0/0/0 from
LOADING to FULL, Loading Done
```

```
TUNJA(config-if)#
```

```
00:31:42: %OSPF-5-ADJCHG: Process 1, Nbr 172.31.2.38 on Serial0/0/1 from
LOADING to FULL, Loading Done
```

```
TUNJA(config-if)#
```

### Listas de control de acceso.

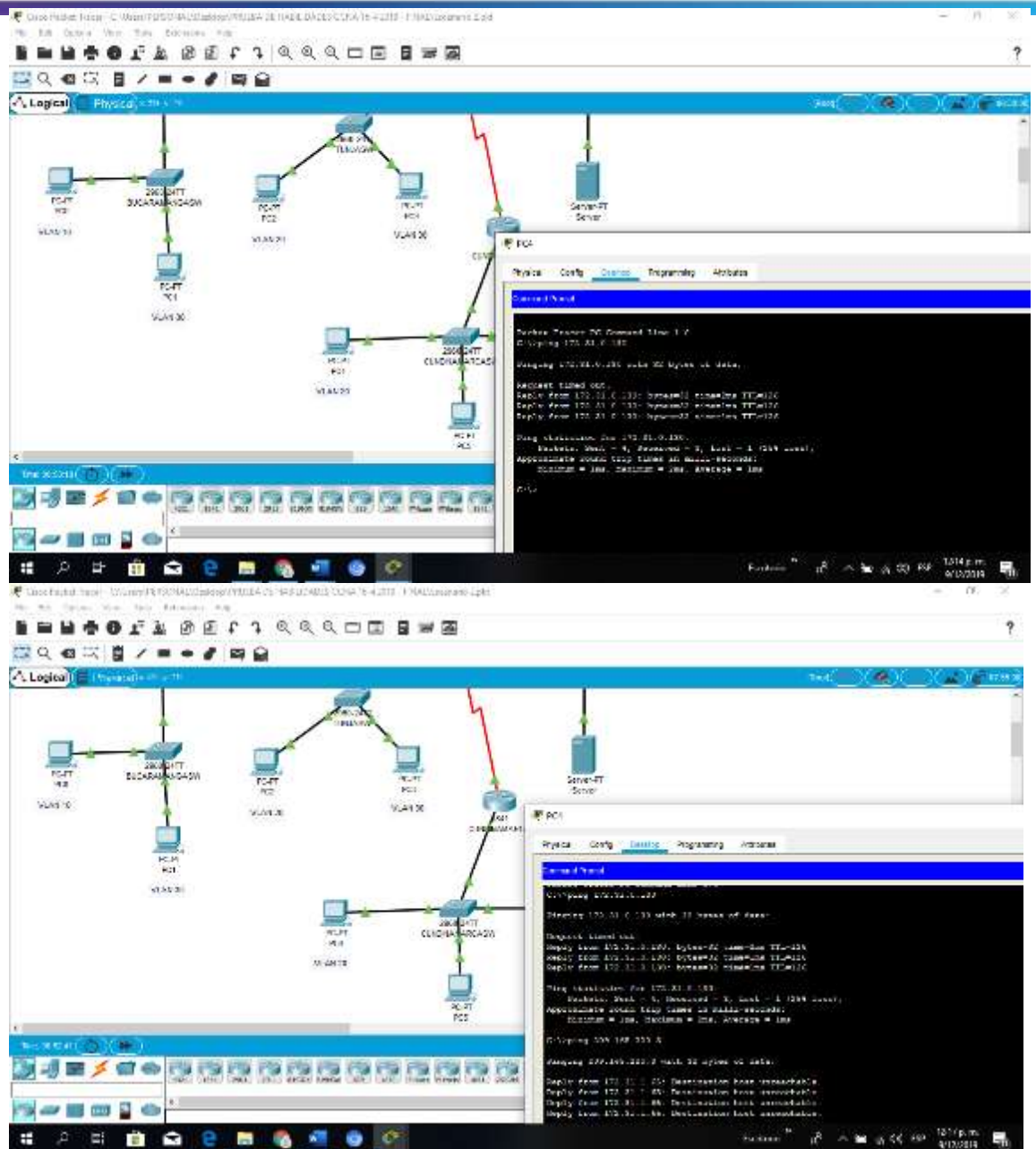
```
CUNDINAMARCA(config-if)#access-list 111 deny ip 172.31.1.64 0.0.0.63
209.165.220.0 0.0.0.255
```

```
CUNDINAMARCA(config)#access-list 111 permit ip any any
```

```
CUNDINAMARCA(config)#int f0/0.20
```

```
CUNDINAMARCA(config-subif)#ip access-group 111 in
```

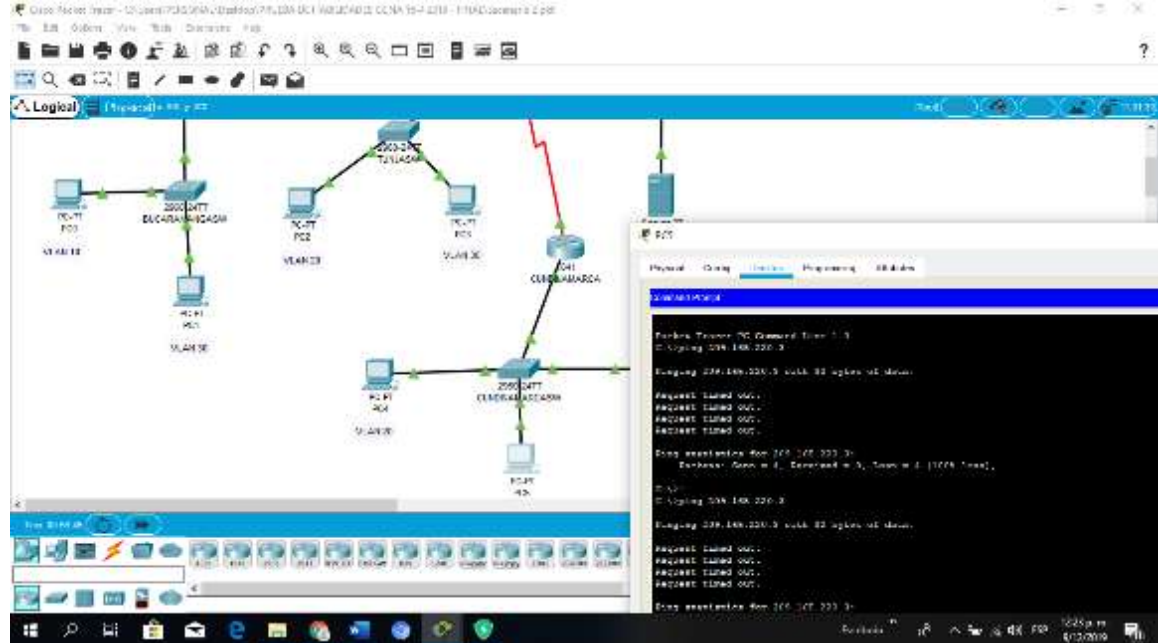
```
CUNDINAMARCA(config-subif)#
```



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

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

### CUNDINAMARCA(config-subif)#

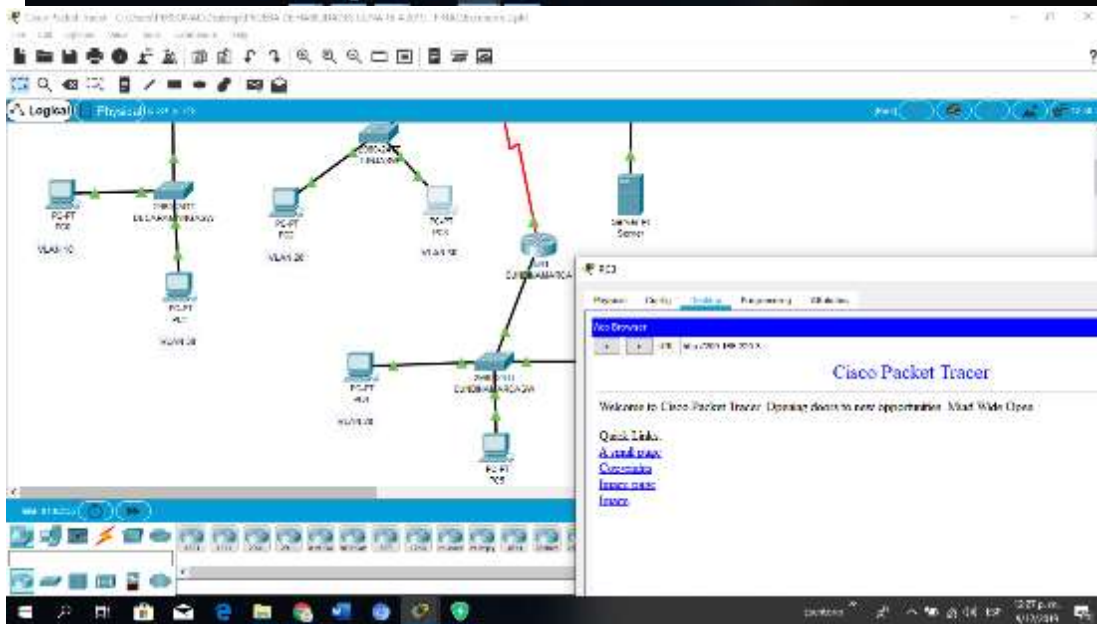
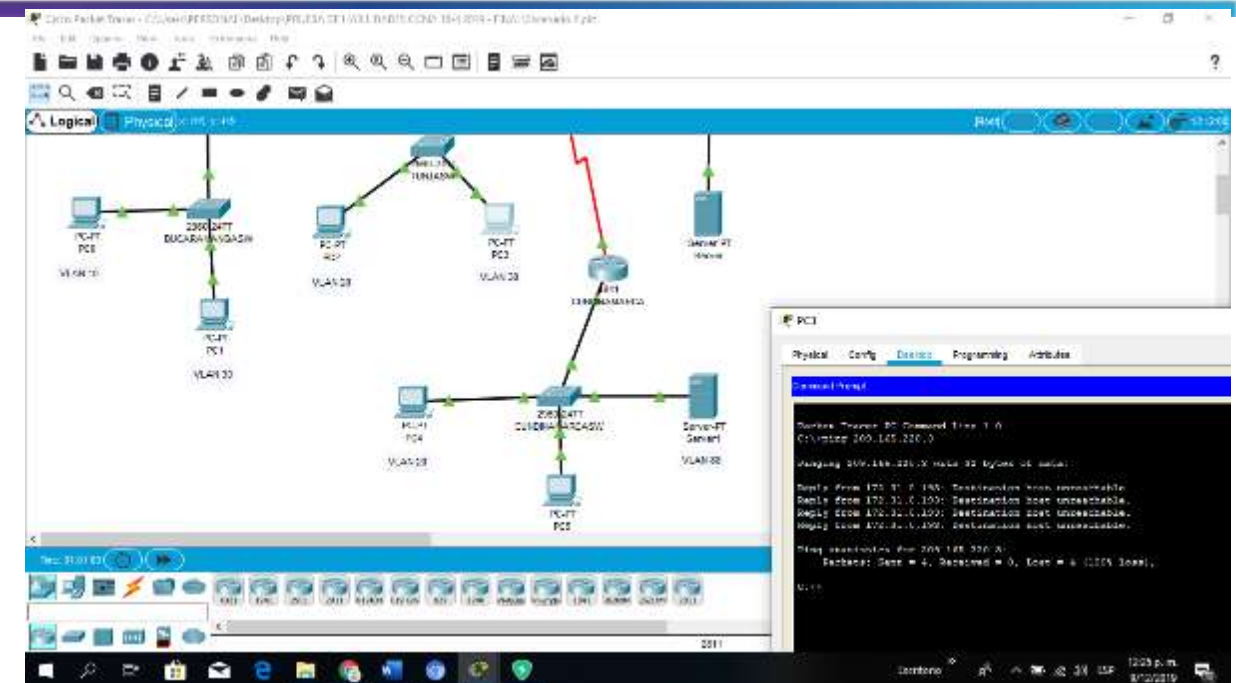


**Los hosts de VLAN 10 en Cundinamarca si acceden a internet y no a la red interna de Tunja.**

```

TUNJA(config)#access-list 111 permit tcp 172.31.0.192 0.0.0.63 209.165.220.0
0.0.0.255 eq 80
TUNJA(config)#access-list 111 permit tcp 172.31.0.192 0.0.0.63 209.165.220.0
0.0.0.255 eq 21
TUNJA(config)#access-list 111 permit tcp 172.31.0.192 0.0.0.63 209.165.220.0
0.0.0.255 eq 20
TUNJA(config)#int f0/0.30
TUNJA(config-subif)#ip access-group 111 in
TUNJA(config-subif)#

```

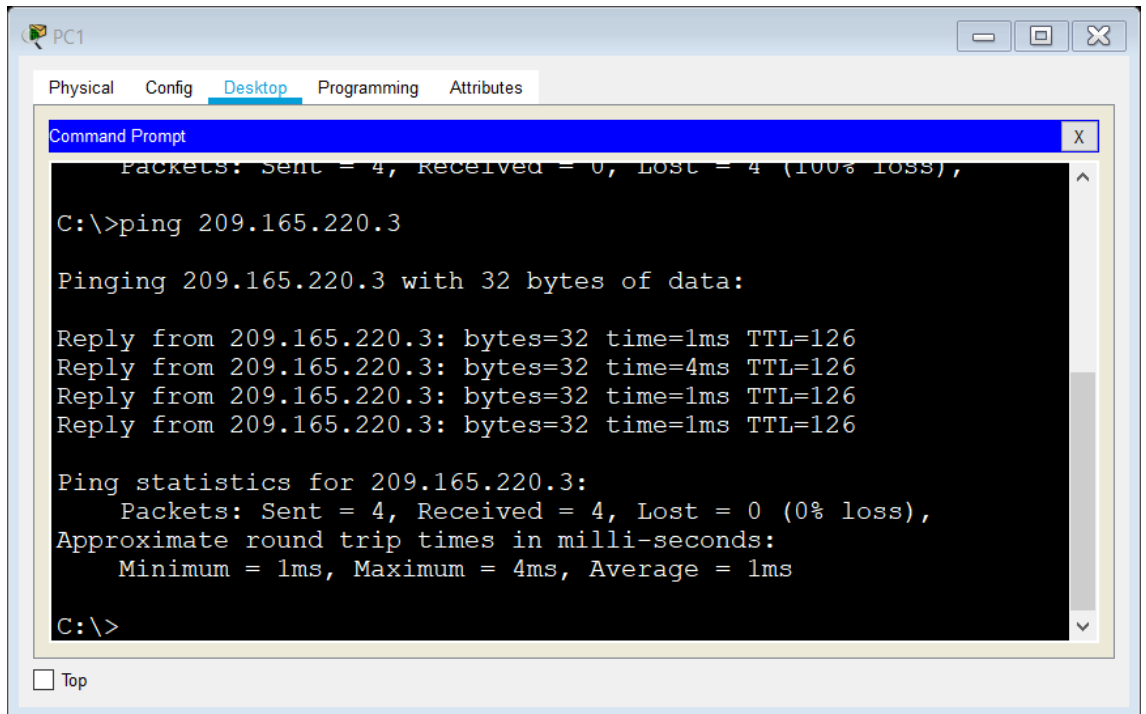


Los hosts de VLAN 30 en Tunja solo acceden a servidores web y ftp de internet.

```

BUCARAMANGA(config)#access-list 111 permit ip 172.31.0.0 0.0.0.63
209.165.220.0 0.0.0.255
BUCARAMANGA(config)#int f0/0.30
BUCARAMANGA(config-subif)#ip access-group 111 in
    
```

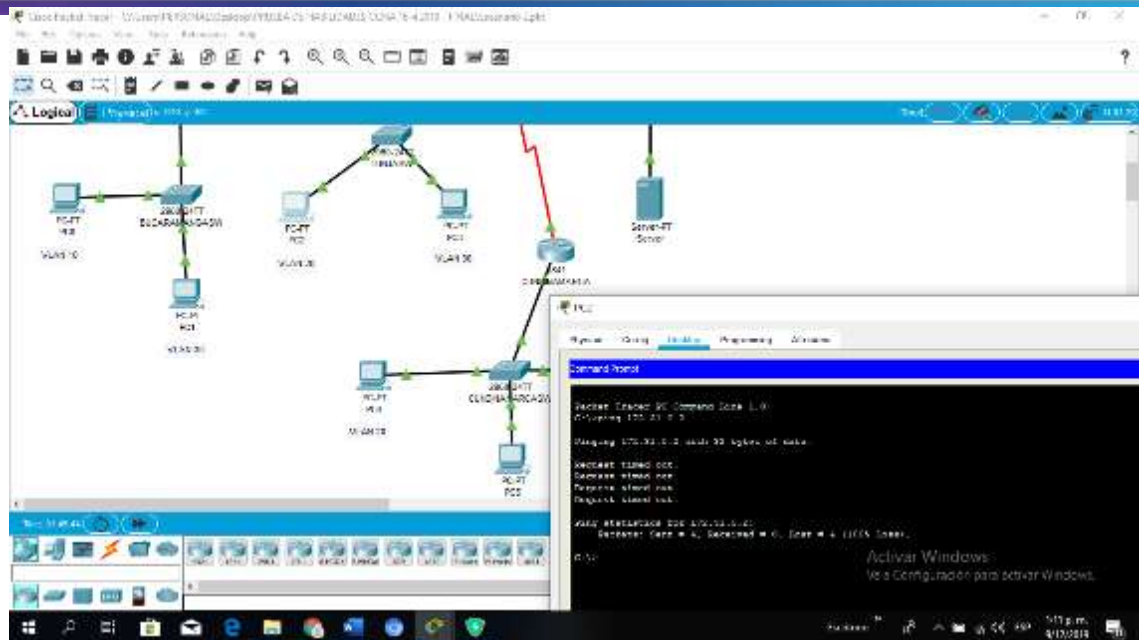
BUCARAMANGA(config-subif)#



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

```

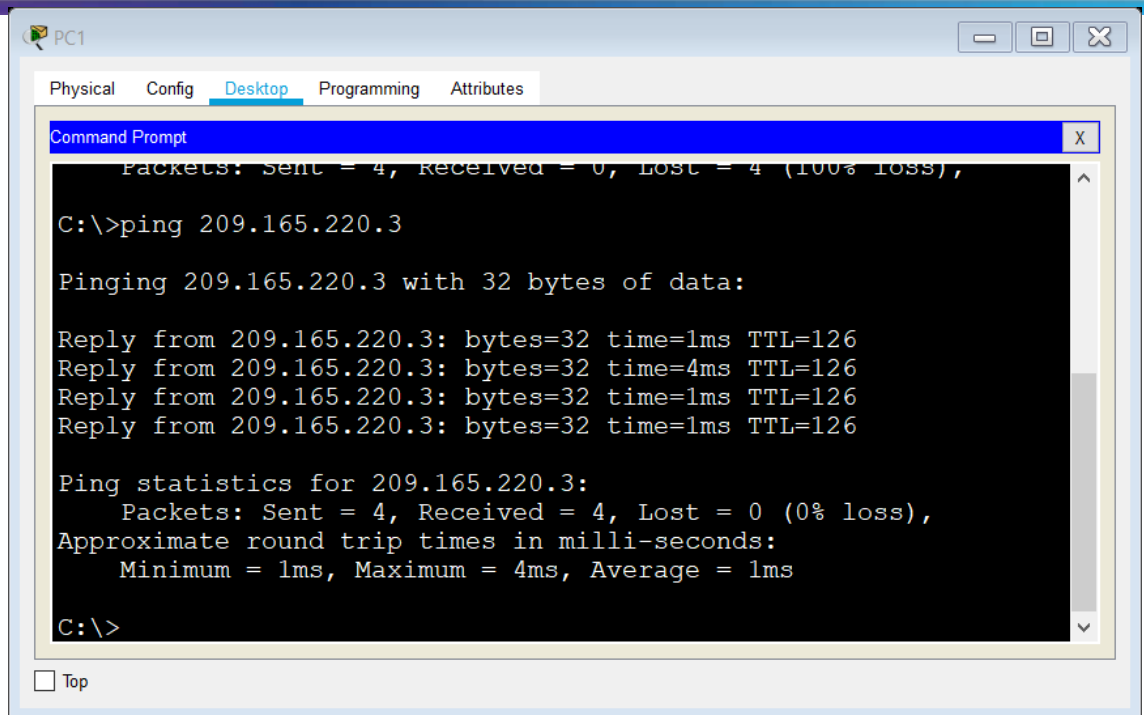
TUNJA(config-subif)#access-list 112 permit ip 172.31.0.128 0.0.0.63 172.31.1.64
0.0.0.63
TUNJA(config)#access-list 112 permit ip 172.31.0.128 0.0.0.63 172.31.0.0
0.0.0.63
TUNJA(config)#int f0/0.20
TUNJA(config-subif)#ip access-group 112 in
TUNJA(config-subif)#
  
```



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

```

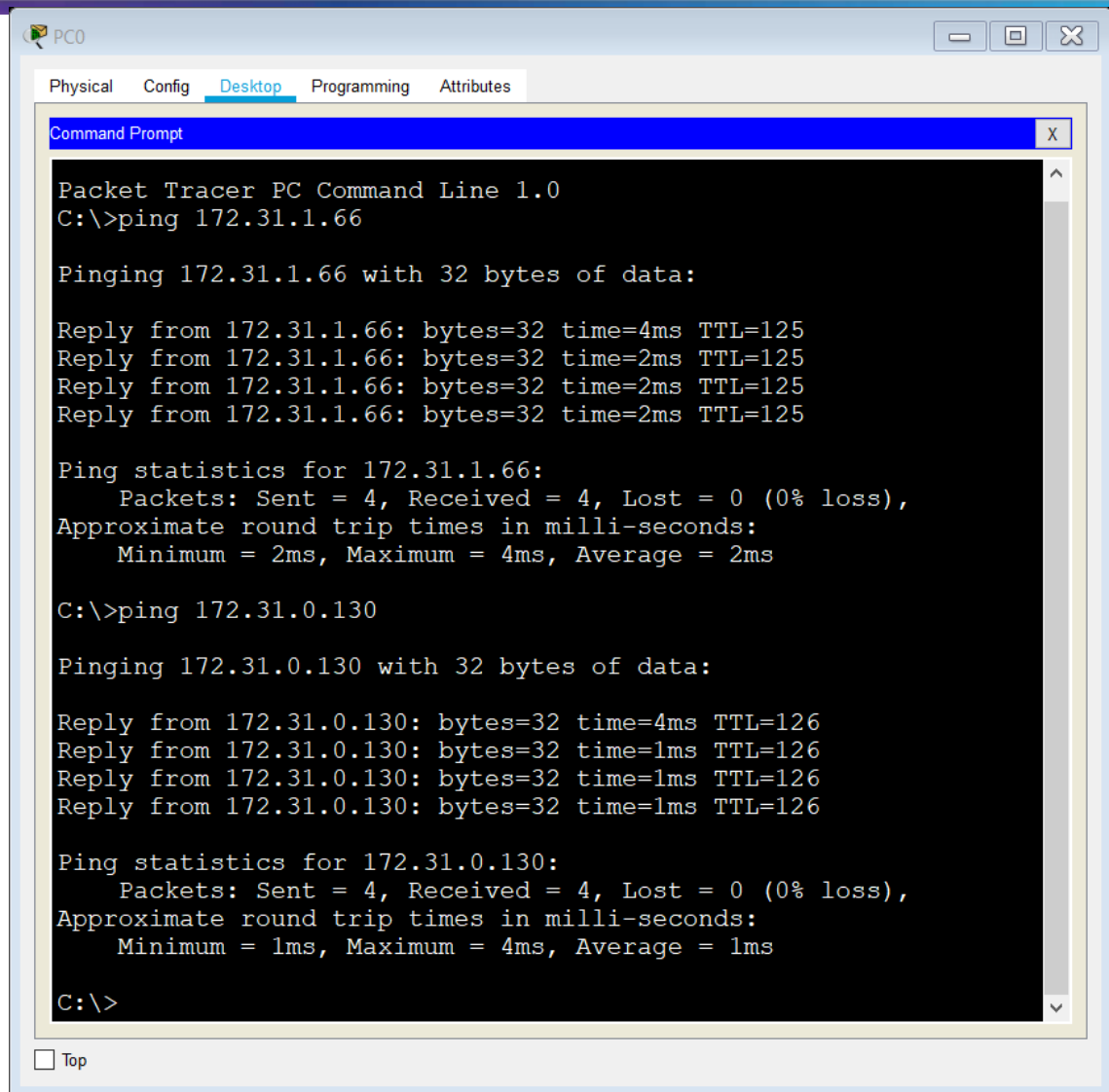
BUCARAMANGA(config)#access-list 111 permit ip 172.31.0.64 0.0.0.63
BUCARAMANGA(config)#int f0/0.30
BUCARAMANGA(config-subif)#ip access-group 111 in
BUCARAMANGA(config-subif)#
    
```



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

```

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



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

```

BUCARAMANGA(config-subif)#access-list 113 deny ip 172.31.2.0 0.0.0.7
172.31.0.0 0.0.0.63
BUCARAMANGA(config)#access-list 113 deny ip 172.31.0.64 0.0.0.63
172.31.0.0 0.0.0.63
BUCARAMANGA(config)#access-list 113 permit ip any any
BUCARAMANGA(config)#int f0/0.10
BUCARAMANGA(config-subif)#ip access-group 113 out
BUCARAMANGA(config-subif)#
  
```

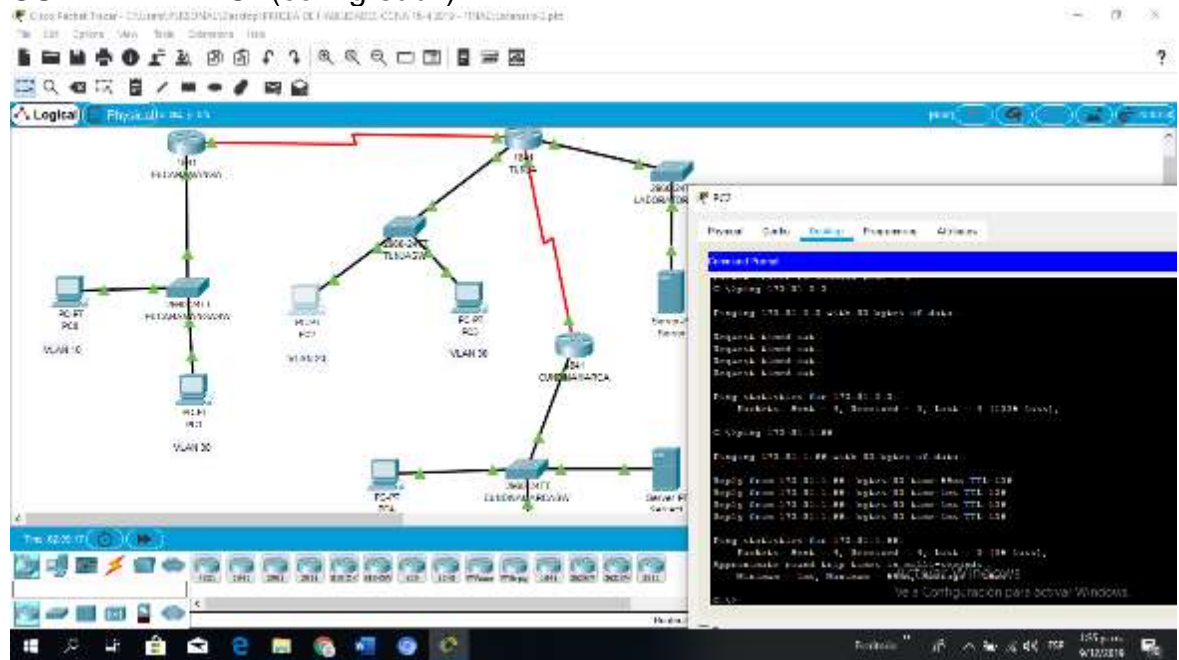
```

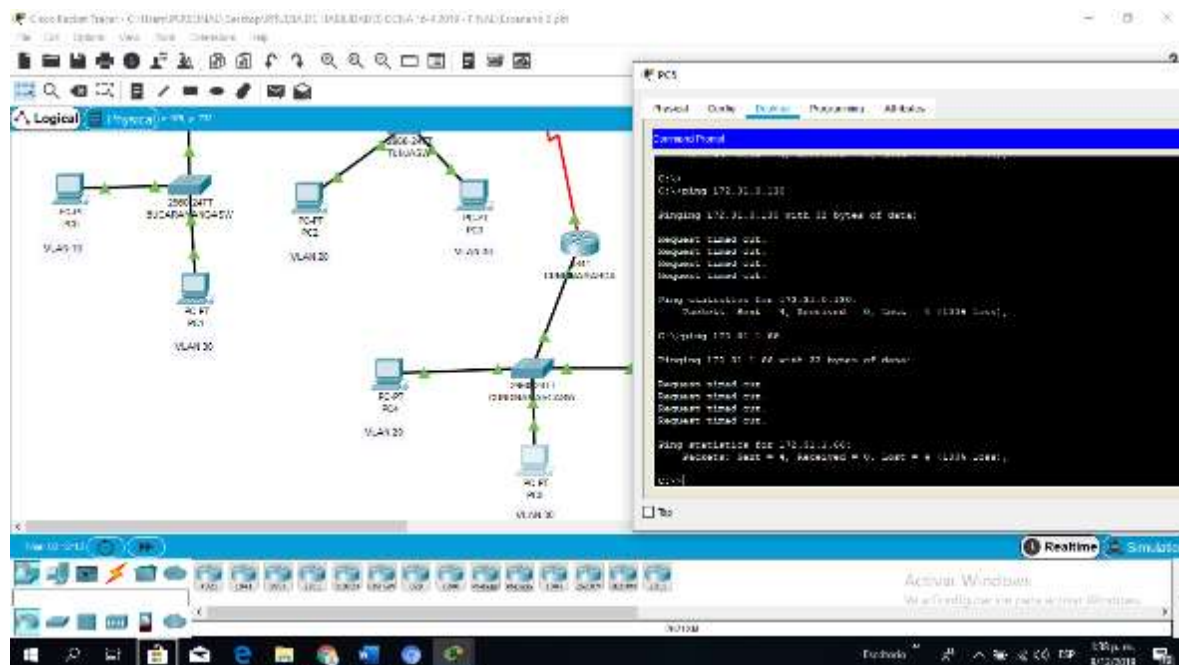
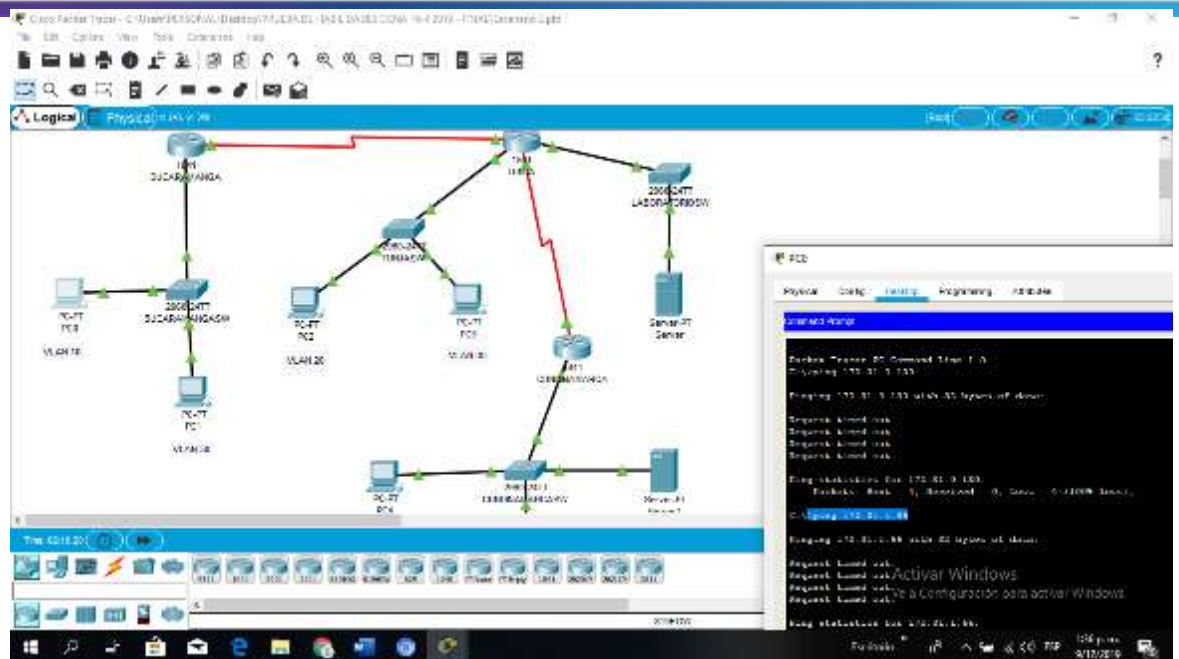
TUNJA(config)#access-list 113 deny ip 172.3.2.8 0.0.0.7 172.31.0.128 0.0.0.63
  
```



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

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





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

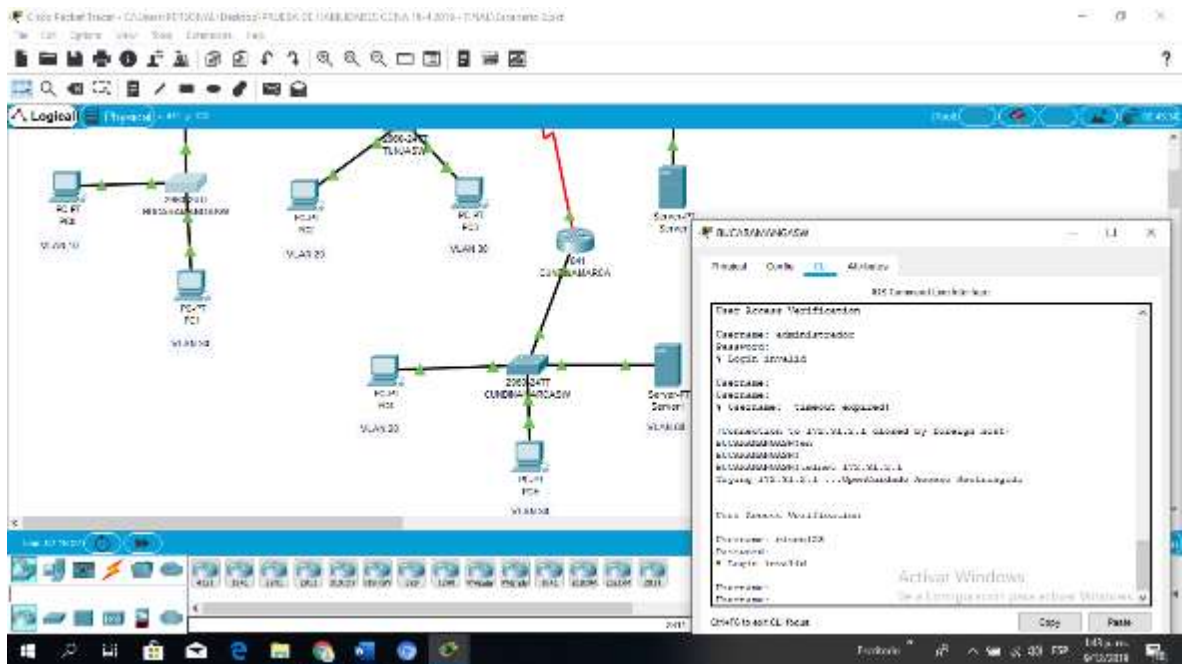
```

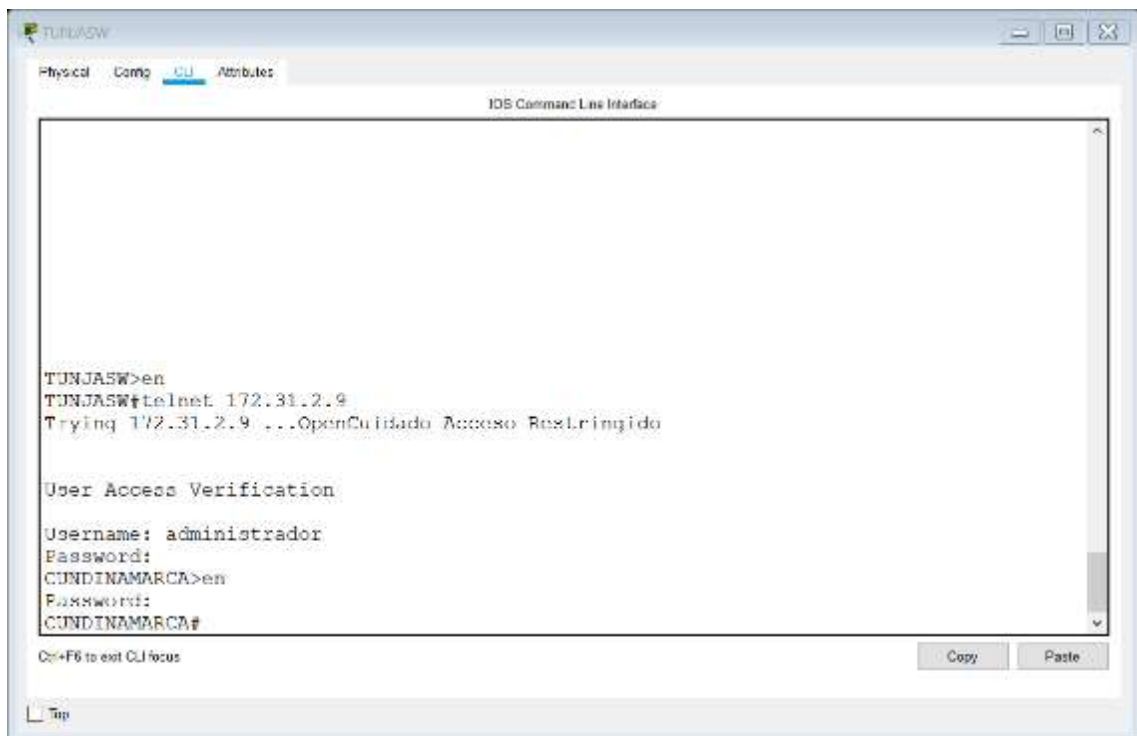
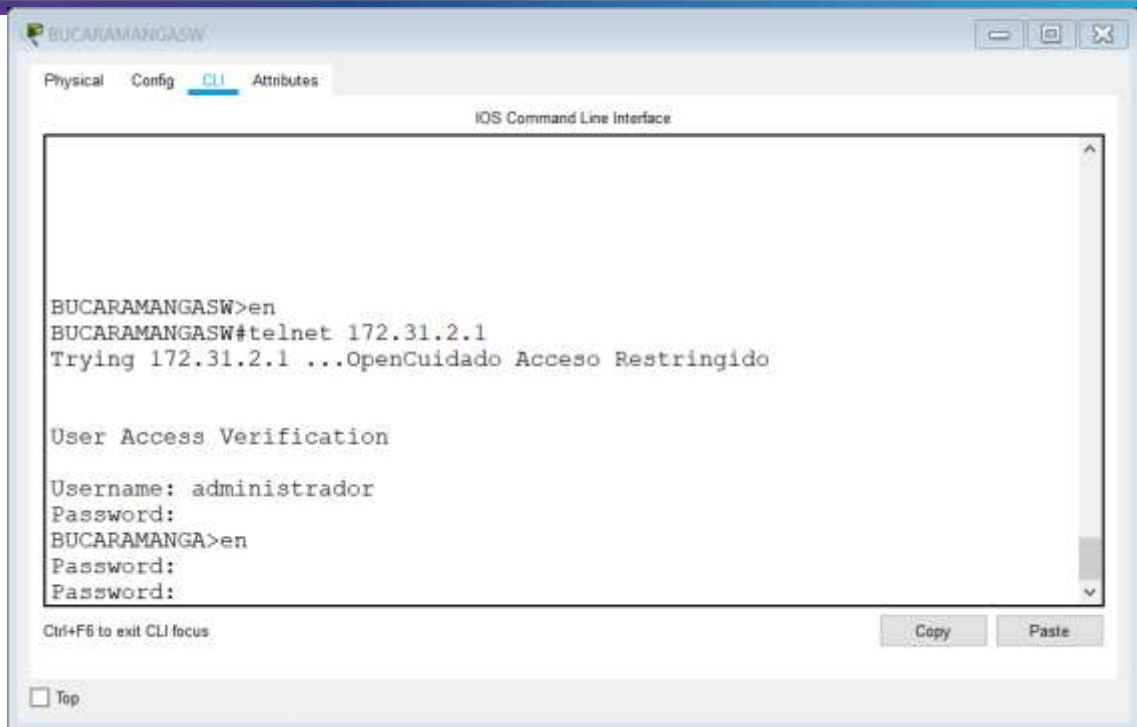
BUCARAMANGA(config-subif)#access-list 3 permit 172.31.2.0 0.0.0.7
BUCARAMANGA(config)#access-list 3 permit 172.3.2.8 0.0.0.7
BUCARAMANGA(config)#access-list 3 permit 172.31.2.8 0.0.0.7
  
```

```
BUCARAMANGA(config)#line vty 0 15
BUCARAMANGA(config-line)#access-class 3 in
BUCARAMANGA(config-line)#
```

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

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





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

## Conclusiones

Puedo concluir con el desarrollo del presente trabajo haber podido realizar la práctica mediante la configuración de las Vlans. Los puestos troncales de acceso, los encapsulamientos y seguridad en Swichs siguiendo los protocolos de conectividad para el transporte de datos sea o no admitida según la configuración. Se ha evidenciado la ejecución de la práctica realizando ping en los dispositivos para ver su funcionamiento como también se hizo la verificación en portal Web. De este modo se cumple lo propuesto en la guía de trabajo.

## Bibliografías

CISCO. (2014). Enrutamiento Dinámico. Principios de Enrutamiento y Conmutación. Recuperado de <https://static-course-assets.s3.amazonaws.com/RSE50ES/module7/index.html#7.0.1.1>

CISCO. (2014). OSPF de una sola área. Principios de Enrutamiento y Conmutación. Recuperado de <https://static-course-assets.s3.amazonaws.com/RSE50ES/module8/index.html#8.0.1.1>

CISCO. (2014). Listas de control de acceso. Principios de Enrutamiento y Conmutación. Recuperado de <https://static-course-assets.s3.amazonaws.com/RSE50ES/module9/index.html#9.0.1.1>

CISCO. (2014). DHCP. Principios de Enrutamiento y Conmutación. Recuperado de <https://static-course-assets.s3.amazonaws.com/RSE50ES/module10/index.html#10.0.1.1>

Vesga, J. (2014). Principios de Enrutamiento [OVA]. Recuperado de [https://1drv.ms/u/s!AmIJYei-NT1IhgOyjWeh6timi\\_Tm](https://1drv.ms/u/s!AmIJYei-NT1IhgOyjWeh6timi_Tm)