

EVALUACIÓN DE HABILIDADES PRÁCTICAS TAREA 11
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INFORME

OPCIÓN DE GRADO PARA INGENIERÍA ELECTRÓNICA

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RESUMEN

Se comienza analizando el planteamiento y obteniendo una topología lógica, según las necesidades de cantidad de usuarios, conexiones, y uso de la red; para luego continuar configurando los parámetros básicos de seguridad y direccionamiento de cada router y switch, así como los parámetros básicos de servicios y direccionamiento de los PC y servidores, pasando por el enrutamiento dinámico, DHCP, NAT, hasta listas de control de acceso ACL. Primero se tiene una red WAN con 3 routers con interfaces Ethernet y Serial, en donde primero se configuran los routers con configuraciones básicas y de contraseñas, además del direccionamiento, luego se desarrollan verificación de dispositivos vecinos, rutas, y conectividad en ciertos tramos, para luego configurar el protocolo de enrutamiento dinámico EIGRP, el cual permite que exista conectividad en todos los tramos, allí también se verifican vecinos EIGRP y se verifican las tablas de enrutamiento, para verificar que se agregaron rutas dinámicamente por EIGRP con el indicativo D; luego, una vez que se cuenta con conectividad total, se restringen ciertos paquetes, para implementar seguridad en la red, en donde ciertas redes LAN no pueden acceder a otras, excepto al servidor ubicado en una de esas LAN, esto se logra al implementar listas de control de acceso ACL, en ciertas interfaces, en determinadas direcciones, y a determinados protocolos y servicios.

Adicionalmente se tiene una red MAN, la cual accede a internet en la oficina central, por medio de una red Ethernet; allí se implementan políticas de seguridad un poco más fuertes, incluso desde la configuración básica de los routers, al implementar acceso con usuarios y contraseñas, un máximo de intentos para acceder, un máximo tiempo de permanencia, y un servidor tftp para hacer backups de cada router remotamente, también, se establece autenticación en el protocolo de enrutamiento dinámico OSPF al tener que configurar una misma contraseña en cada interfaz que se conecta con el vecino OSPF el cual deber tener configurada la misma contraseña; en esta red se configura un router como servidor DHCP solo para 2 de las 3 redes LAN; también se configura NAT para traducir las direcciones de la MAN, a una dirección IP global interna (publica), con la cual se accede a internet, implementando NAT y PAT; y finalmente se aplican listas de control de acceso ACL, principalmente a fin de que cada VLAN solo acceda a terminados sectores y servicios.

ABSTRACT

It begins by analyzing the problem and the logical topology, according to the need of number of users, connections, and use of the network; and then configuring the basic security and addressing parameters of each router and switch, as well as the basic services and addressing parameters of the PCs and servers, through dynamic routing, DHCP, NAT, up to ACL access control lists. First there is a WAN network with 3 routers with Ethernet and Serial interfaces, where first the routers with basic configurations and passwords are configured, in addition to the addressing, then, continue with verification of neighboring devices, the routes, and connectivity are verified in certain sections, to then configure the EIGRP dynamic routing protocol, which allows full connectivity in all sections, there, the EIGRP neighbors are verified and routing tables are verified, to verify that routes were dynamically added by EIGRP with the callsign D; then, once full connectivity is available, certain packets need to be restricted to implement network security, where, certain LAN networks cannot access others, except to the server located on one of those LANs, this is achieved by implementing of lists ACL access control, on certain interfaces, on certain addresses, and on certain protocols and services.

Additionally, there is a MAN network, which accesses the Internet in the head office, through an Ethernet network; there, a little stronger security policies are implemented, even from the basic configuration of the routers, when implementing access with users and passwords, a maximum of attempts to access, a maximum time of permanence, and a tftp server to make backups of each Router remotely, then, also establishes authentication in the OSPF dynamic routing protocol by having to configure the same password on each interface that it's connects to the OSPF neighbor, which must be the same password configured; then, in this network a router is configured as a DHCP server only for 2 of the 3 LAN networks; NAT is also configured to translate the addresses of the network MAN, to an internal (public) global IP address, with which the internet is accessed, implementing NAT and PAT; and finally ACL access control lists are applied, mainly so that each VLAN only accesses to a determinate sectors and services.

INTRODUCCIÓN

Las redes de telecomunicaciones son bastante complejas si se requiere que sean optimas y efectivas, comenzando por la creación de VLAN's, pasando por los protocolos de enrutamiento, hasta implementar políticas de seguridad para restringir el acceso desde y hacia ciertas zonas de la red, e incluso restringir las conexiones externas para ciertas subredes. Además, existen muchas configuraciones adicionales, tanto en la configuración básica, como en el enrutamiento, para añadir cierto nivel de seguridad; incluso las listas de acceso ACL se pueden configurar de diferentes maneras, a fin añadir seguridad a la red, sin comprometer rendimiento. Con todo esto se analizan prácticamente, aspectos y comandos necesarios y opcionales, como DHCP, NAT, contraseñas, enrutamiento EIGRP y OSPF, aplicables a los routers cisco, y configuraciones de VLAN que se aplican a los switch.

OBJETIVOS

General:

Demostrar las habilidades adquiridas durante el tiempo de estudio de los módulos establecidos en los cursos CP CCNA1 I-2018yCP CCNA2 I-2018, a través de cuestionarios y casos prácticos elaborados en la herramienta de simulación Packet Tracer.

Específicos:

- Determinar los equipos requeridos para establecer la topología de red.
- Configurar los equipos y conectarlos de acuerdo a los requerimientos establecidos en la guía de actividades.
- Poner en práctica las habilidades y conocimientos adquiridos sobre OSPFv2, enrutamiento, VLAN, NAT, Access Lists entre otros.
- Elaborar el informe final, acompañado de las respectivas evidencias de configuración de los dispositivos.

Escenario 1

Una empresa posee sucursales distribuidas en las ciudades de Bogotá, Medellín y Cali en donde el estudiante será el administrador de la red, el cual deberá configurar e interconectar entre sí cada uno de los dispositivos que forman parte del escenario, acorde con los lineamientos establecidos para el direccionamiento IP, protocolos de enrutamiento y demás aspectos que forman parte de la topología de red.

Topología de red

Los requerimientos solicitados son los siguientes:

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

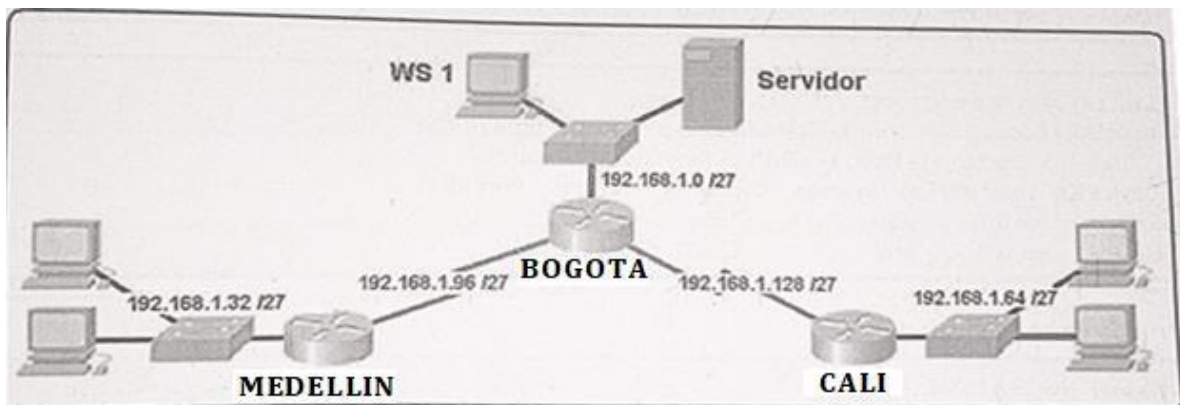
Parte 2: Considerar la asignación de los parámetros básicos y la detección de vecinos directamente conectados.

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

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

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

Parte 6: Configuración final.



Desarrollo

Como trabajo inicial se debe realizar lo siguiente.

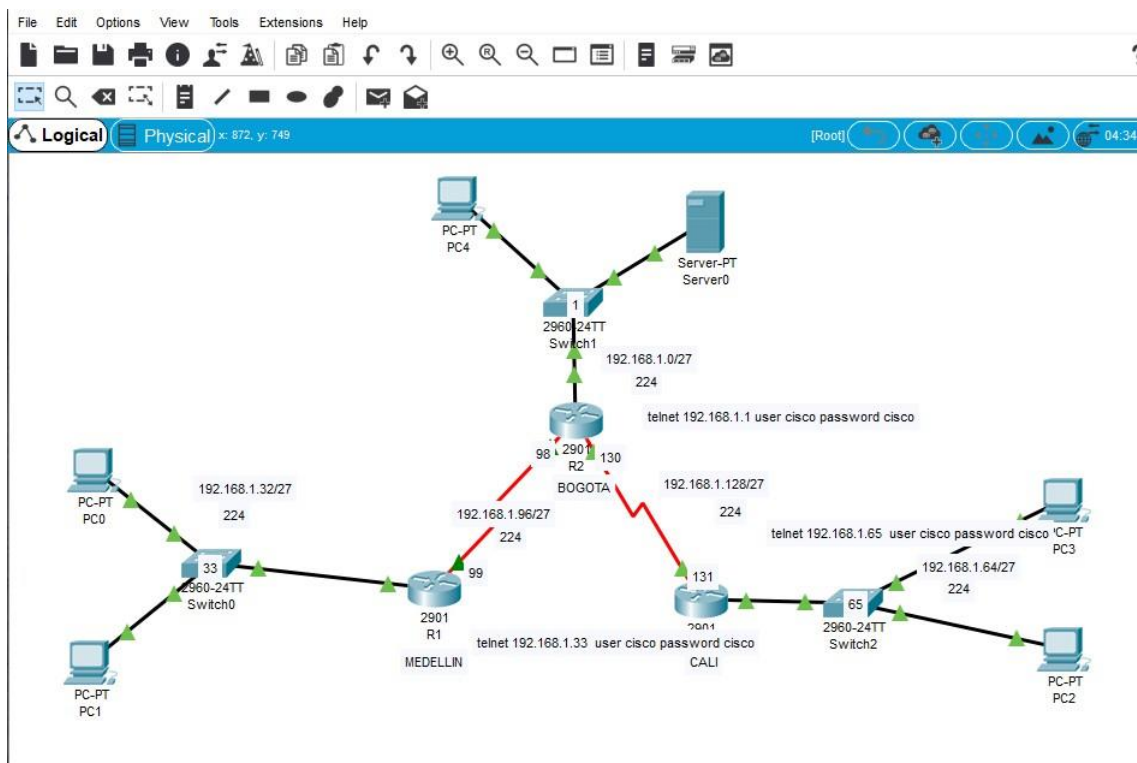
- Realizar las rutinas de diagnóstico y dejar los equipos listos para su configuración (asignar nombres de equipos, asignar claves de seguridad, etc).

- Realizar la conexión 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.



Parte 2: Configuración Básica.

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

	R1	R2	R3
Nombre de Host	MEDELLIN	BOGOTA	CALI
Dirección de Ip en interfaz Serial 0/0	192.168.1.99	192.168.1.98	192.168.1.131

Dirección de Ip en interfaz Serial 0/1	192.168.1.130		
Dirección de Ip en interfaz FA 0/0	192.168.1.33	192.168.1.1	192.168.1.65
Protocolo de enrutamiento	Eigrp	Eigrp	Eigrp
Sistema Autónomo	200	200	200
Afirmaciones de red	192.168.1.0	192.168.1.0	192.168.1.0

Bogota

Physical Config CLI Attributes

IOS Command Line Interface

```

spanning-tree mode pvst
!
!
!
!
!
!
interface GigabitEthernet0/0
ip address 192.168.1.1 255.255.255.224
duplex auto
speed auto
!
interface GigabitEthernet0/1
no ip address
duplex auto
speed auto
shutdown
!
interface Serial0/0/0
ip address 192.168.1.98 255.255.255.224
!
interface Serial0/0/1
ip address 192.168.1.130 255.255.255.224
clock rate 2000000
!
interface Vlan1
no ip address
shutdown

```

MEDELLIN

Physical Config CLI Attributes

IOS Command Line Interface

```

!
!
!
interface GigabitEthernet0/0
ip address 192.168.1.33 255.255.255.224
duplex auto
speed auto
!
interface GigabitEthernet0/1
no ip address
duplex auto
speed auto
shutdown
!
interface Serial0/0/0
ip address 192.168.1.99 255.255.255.224
clock rate 2000000
!
interface Serial0/0/1
no ip address
clock rate 2000000
shutdown

```

```
!
!
interface GigabitEthernet0/0
ip address 192.168.1.65 255.255.255.224
duplex auto
speed auto
!
interface GigabitEthernet0/1
no ip address
duplex auto
speed auto
shutdown
!
interface Serial0/0/0
ip address 192.168.1.131 255.255.255.224
!
interface Serial0/0/1
no ip address
clock rate 2000000
```

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.

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

Gateway of last resort is not set

      192.168.1.0/24 is variably subnetted, 8 subnets, 2 masks
C       192.168.1.0/27 is directly connected, GigabitEthernet0/0
L       192.168.1.1/32 is directly connected, GigabitEthernet0/0
D       192.168.1.32/27 [90/2172416] via 192.168.1.99, 00:11:35,
Serial0/0/0
D       192.168.1.64/27 [90/2172416] via 192.168.1.131, 00:11:36,
Serial0/0/1
C       192.168.1.96/27 is directly connected, Serial0/0/0
L       192.168.1.98/32 is directly connected, Serial0/0/0
C       192.168.1.128/27 is directly connected, Serial0/0/1
L       192.168.1.130/32 is directly connected, Serial0/0/1

Bogota(config)#
```

Ctrl+F6 to exit CLI focus

Copy Paste

Physical Config CLI Attributes

IOS Command Line Interface

```

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

Gateway of last resort is not set

192.168.1.0/24 is variably subnetted, 7 subnets, 2 masks
D 192.168.1.0/27 [90/2172416] via 192.168.1.98, 00:12:13,
Serial0/0/0
C 192.168.1.32/27 is directly connected, GigabitEthernet0/0
L 192.168.1.33/32 is directly connected, GigabitEthernet0/0
D 192.168.1.64/27 [90/2684416] via 192.168.1.98, 00:12:13,
Serial0/0/0
C 192.168.1.96/27 is directly connected, Serial0/0/0
L 192.168.1.99/32 is directly connected, Serial0/0/0
D 192.168.1.128/27 [90/2681856] via 192.168.1.98, 00:12:13,
Serial0/0/0
Medellin(config)#

```

Physical Config CLI Attributes

IOS Command Line Interface

```

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

Gateway of last resort is not set

192.168.1.0/24 is variably subnetted, 7 subnets, 2 masks
D 192.168.1.0/27 [90/2172416] via 192.168.1.130, 00:14:59,
Serial0/0/0
D 192.168.1.32/27 [90/2684416] via 192.168.1.130, 00:14:58,
Serial0/0/0
C 192.168.1.64/27 is directly connected, GigabitEthernet0/0
L 192.168.1.65/32 is directly connected, GigabitEthernet0/0
D 192.168.1.96/27 [90/2681856] via 192.168.1.130, 00:14:58,
Serial0/0/0
C 192.168.1.128/27 is directly connected, Serial0/0/0
L 192.168.1.131/32 is directly connected, Serial0/0/0

```

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

```

Bogota#sh cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route
Bridge
                S - Switch, H - Host, I - IGMP, r - Repeater, P
- Phone
Device ID      Local Intrfce  Holdtme    Capability   Platform
Port ID
Switch         Gig 0/0        155        S            2960
Fas 0/1
Router         Ser 0/0/1      163        R            C2900
Ser 0/0/0
Medellin       Ser 0/0/0      155        R            C2900
Ser 0/0/0
Bogota#

```

```

Medellin#SHOW CDp ne
Medellin#SHOW CDP neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route
Bridge
                S - Switch, H - Host, I - IGMP, r - Repeater, P
- Phone
Device ID      Local Intrfce  Holdtme    Capability   Platform
Port ID
Switch         Gig 0/0        122        S            2960
Fas 0/1
Bogota         Ser 0/0/0      130        R            C2900
Ser 0/0/0
Medellin#

```

```

Router#sh cdp ne
Router#sh cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route
Bridge
                S - Switch, H - Host, I - IGMP, r - Repeater, P
- Phone
Device ID      Local Intrfce  Holdtme    Capability   Platform
Port ID
Switch         Gig 0/0        134        S            2960
Fas 0/1
Bogota         Ser 0/0/0      142        R            C2900
Ser 0/0/1
Router#

```

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

```

C:\>
C:\>
C:\>ping 192.168.1.35

Pinging 192.168.1.35 with 32 bytes of data:

Reply from 192.168.1.35: bytes=32 time<1ms TTL=128
Reply from 192.168.1.35: bytes=32 time<1ms TTL=128
Reply from 192.168.1.35: bytes=32 time<1ms TTL=128
Reply from 192.168.1.35: bytes=32 time<1ms TTL=128

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

C:\>

```

```

Pinging 192.168.1.67 with 32 bytes of data:

Reply from 192.168.1.67: bytes=32 time=2ms TTL=128
Reply from 192.168.1.67: bytes=32 time=1ms TTL=128
Reply from 192.168.1.67: bytes=32 time<1ms TTL=128
Reply from 192.168.1.67: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.67:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss)
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 2ms, Average = 0ms

C:\>|

```

```

Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:


Reply from 192.168.1.3: bytes=32 time=1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128

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

```

Parte 3: Configuración de Enrutamiento.

- a. Asignar el protocolo de enrutamiento EIGRP a los Routers considerando el direccionamiento diseñado.

 BOGOTÁ

```

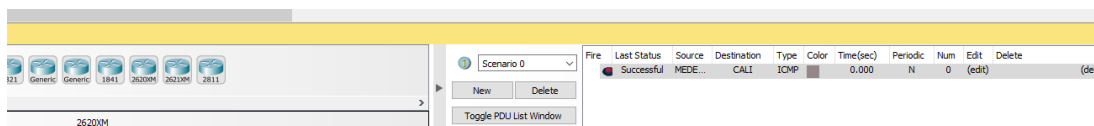
Physical  Config  CLI  Attributes
-----
IOS Command Line Interface
interface Serial0/0/1
ip address 192.168.1.130 255.255.255.224
clock rate 2000000
!
interface Vlan1
no ip address
shutdown
!
router eigrp 200
network 192.168.1.0 0.0.0.31
network 192.168.1.96 0.0.0.31
network 192.168.1.128 0.0.0.31
.

```

```
MEDELLIN
Physical Config CLI Attributes
IOS Command Line Interface
shutdown
!
interface GigabitEthernet0/1/0
  no ip address
  shutdown
!
interface Vlan1
  no ip address
  shutdown
!
router eigrp 200
  network 192.168.1.32 0.0.0.31
  network 192.168.1.96 0.0.0.31
```

```
CALI
Physical Config CLI Attributes
IOS Command Line Interface
!
interface Vlan1
  no ip address
  shutdown
!
router eigrp 200
  network 192.168.1.128 0.0.0.31
  network 192.168.1.64 0.0.0.31
!
```

b. Verificar si existe vecindad con los Routers configurados con EIGRP.



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

PC3

Physical Config Desktop Programming Attributes

Command Prompt

```
C:\>ping 192.168.1.35

Pinging 192.168.1.35 with 32 bytes of data:

Reply from 192.168.1.35: bytes=32 time=2ms TTL=125
Reply from 192.168.1.35: bytes=32 time=2ms TTL=125
Reply from 192.168.1.35: bytes=32 time=2ms TTL=125
Reply from 192.168.1.35: bytes=32 time=2ms TTL=125

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

C:\>ping 192.168.1.34

Pinging 192.168.1.34 with 32 bytes of data:

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

Ping statistics for 192.168.1.34:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
```

Top

PC3

Physical Config Desktop Programming Attributes

Command Prompt

```
Reply from 192.168.1.3: bytes=32 time=6ms 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
Reply from 192.168.1.3: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 6ms, Average = 2ms

C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time=7ms 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
Reply from 192.168.1.2: bytes=32 time=34ms TTL=126

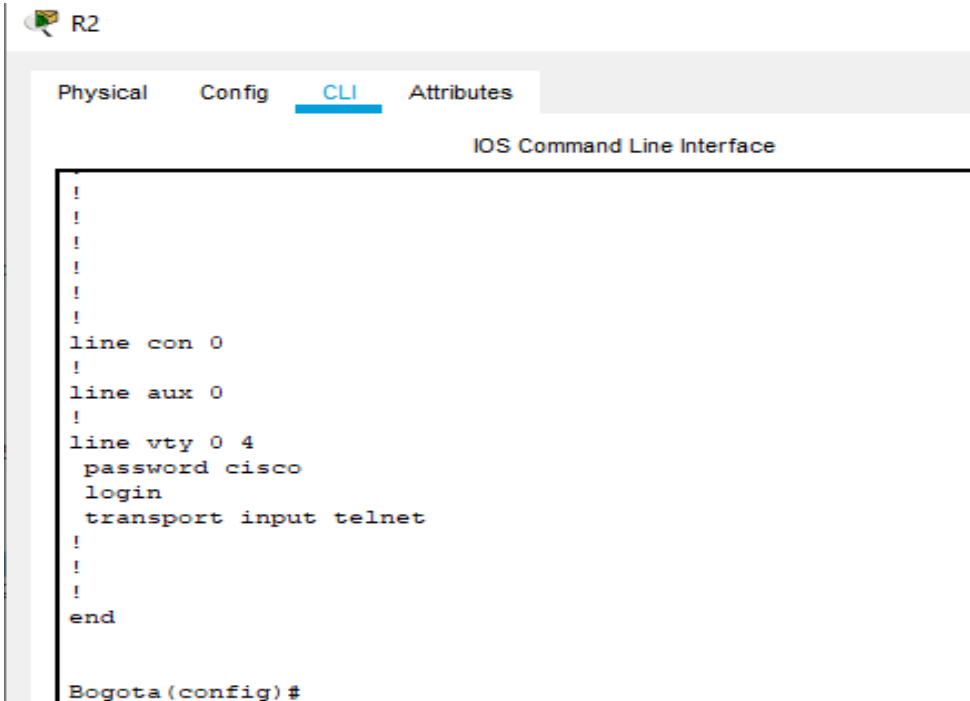
Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 34ms, Average = 10ms
```

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

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

Las condiciones para crear las ACL son las siguientes:

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



The screenshot shows the CLI interface for router R2. The tabs at the top are Physical, Config, CLI (selected), and Attributes. The title is "IOS Command Line Interface". The configuration text is as follows:

```
!  
!  
!  
!  
!  
!  
line con 0  
!  
line aux 0  
!  
line vty 0 4  
  password cisco  
  login  
  transport input telnet  
!  
!  
!  
end  
Bogota(config)#
```



The screenshot shows the CLI interface for router R3. The tabs at the top are Physical, Config, CLI (selected), and Attributes. The title is "IOS Command Line Interface". The configuration text is as follows:

```
!  
!  
!  
!  
line con 0  
!  
line aux 0  
!  
line vty 0 4  
  password cisco  
  login  
  transport input telnet  
!  
!  
!  
end  
Cali(config)#
```

```
!
line con 0
!
line aux 0
!
line vty 0 4
  password cisco
  login
  transport input telnet
!
!
!
end
```

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.

```
Packet Tracer SERVER Command Line 1.0
C:\>
C:\>ping 192.168.1.35

Pinging 192.168.1.35 with 32 bytes of data:

Reply from 192.168.1.35: bytes=32 time=9ms TTL=126
Reply from 192.168.1.35: bytes=32 time=1ms TTL=126
Reply from 192.168.1.35: bytes=32 time=1ms TTL=126
Reply from 192.168.1.35: bytes=32 time=2ms TTL=126

Ping statistics for 192.168.1.35:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 9ms, Average = 3ms

C:\>ping 192.168.1.34

Pinging 192.168.1.34 with 32 bytes of data:

Reply from 192.168.1.34: bytes=32 time=1ms TTL=126
Reply from 192.168.1.34: bytes=32 time=30ms TTL=126
Reply from 192.168.1.34: bytes=32 time=1ms TTL=126
Reply from 192.168.1.34: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.1.66:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 11ms, Average = 4ms

C:\>ping 192.168.1.67

Pinging 192.168.1.67 with 32 bytes of data:

Reply from 192.168.1.67: bytes=32 time=1ms TTL=126
Reply from 192.168.1.67: bytes=32 time=1ms TTL=126
Reply from 192.168.1.67: bytes=32 time=1ms TTL=126
Reply from 192.168.1.67: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.1.67:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms
```

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.

PC3

```
Physical  Config  Desktop  Programming  Attributes

Command Prompt

Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

Reply from 192.168.1.3: bytes=32 time=1ms TTL=126
Reply from 192.168.1.3: bytes=32 time=1ms TTL=126
Reply from 192.168.1.3: bytes=32 time=3ms 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 = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 3ms, Average = 1ms

C:\>|
```

PC2

```
Physical  Config  Desktop  Programming  Attributes

Command Prompt

Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

Reply from 192.168.1.3: bytes=32 time=3ms TTL=126
Reply from 192.168.1.3: bytes=32 time=2ms TTL=126
Reply from 192.168.1.3: bytes=32 time=1ms TTL=126
Reply from 192.168.1.3: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 3ms, Average = 1ms

C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Request timed out.

|
```

PC0

```
Physical  Config  Desktop  Programming  Attributes

Command Prompt

Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

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

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

C:\>ping 192.168.1.66

Pinging 192.168.1.66 with 32 bytes of data:
```

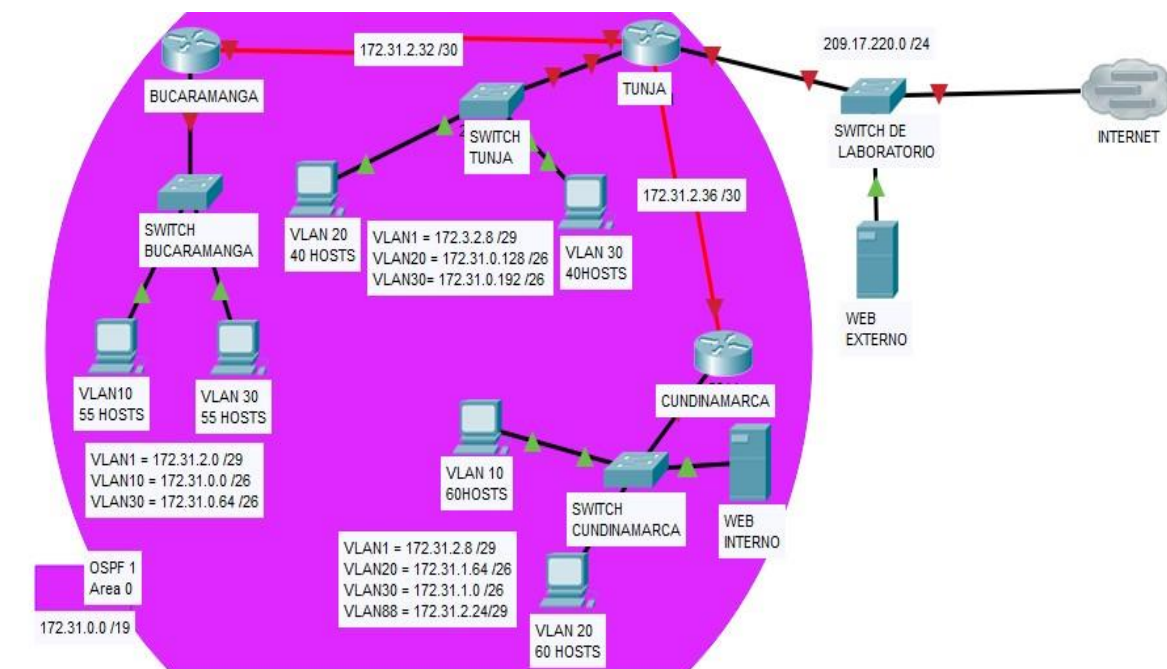
Parte 5: Comprobación de la red instalada.

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.

	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	

Escenario 2



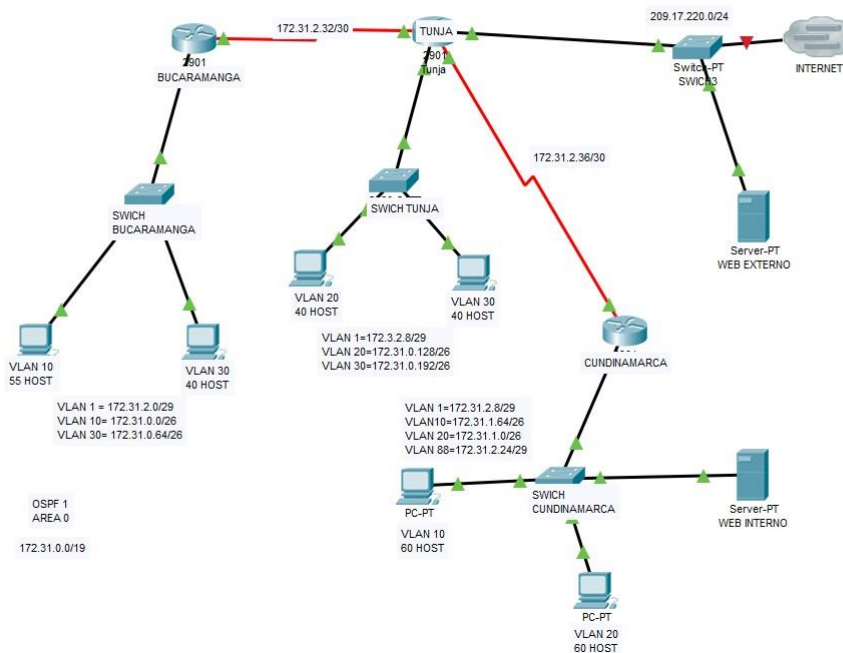
Una empresa tiene la conexión a internet en una red Ethernet, lo cual deben adaptarlo para facilitar que sus Routers y las redes que incluyen puedan, por esa vía, conectarse a internet, pero empleando las direcciones de la red LAN original.

Desarrollo

Los siguientes son los requerimientos necesarios:

- Todos los Routers deberán tener los siguiente:
- Configuración básica.
- Autenticación local con AAA.
- Cifrado de contraseñas.
- Un máximo de internos para acceder al router.
- Máximo tiempo de acceso al detectar ataques.
- Establezca un servidor TFTP y almacene todos los archivos necesarios de los Routers.
- El DHCP deberá proporcionar solo direcciones a los hosts de Bucaramanga y Cundinamarca

- El web server deberá tener NAT estático y el resto de los equipos de la topología emplearan NAT de sobrecarga (PAT).
- El enrutamiento deberá tener autenticación.
- Listas de control de acceso:
- Los hosts de VLAN 20 en Cundinamarca no acceden a internet, solo a la red interna de Tunja.
- Los hosts de VLAN 10 en Cundinamarca si acceden a internet y no a la red interna de Tunja.
- Los hosts de VLAN 30 en Tunja solo acceden a servidores web y ftp de internet.
- Los hosts de VLAN 20 en Tunja solo acceden a la VLAN 20 de Cundinamarca y VLAN 10 de Bucaramanga.
- Los hosts de VLAN 30 de Bucaramanga acceden a internet y a cualquier equipo de VLAN 10.
- Los hosts de VLAN 10 en Bucaramanga acceden a la red de Cundinamarca (VLAN 20) y Tunja (VLAN 20), no internet.
- Los hosts de una VLAN no pueden acceder a los de otra VLAN en una ciudad.
- Solo los hosts de las VLAN administrativas y de la VLAN de servidores tienen acceso a los Routers e internet.
- 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



- **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)# 27
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
```

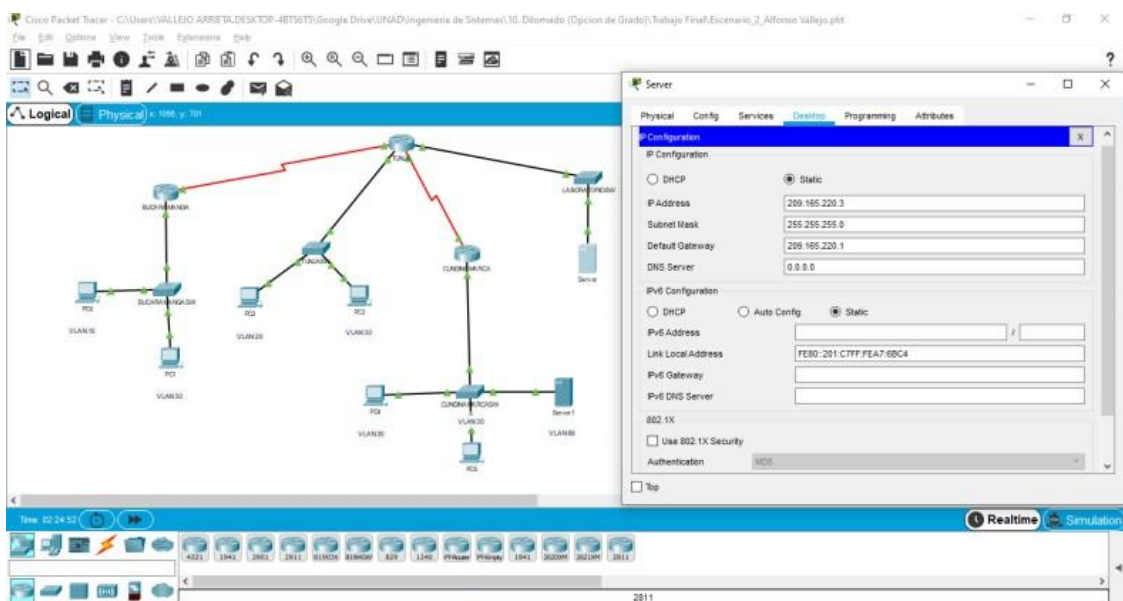
- **Un máximo de internos para acceder al router.**

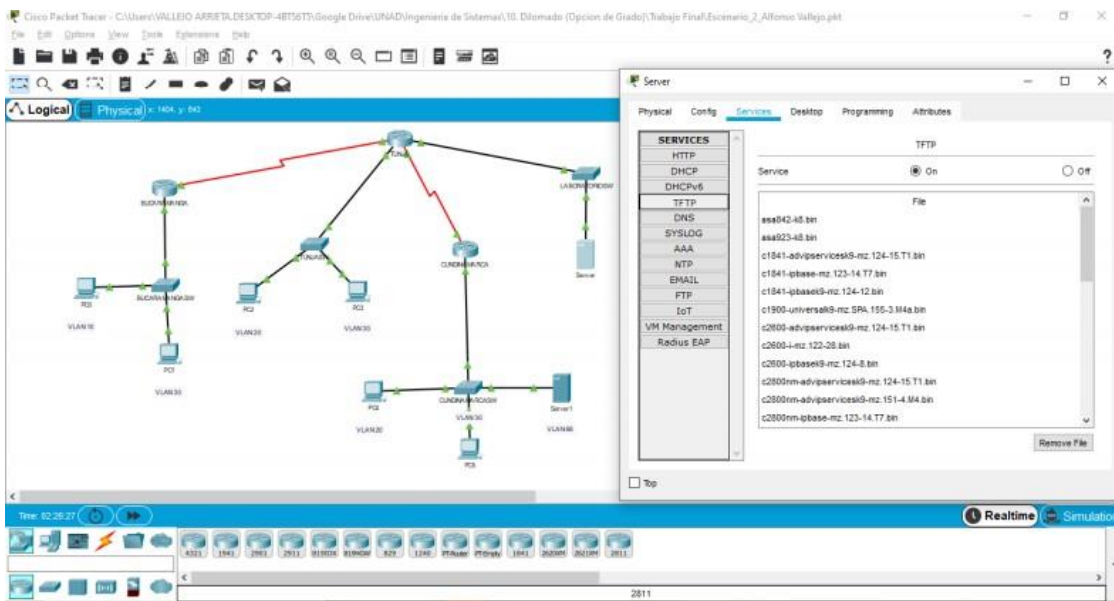
```
BUCARAMANGA(config-line)#login block-for 5 attempts 4
within 60 TUNJA(config-line)#login block-for 5 attempts
4 within 60
CUNDINAMARCA(config-line)#login block-for 5 attempts 4
within 60 32
```

- **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)# 34
```

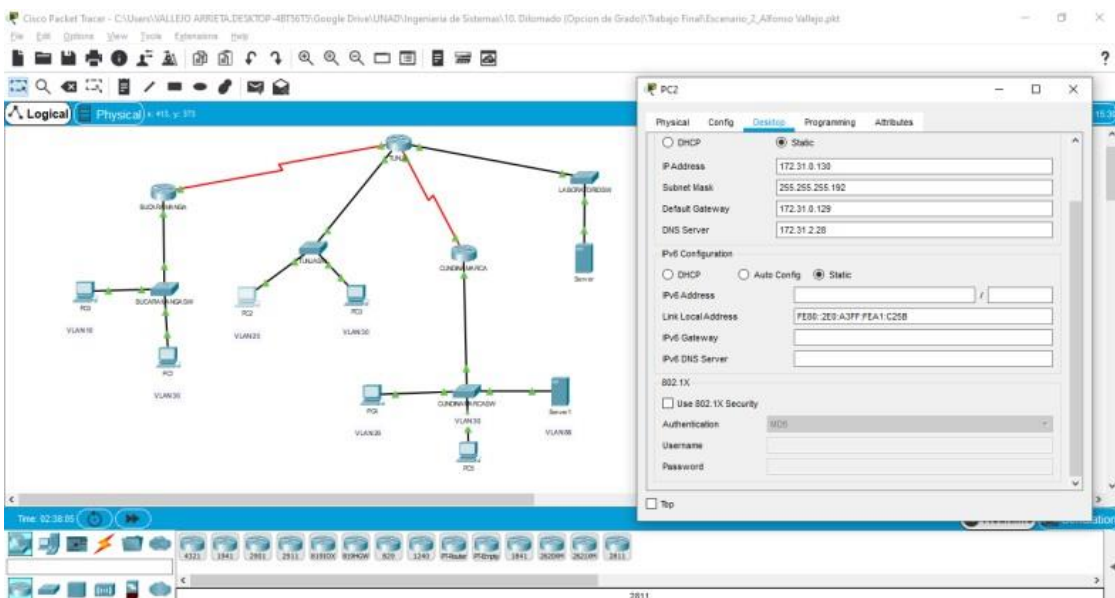
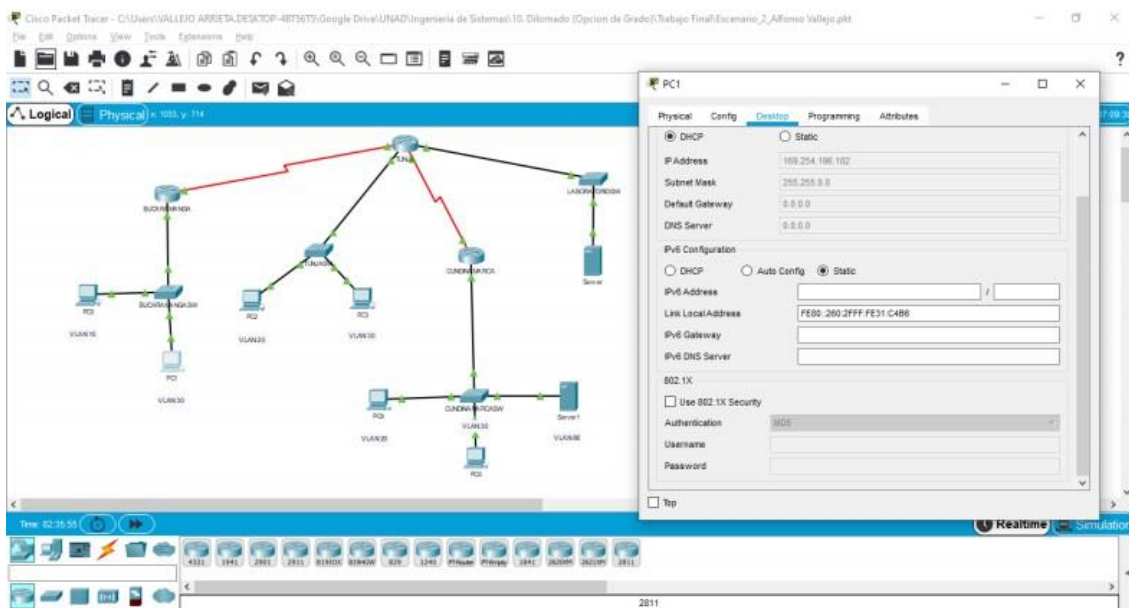
```
BUCARAMANGA (config)#int f0/0.10
BUCARAMANGA (config-subif)#ip helper-address 172.31.2.33
BUCARAMANGA (config-subif)#int f0/0.30
BUCARAMANGA (config-subif)#ip helper-address 172.31.2.33
```



```

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#

```



Cisco Packet Tracer - C:\Users\WALLEJO ARRIETA\DESKTOP-4BT36T5\Google Drive\UNAD\Ingeniería de Sistemas\10. Diplomado (Opción de Grado)\Trabajo Final\Escenario_2_Alfonso Vallejo.pkt

File Edit Options View Tools Extensions Help

Logical Physical = 115, y: 171

Time: 02:39:41

2011

PC1

Physical Config Desktop Programming Attributes

DHCP Static

IP Address: 172.31.0.194

Subnet Mask: 255.255.255.192

Default Gateway: 172.31.0.193

DNS Server: 172.31.2.28

IPv6 Configuration

DHCP Auto Config Static

IPv6 Address: /

Link Local Address: FE80::2D9:BAFF:FECB:4C9A

IPv6 Gateway: /

IPv6 DNS Server: /

802.1X

Use 802.1X Security

Authentication: RADIUS

Username: /

Password: /

Top

Cisco Packet Tracer - C:\Users\WALLEJO ARRIETA\DESKTOP-4BT36T5\Google Drive\UNAD\Ingeniería de Sistemas\10. Diplomado (Opción de Grado)\Trabajo Final\Escenario_2_Alfonso Vallejo.pkt

File Edit Options View Tools Extensions Help

Logical Physical = 117, y: 110

Time: 02:45:37

1841

PC4

Physical Config Desktop Programming Attributes

DHCP Static

IP Address: 172.31.1.88

Subnet Mask: 255.255.255.192

Default Gateway: 172.31.1.85

DNS Server: 172.31.2.28

IPv6 Configuration

DHCP Auto Config Static

IPv6 Address: /

Link Local Address: FE80::2D1:42FF:FE16:70E1

IPv6 Gateway: /

IPv6 DNS Server: /

802.1X

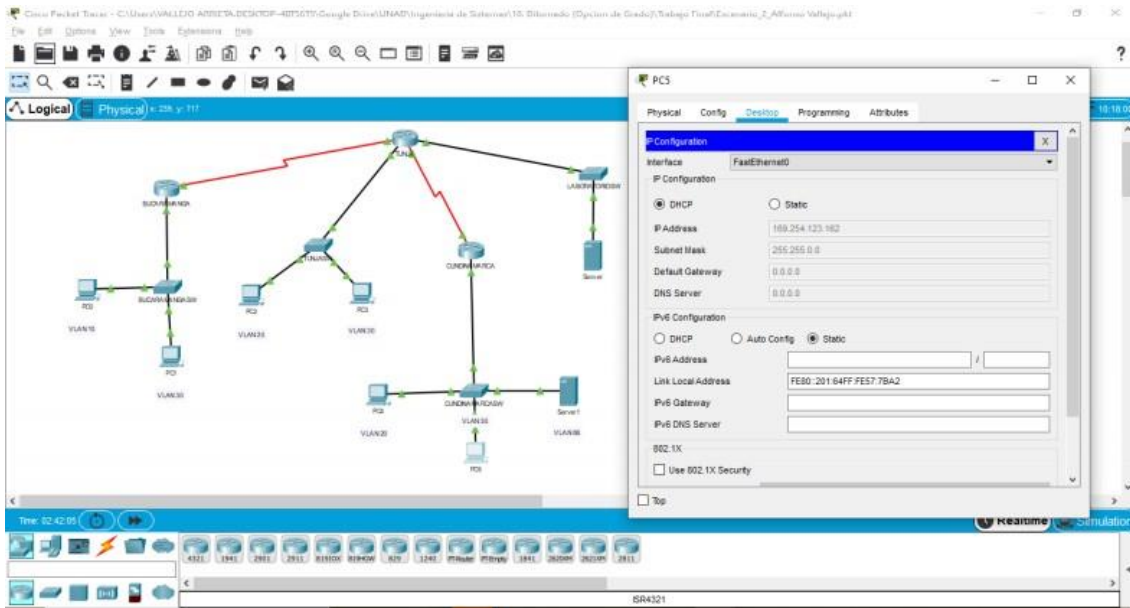
Use 802.1X Security

Authentication: RADIUS

Username: /

Password: /

Top



- 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
```

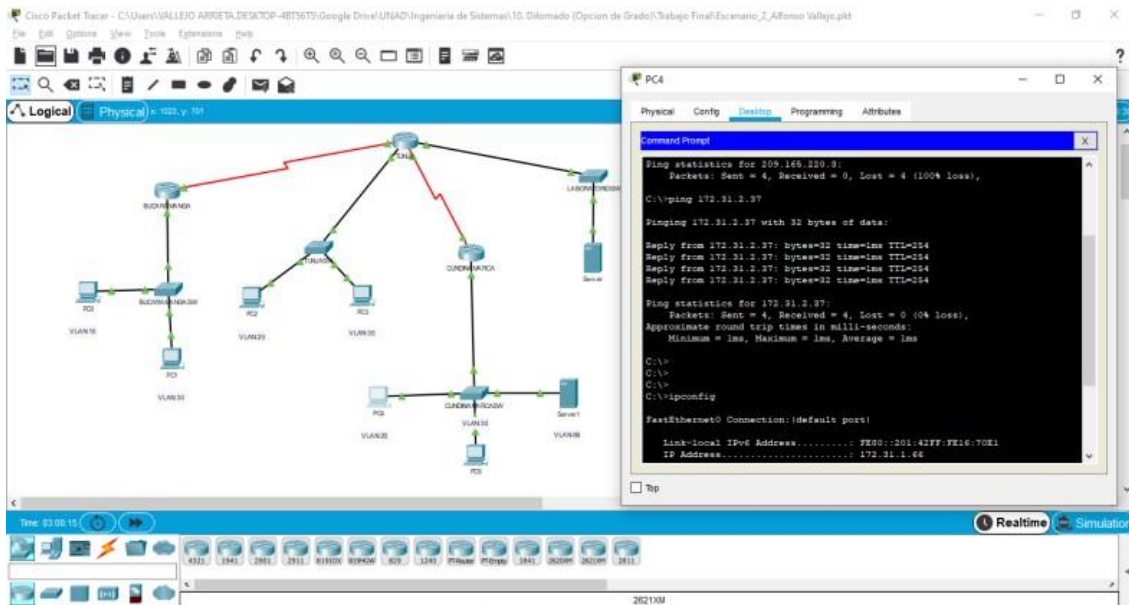
```
O 172.31.2.0/29 [110/129] via 172.31.2.37, 00:24:15,
Serial0/0/0
```

```
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
```

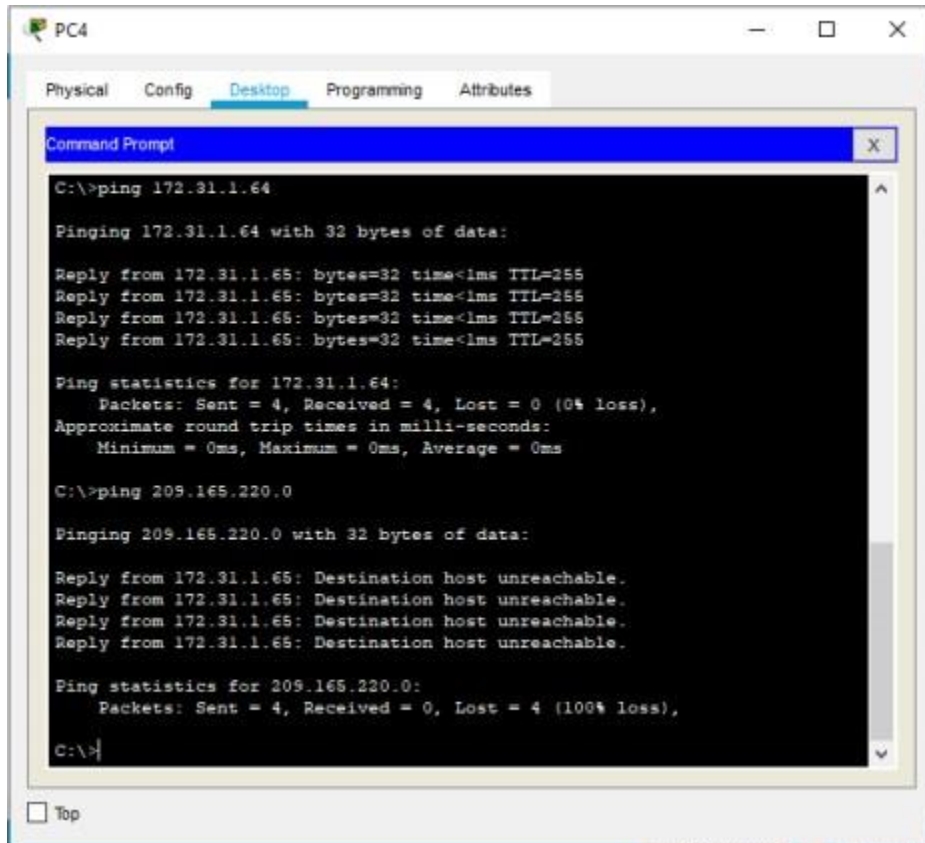
```
TUNJA#conf t Enter configuration commands, one per line.
End with CNTL/Z. TUNJA(config)#int s0/0/0
TUNJA(config-if)#ip ospf authentication message-digest
TUNJA(config-if)#ip ospf message-digest-key 1 md5 cisco123
TUNJA(config-if)#int s0/0/1
TUNJA(config-if)#ip ospf authentication message-digest
TUNJA(config-if)#ip 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: Los hosts de VLAN 20 en Cundinamarca no acceden a internet, solo a la red interna de Tunja.**

```
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 10 en Cundinamarca si acceden a internet y no 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)#
```



```
Physical Config Desktop Programming Attributes
Command Prompt
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 209.165.220.3
Pinging 209.165.220.3 with 32 bytes of data:
Reply from 209.165.220.3: bytes=32 time=1ms TTL=126
Reply from 209.165.220.3: bytes=32 time=1ms TTL=126
Reply from 209.165.220.3: bytes=32 time=1ms TTL=126
Reply from 209.165.220.3: bytes=32 time=1ms TTL=126

Ping statistics for 209.165.220.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>
```

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

```
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)#
```

```
Physical  Config  Desktop  Programming  Attributes
Command Prompt
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 209.165.220.3

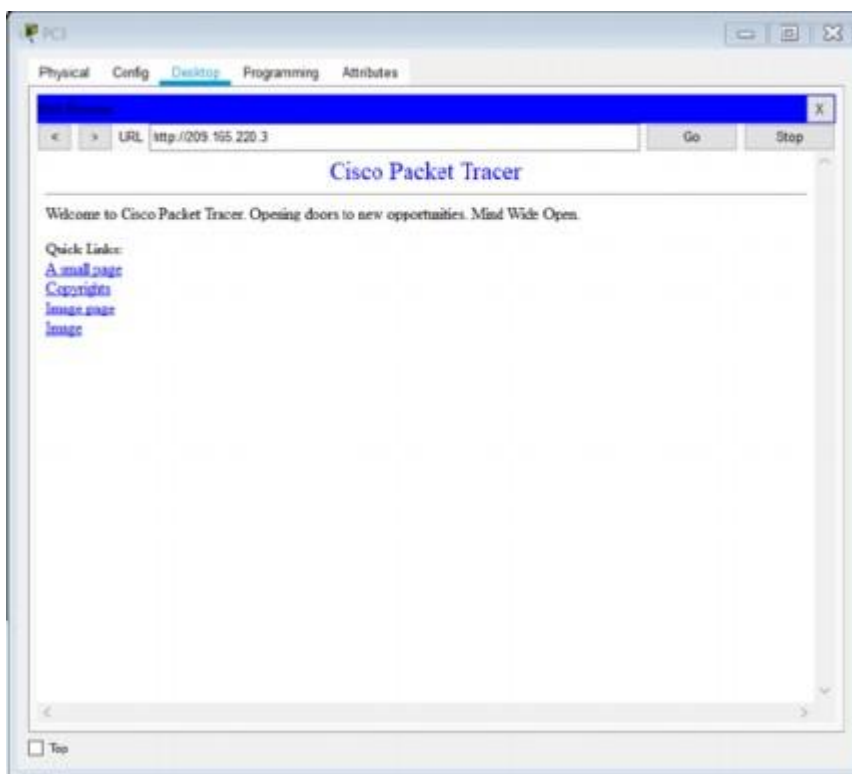
Pinging 209.165.220.3 with 32 bytes of data:

Reply from 172.31.0.193: Destination host unreachable.
Reply from 172.31.0.193: Destination host unreachable.
Reply from 172.31.0.193: Destination host unreachable.
Reply from 172.31.0.193: Destination host unreachable.

Ping statistics for 209.165.220.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ftp 209.165.220.3
Trying to connect...209.165.220.3
Connected to 209.165.220.3
220- Welcome to PT Ftp server
Username:cisco
331- Username ok, need password
Password:
230- Logged in
(passive mode On)
ftp>quit

221- Service closing control connection.
C:\>
```

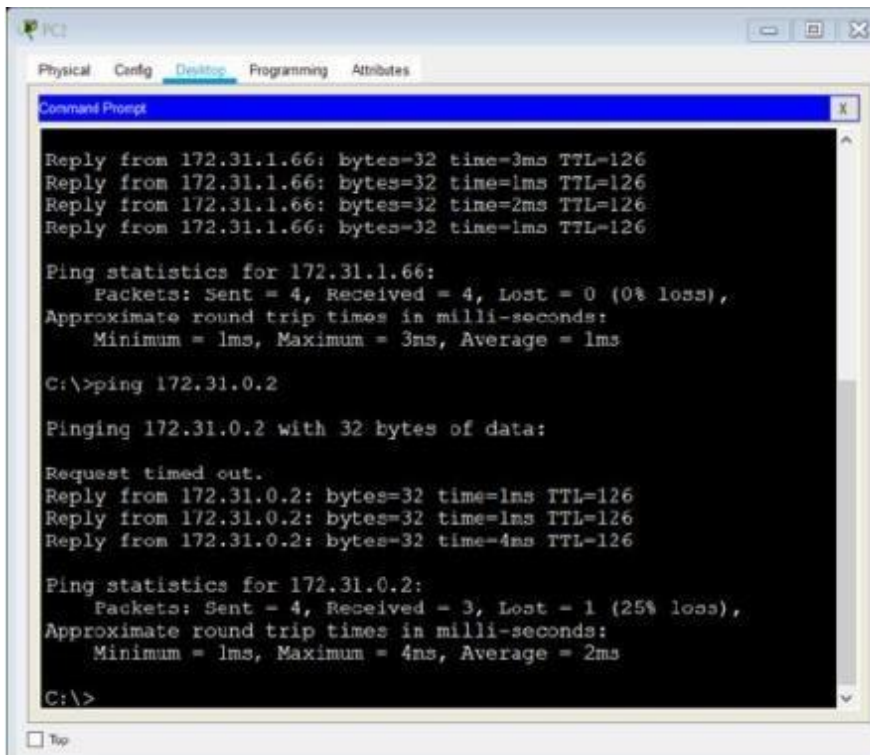


- Los hosts de VLAN 20 en Tunja solo acceden a la VLAN 20 de Cundinamarca y VLAN 10 de Bucaramanga.

```
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)#
```



The screenshot shows a Windows Command Prompt window with the following text:

```
Physical Config Devices Programming Attributes
Command Prompt
Reply from 172.31.1.66: bytes=32 time=3ms TTL=126
Reply from 172.31.1.66: bytes=32 time=1ms TTL=126
Reply from 172.31.1.66: bytes=32 time=2ms TTL=126
Reply from 172.31.1.66: bytes=32 time=1ms TTL=126

Ping statistics for 172.31.1.66:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 3ms, Average = 1ms

C:\>ping 172.31.0.2

Pinging 172.31.0.2 with 32 bytes of data:

Request timed out.
Reply from 172.31.0.2: bytes=32 time=1ms TTL=126
Reply from 172.31.0.2: bytes=32 time=1ms TTL=126
Reply from 172.31.0.2: bytes=32 time=4ms TTL=126

Ping statistics for 172.31.0.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 4ms, Average = 2ms

C:\>
```

The screenshot shows a PC window titled 'PC1' with tabs for 'Physical', 'Config', 'Desktop', 'Programming', and 'Attributes'. The 'Desktop' tab is active, displaying a 'Command Prompt' window. The command prompt shows the following output:

```
C:\>ping 172.31.0.66

Pinging 172.31.0.66 with 32 bytes of data:

Reply from 172.31.0.129: Destination host unreachable.
Reply from 172.31.0.129: Destination host unreachable.
Reply from 172.31.0.129: Destination host unreachable.
Reply from 172.31.0.129: Destination host unreachable.

Ping statistics for 172.31.0.66:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 172.31.2.28

Pinging 172.31.2.28 with 32 bytes of data:

Reply from 172.31.0.129: Destination host unreachable.
Reply from 172.31.0.129: Destination host unreachable.
Reply from 172.31.0.129: Destination host unreachable.
Reply from 172.31.0.129: Destination host unreachable.

Ping statistics for 172.31.2.28:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

- 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  
0.0.0.63 209.165.220.0 0.0.0.255
```

```
BUCARAMANGA(config)#int f0/0.30
```

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

```
BUCARAMANGA(config-subif)#
```

```
PC1
Physical Config Desktop Programming Attributes
Command Prompt
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 209.165.220.3
Pinging 209.165.220.3 with 32 bytes of data:
Reply from 209.165.220.3: bytes=32 time=1ms TTL=126
Reply from 209.165.220.3: bytes=32 time=4ms TTL=126
Reply from 209.165.220.3: bytes=32 time=1ms TTL=126
Reply from 209.165.220.3: bytes=32 time=1ms TTL=126
Ping statistics for 209.165.220.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 4ms, Average = 1ms
C:\>
```

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

```
BUARAMANGA(config-subif)#access-list 112 permit ip
172.31.0.0 0.0.0.63 172.31.1.64 0.0.0.63
```

```
BUARAMANGA(config)#access-list 112 permit ip 172.31.0.0
0.0.0.63 172.31.0.128 0.0.0.63
```

```
BUARAMANGA(config)#int f0/0.10 BUARAMANGA(config-
subif)#ip access-group 112 in BUARAMANGA(config-subif)#
```

```
Packet Tracer PC Command Line 1.0
C:\>ping 172.31.1.66

Pinging 172.31.1.66 with 32 bytes of data:

Reply from 172.31.1.66: bytes=32 time=4ms TTL=125
Reply from 172.31.1.66: bytes=32 time=2ms TTL=125
Reply from 172.31.1.66: bytes=32 time=2ms TTL=125
Reply from 172.31.1.66: bytes=32 time=2ms TTL=125

Ping statistics for 172.31.1.66:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 4ms, 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=4ms 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 = 4ms, Average = 1ms

C:\>
```

```
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 4ms, Average = 1ms

C:\>ping 209.165.220.3

Pinging 209.165.220.3 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 209.165.220.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

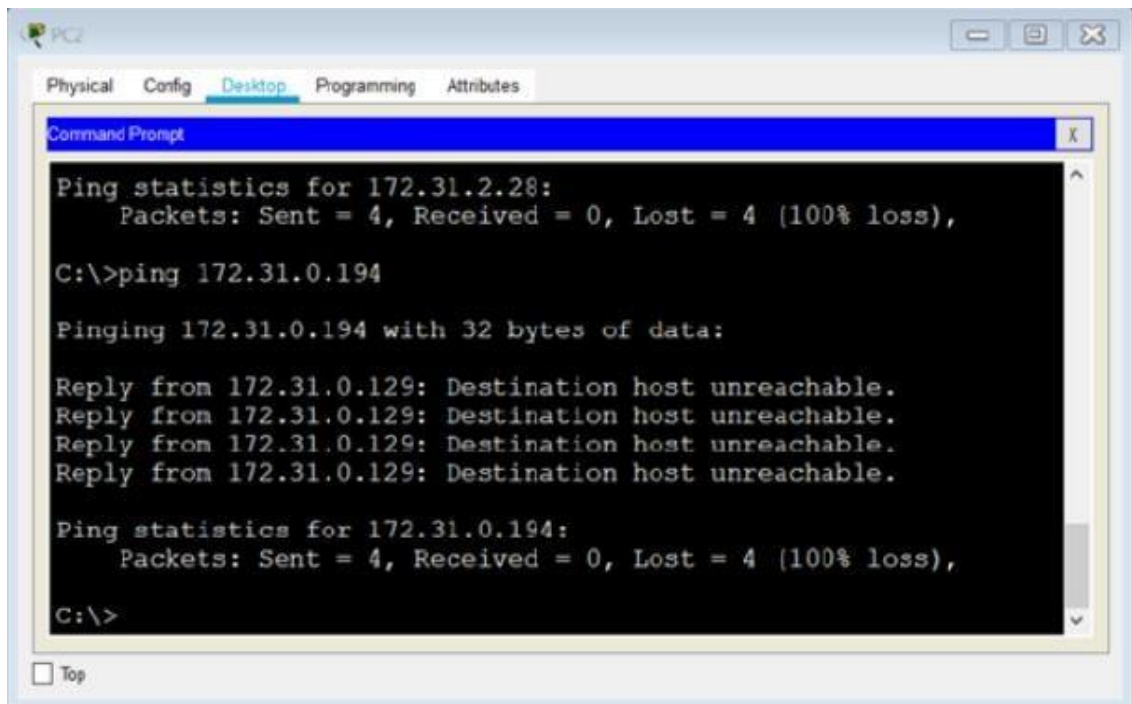
C:\>
```

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

```
BUCARAMANGA(config-subif)#access-list 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 48
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)#
```




```
PC0
Physical Config Desktop Programming Attributes
Command Prompt
Ping statistics for 209.165.220.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 172.31.0.66

Pinging 172.31.0.66 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 172.31.0.66:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

```
PC5
Physical Config Desktop Programming Attributes
Command Prompt
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>ping 172.31.1.66

Pinging 172.31.1.66 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 172.31.1.66:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

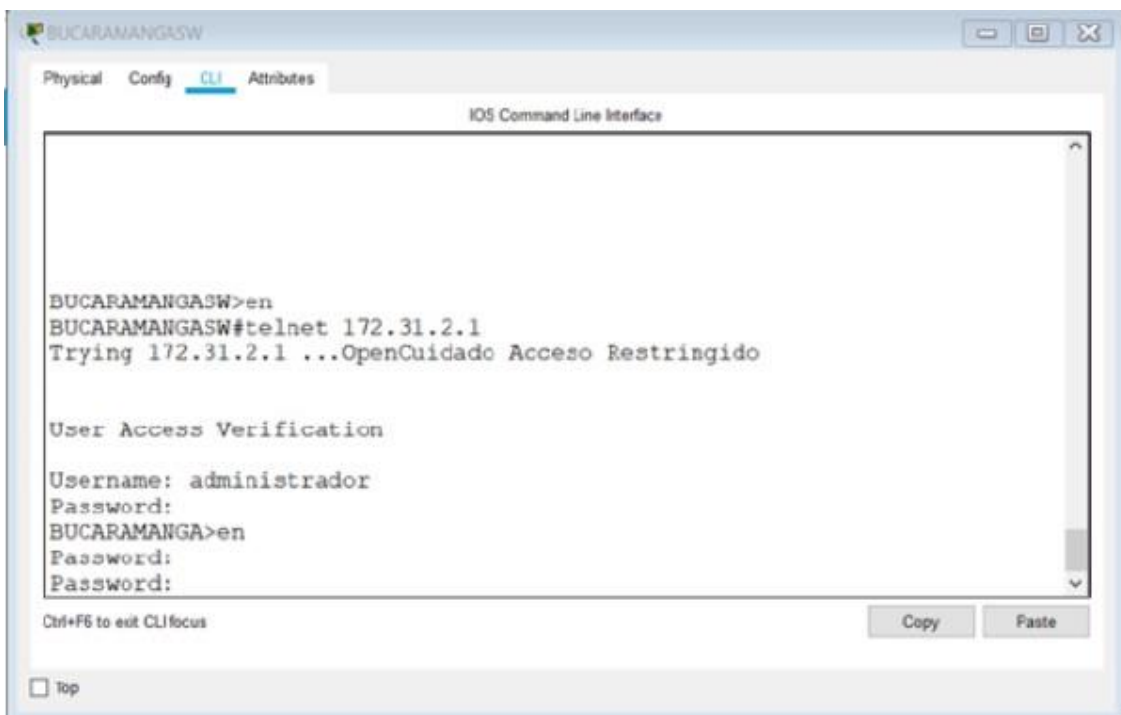
C:\>
```

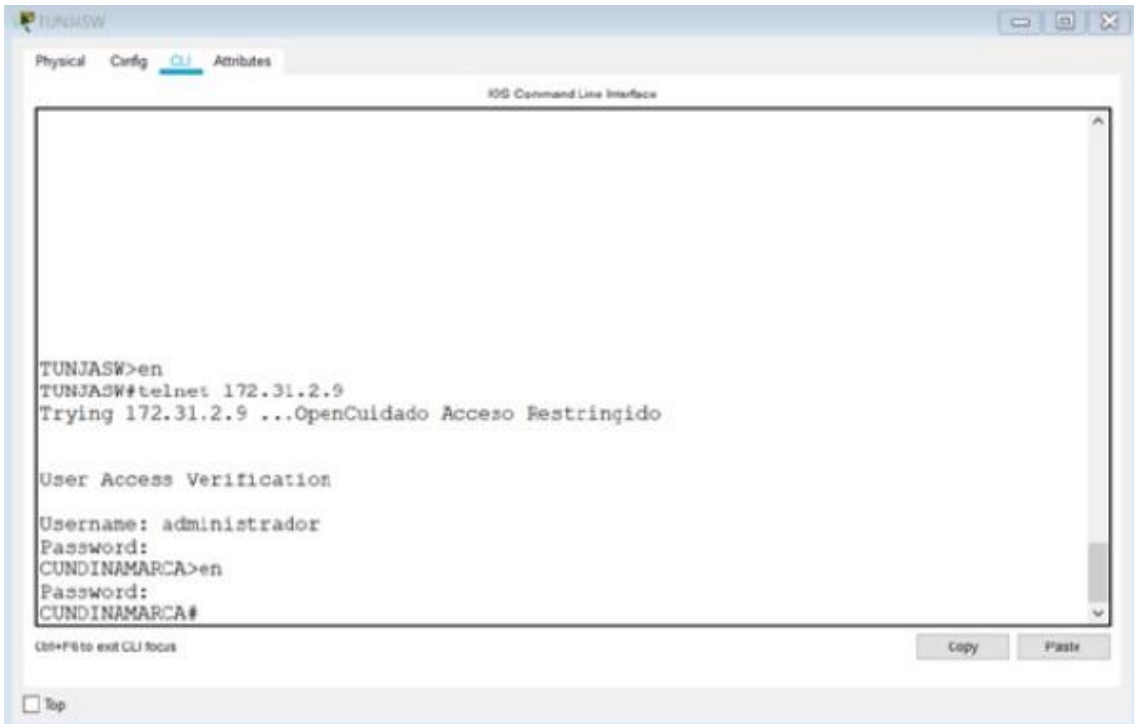
- Solo los hosts de las VLAN administrativas y de la VLAN de servidores tienen acceso a los routers e internet.


```
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)#
```





CONCLUSIONES

- Se logró la configuración de la topología sugerida en la prueba de habilidades, aplicando los conocimientos y habilidades obtenidas durante el Diplomado.
- Con la configuración de DHCP se pudo ahorrar tiempo en cuanto a la configuración y asignación de direcciones IP.
- Mediante la configuración de las listas de acceso, pudimos permitir o denegar el acceso de hosts a algunos servicios ofrecidos en red.
- Se utilizó la herramienta de simulación Cisco Packet Tracer, como medio para desarrollar la práctica y puesta en marcha de habilidades adquiridas durante el Diplomado.

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