

PRUEBA DE HABILIDADES PRACTICAS CCNA

BAYRON ANDRES RUIZ AGUILERA

INFORME FINAL

TUTOR:

DIEGO EDINSON RAMIREZ

UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA ESCUELA DE CIENCIAS
BASICAS, TECNOLOGIA E INGENIERIA INGENIERIA DE SISTEMAS

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Dedico este trabajo a las personas que siempre creyeron en mi y me dieron
la fortaleza de seguir siempre a delante

A mi futura esposa que siempre me ha acompañado en lo largo de mi
carrera para seguir siempre adelante

Tabla de contenido

RESUMEN	5
ABSTRACT	6
INTRODUCCIÓN	7
OBJETIVOS	8
OBJETIVO GENERAL.....	8
OBJETIVOS ESPECIFICOS	8
ESCENARIO 1	9
TOPOLOGIA DE LA RED	9
TOPOLOGÍA DE LA RED PROPUESTA DESARROLLADA EN PACKET TRACER.....	9
DESARROLLO	11
PARTE 1 Asignación de direcciones IP:	11
PARTE 2: Configuración Básica.	12
Configuración básica de los routers	12
Tabla de enrutamiento Router Medellín.....	14
Tabla de enrutamiento Router Bogotá	15
Tabla de enrutamiento Router Cali.....	15
PARTE 3: Configuración de Enrutamiento.	19
Configuración eirgp 200	19
PARTE 4: Configuración de las listas de Control de Acceso	22
Configuración de ACL en cada Router	23
a. Cada router debe estar habilitado para establecer conexiones Telnet con los demás routers y tener acceso a cualquier dispositivo en la red.....	24
PARTE 5: Comprobación de la red instalada.	31
CONFIGURACIÓN FINAL DE CADA ROUTER	33
ESCENARIO 2	40
TOPOLOGIA DE LA RED	40
Topología de la red propuesta desarrollada en packet tracer.....	41
Desarrollo	42
1. Todos los routers deberán tener los siguiente	42
Configuración de autenticación	42
Configuración de consola.....	43

Configuración de terminal virtual.....	43
Usuarios registrados en todos los routers	43
Un máximo de internos para acceder al router.....	44
Establezca un servidor TFTP y almacene todos los archivos necesarios de los routers.	44
2.El DHCP deberá proporcionar solo direcciones a los hosts de Bucaramanga y Cundinamarca.....	45
Se establece los pools de cada VLAN.....	45
Las subinterfaces de los Router Bucaramanga y Cundinamarca se da paso del broadcast DHCP para el Router de Tunja.....	46
3.EL WEB SERVER DEBERÁ TENER NAT ESTÁTICO Y EL RESTO DE LOS EQUIPOS DE LA TOPOLOGÍA EMPLEARAN NAT DE SOBRECARGA (PAT).....	46
Nat en router tunja	46
4.EL ENRUTAMIENTO DEBERÁ TENER AUTENTICACIÓN.	46
Configuración de interfaces	47
5.LISTAS DE CONTROL DE ACCESO:.....	49
Configuración de opf1 en los Routers	49
Tabla de vecinos.....	50
Tabla de enrutamiento.....	52
Tabla de NAT	54
6.CONFIGURACION ROUTER ISP.....	56
7. CONFIGURACIÓN FINAL DE CADA ROUTER	62
CONCLUSIONES.....	74
BIBLIOGRAFIA.....	75

RESUMEN

Comprender el papel fundamental del uso de las telecomunicaciones en nuestro entorno, en el uso diario, en el uso práctico y poder comprender de cómo se mueve la información a través de las nuevas redes de información y ver sus alcances logrados durante el desarrollo de este diplomado donde se evidencia a continuación.

En uno de los mejores convenios que maneja la Universidad con Cisco donde cada estudiante aprende en el diplomado a diseñar e implementar de las redes LAN-WAN, capaces de diseñar e implementar subredes de menor y mayor complejidad y donde mediante orientación a la conceptualización de configuración y resolución de protocolos de enrutamiento y estado del enlace.

ABSTRACT

Understand the fundamental role of the use of telecommunications in our environment, in daily use, in practical use and to be able to understand how information moves through the new information networks and their scope achieved during the development of this diploma where evidence below.

In one of the best agreements that the University manages with Cisco where each student learns in the diploma to design and implement LAN-WAN networks, you can design and implement subnets of lesser and greater complexity and where through orientation to the conceptualization of configuration and resolution of routing protocols and link status.

INTRODUCCIÓN

El trabajo pruebas de habilidades CCNA se desarrollaron y se implementaron los conocimientos aprendidos durante el diplomado donde asignó direcciones IP de la red y se Subneteo, configuraciones básicas como autenticación local AAA, cifrado de contraseñas, se establecieron servidores TFTP, WEB Y FTP.

Configuraciones de servers DHCP, NAT estático y de sobre carga, Protocolos de routing EIGRP OSPF, listas de control de acceso ACL se configuran en los routers para mejorar la seguridad de la red e implementar las políticas de restricción de entrada y salida en los paquetes para algunos equipos seleccionados.

OBJETIVOS

OBJETIVO GENERAL

Unificar lo aprendido en el transcurso del diplomado CCNA1 y CCNA2 para aplicar y solucionar los casos de las situaciones de estudio del problema de Networking por parte de los futuros ingenieros.

OBJETIVOS ESPECIFICOS

Implementar Subneteo en las redes.

Configuraciones básicas y de seguridad AAA.

Establecer servidores TFTP, WEB Y FTP.

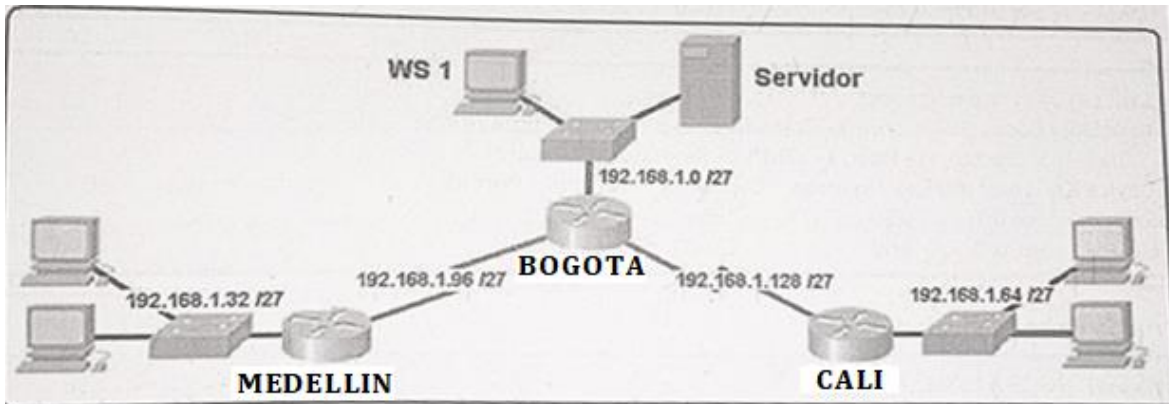
Configurar servers DHCP, NAT estático y de sobre carga.

Implementar Protocolos de Routing EIGRP OSPF, listas de control de acceso ACL

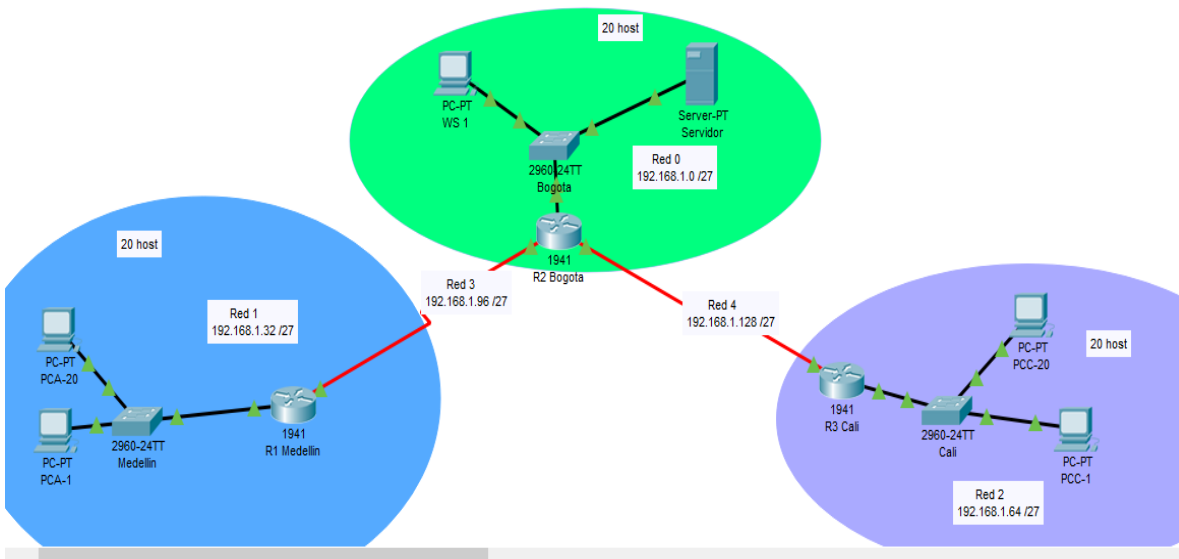
ESCENARIO 1

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.

TOPOLOGIA DE LA RED



TOPOLOGÍA DE LA RED PROPUESTA DESARROLLADA EN PACKET TRACER



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

PARTE 1 Asignación de direcciones IP:

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

Para la creación de las ocho subredes se toman prestados 3 bits, se crean 8 subredes. $2^3 = 8$ subredes

Red 0	Red	192.168.1. 000	0 0000	192.168.1.0
	Primero	192.168.1. 000	0 0001	192.168.1.1
	Ultima	192.168.1. 000	1 1110	192.168.1.30
	Broadcast	192.168.1. 000	1 1111	192.168.1.31
Red 1	Red	192.168.1. 001	0 0000	192.168.1.32
	Primero	192.168.1. 001	0 0001	192.168.1.33
	Ultima	192.168.1. 001	1 1110	192.168.1.62
	Broadcast	192.168.1. 001	1 1111	192.168.1.63
Red 2	Red	192.168.1. 010	0 0000	192.168.1.64
	Primero	192.168.1. 010	0 0001	192.168.1.65
	Ultima	192.168.1. 010	1 1110	192.168.1.94
	Broadcast	192.168.1. 010	1 1111	192.168.1.95
Red 3	Red	192.168.1. 011	0 0000	192.168.1.96
	Primero	192.168.1. 011	0 0001	192.168.1.97
	Ultima	192.168.1. 011	1 1110	192.168.1.126
	Broadcast	192.168.1. 011	1 1111	192.168.1.127
Red 4	Red	192.168.1. 100	0 0000	192.168.1.128
	Primero	192.168.1. 100	0 0001	192.168.1.129
	Ultima	192.168.1. 100	1 1110	192.168.1.158
	Broadcast	192.168.1. 100	1 1111	192.168.1.159
Red 5	Red	192.168.1. 101	0 0000	192.168.1.160
	Primero	192.168.1. 101	0 0001	192.168.1.161
	Ultima	192.168.1. 101	1 1110	192.168.1.190
	Broadcast	192.168.1. 101	1 1111	192.168.1.191
Red 6	Red	192.168.1. 110	0 0000	192.168.1.192
	Primero	192.168.1. 110	0 0001	192.168.1.193
	Ultima	192.168.1. 110	1 1110	192.168.1.222
	Broadcast	192.168.1. 110	1 1111	192.168.1.223
Red 7	Red	192.168.1. 111	0 0000	192.168.1.224
	Primero	192.168.1. 111	0 0001	192.168.1.225
	Ultima	192.168.1. 111	1 1110	192.168.1.254
	Broadcast	192.168.1. 111	1 1111	192.168.1.255

b. Asignar una dirección IP a la red.
Se asigno la ip para nuestra red 192.168.1.0

PARTE 2: Configuración Básica.

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

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

Configuración básica de los routers

-----Router Medellin-----

Router>enable

Router#conf t

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

Router(config)#hostname MEDELLIN

MEDELLIN(config)#enable secret unad

MEDELLIN(config)#line con 0

MEDELLIN(config-line)#password co

MEDELLIN(config-line)#password unad

MEDELLIN(config-line)#login

MEDELLIN(config-line)#line vty 0 4

MEDELLIN(config-line)#pas

MEDELLIN(config-line)#password vty unad

MEDELLIN(config-line)#banner motd "Solo personal autorizado por la UNAD"

service password-encryption

MEDELLIN(config)#

MEDELLIN#conf t

MEDELLIN(config)#interface s0/0/0

MEDELLIN(config-if)#ip address 192.168.1.99 255.255.255.224

MEDELLIN(config-if)#description ENLACE MEDELLIN

MEDELLIN(config-if)#clock rate 128000

MEDELLIN(config-if)#no shutdown

MEDELLIN(config-if)#interface g0/0

```
MEDELLIN(config-if)#ip address 192.168.1.33 255.255.255.224
MEDELLIN(config-if)#description LAN MEDELLIN
MEDELLIN(config-if)#no shutdown
```

-----Router Bogota-----

```
Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname BOGOTA
BOGOTA(config)#enable secret unad
BOGOTA(config)#line con 0
BOGOTA(config-line)#password unad
BOGOTA(config-line)#login
BOGOTA(config-line)#line vty 0 4
BOGOTA(config-line)#password vty unad
BOGOTA(config-line)#login
BOGOTA(config-line)#banner motd "Solo personal autorizado por la UNAD"service
password-encryption
BOGOTA(config)#
```

```
BOGOTA#conf t
```

```
BOGOTA(config)#interface s0/0/0
BOGOTA(config-if)#description ENLACE MEDELLIN
BOGOTA(config-if)#ip address 192.168.1.98 255.255.255.224
BOGOTA(config-if)#no shutdown
```

```
BOGOTA(config-if)#interface s0/0/1
BOGOTA(config-if)#description ENLACE CALI
BOGOTA(config-if)#ip address 192.168.1.130 255.255.255.224
BOGOTA(config-if)#clock rate 128000
```

```
BOGOTA(config-if)#interface g0/0
BOGOTA(config-if)#ip address 192.168.1.1 255.255.255.224
BOGOTA(config-if)#no shutdown
```

-----Router Cali-----

```
Router>enable
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname CALI
CALI(config)#enable secret unad
CALI(config)#line con 0
CALI(config-line)#password unad
```

```
CALI(config-line)#login
CALI(config-line)#line vty 0 4
CALI(config-line)#password vty unad
CALI(config-line)#login
```

```
CALI(config-line)#banner motd "Solo personal autorizado por la UNAD"service
password-encryption
CALI(config)#
```

```
CALI#conf t
CALI(config)#interface s0/0/0
CALI(config-if)#ip address 192.168.1.131 255.255.255.224
CALI(config-if)#no shutdown
```

```
CALI(config-if)#interface g0/0
CALI(config-if)#ip address 192.168.1.65 255.255.255.224
CALI(config-if)#no shutdown
```

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.

Tabla de enrutamiento Router Medellín

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

```
Gateway of last resort is not set
```

```
192.168.1.0/24 is variably subnetted, 7 subnets, 2 masks
R    192.168.1.0/27 [120/1] via 192.168.1.98, 00:00:19, 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
R    192.168.1.64/27 [120/2] via 192.168.1.98, 00:00:19, 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
R    192.168.1.128/27 [120/1] via 192.168.1.98, 00:00:19, Serial0/0/0
```

```
MEDELLIN#|
```

Tabla de enrutamiento Router Bogotá

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

Gateway of last resort is not set

    192.168.1.0/24 is variably subnetted, 8 subnets, 2 masks
C       192.168.1.0/27 is directly connected, GigabitEthernet0/0
L       192.168.1.1/32 is directly connected, GigabitEthernet0/0
R       192.168.1.32/27 [120/1] via 192.168.1.99, 00:00:18, Serial0/0/0
R       192.168.1.64/27 [120/1] via 192.168.1.131, 00:00:18, 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#
```

Tabla de enrutamiento Router Cali

```

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

Gateway of last resort is not set

    192.168.1.0/24 is variably subnetted, 7 subnets, 2 masks
R       192.168.1.0/27 [120/1] via 192.168.1.130, 00:00:20, Serial0/0/0
R       192.168.1.32/27 [120/2] via 192.168.1.130, 00:00:20, 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
R       192.168.1.96/27 [120/1] via 192.168.1.130, 00:00:20, 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

CALI#

```

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

```

PCC-1
Physical Config Desktop Programming Attributes
Command Prompt
Packet Tracer PC Command Line 1.0
C:\>tracert 192.168.1.99

Tracing route to 192.168.1.99 over a maximum of 30 hops:

  0  1 ms    0 ms    0 ms    192.168.1.65
  1  0 ms    1 ms    0 ms    192.168.1.130
  2  0 ms    0 ms    1 ms    192.168.1.99

Trace complete.

C:\>tracert 192.168.1.99

Tracing route to 192.168.1.99 over a maximum of 30 hops:

  0  1 ms    0 ms    0 ms    192.168.1.65
  1  0 ms    0 ms    0 ms    192.168.1.130
  2  2 ms    1 ms    1 ms    192.168.1.99

Trace complete.

```

d. Realizar un diagnóstico de vecinos usando el comando cdp.
Router Bogotá


```

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

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
MEDELLIN        Ser 0/0/0       165        R            C1900      Ser 0/0/0
Switch          Gig 0/0         168        S            2960      Gig 0/1
BOGOTA#show cdp neighbors detail

Device ID: MEDELLIN
Entry address(es):
  IP address : 192.168.1.99
Platform: cisco C1900, Capabilities: Router
Interface: Serial0/0/0, Port ID (outgoing port): Serial0/0/0
Holdtime: 124

Version :
Cisco IOS Software, C1900 Software (C1900-UNIVERSALK9-M), Version 15.1(4)M4, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2012 by Cisco Systems, Inc.
Compiled Thurs 5-Jan-12 15:41 by pt_team

advertisement version: 2
Duplex: full
-----

Device ID: Switch
Entry address(es):
Platform: cisco 2960, Capabilities: Switch
Interface: GigabitEthernet0/0, Port ID (outgoing port): GigabitEthernet0/1
Holdtime: 127

Version :
Cisco IOS Software, C2960 Software (C2960-LANBASE-M), Version 12.2(25)FX, RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2005 by Cisco Systems, Inc.
Compiled Wed 12-Oct-05 22:05 by pt_team

advertisement version: 2
Duplex: full
-----

Device ID: CALI
Entry address(es):
  IP address : 192.168.1.131
Platform: cisco C1900, Capabilities: Router
Interface: Serial0/0/1, Port ID (outgoing port): Serial0/0/0
Holdtime: 170

Version :
Cisco IOS Software, C1900 Software (C1900-UNIVERSALK9-M), Version 15.1(4)M4, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2012 by Cisco Systems, Inc.
Compiled Thurs 5-Jan-12 15:41 by pt_team

advertisement version: 2
Duplex: full

BOGOTA#

```

Con el comando “show cdp neighbord detail”, obtenemos más detalle, como, por ejemplo, la dirección IP del dispositivo vecino, además de su versión de software e. Realizar una prueba de conectividad en cada tramo de la ruta usando Ping.

```
PCC-1
Physical Config Desktop Programming Attributes
Command Prompt
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=1ms TTL=126
Reply from 192.168.1.2: bytes=32 time=3ms 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 = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 3ms, Average = 1ms
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=3ms 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:
        Minimum = 2ms, Maximum = 3ms, Average = 2ms
C:\>ping 192.168.1.1
Pinging 192.168.1.1 with 32 bytes of data:
Reply from 192.168.1.1: bytes=32 time=2ms TTL=254
Reply from 192.168.1.1: bytes=32 time=1ms TTL=254
Reply from 192.168.1.1: bytes=32 time=1ms TTL=254
Reply from 192.168.1.1: bytes=32 time=1ms TTL=254
Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
C:\>ping 192.168.1.99
Pinging 192.168.1.99 with 32 bytes of data:
Reply from 192.168.1.99: bytes=32 time=6ms TTL=253
Reply from 192.168.1.99: bytes=32 time=2ms TTL=253
Reply from 192.168.1.99: bytes=32 time=2ms TTL=253
Reply from 192.168.1.99: bytes=32 time=6ms TTL=253
Ping statistics for 192.168.1.99:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 6ms, Average = 4ms
```

Se realiza prueba de ping desde la sede de Cali desde el PCC1 hacia la sede de Bogotá al pc sw1 192.168.1.2, luego se hace ping hacia el PCA1 de la sede de Medellín 192.168.1.34, se hace prueba de ping a hacia el Router de Bogotá y se hace ping hacia Router de Medellín con esto se verifica que desde la sede de Cali se puede hacer ping a todos los equipos conectados

PARTE 3: Configuración de Enrutamiento.

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

Configuración eigrp 200

Router Medellín

```
MEDELLIN(config)#router eigrp 200
MEDELLIN(config-router)#net
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)#no auto-summary
```

Router Bogotá

```
BOGOTA#conf t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#router eigrp 200
BOGOTA(config-router)#
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)#no auto-summary
BOGOTA(config-router)#exit
BOGOTA(config)#exit
```

Router Cali

```
CALI(config)#router eigrp 200
CALI(config-router)#network 192.168.1.128 0.0.0.31
CALI(config-router)#network 192.168.1.64 0.0.0.31
CALI(config-router)#no auto-summary
```

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

Router Bogota

```
BOGOTA#sh ip eigrp neighbors
IP-EIGRP neighbors for process 200
H   Address           Interface           Hold Uptime        SRTT   RTO   Q   Seq
   (sec)              (ms)              (sec)              (ms)   Cnt   Num
0   192.168.1.99       Se0/0/0            12   02:26:23   40    1000  0   7
1   192.168.1.131     Se0/0/1            13   02:21:07   40    1000  0   7
```

Router Medellín

```
MEDELLIN#sh ip eigrp neighbors
IP-EIGRP neighbors for process 200
H   Address           Interface           Hold Uptime        SRTT   RTO   Q   Seq
   (sec)              (ms)              (sec)              (ms)   Cnt   Num
0   192.168.1.98       Se0/0/0            11   02:28:28   40    1000  0   5
```

Router Cali

```

CALI#sh ip eigrp neighbors
IP-EIGRP neighbors for process 200
H   Address          Interface      Hold Uptime    SRTT   RTO   Q   Seq
   (sec)              (ms)          (ms)          Cnt   Num
0   192.168.1.130     Se0/0/0       12  02:24:44    40    1000  0   6

```

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

Router Medellín

```

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

Gateway of last resort is not set

    192.168.1.0/24 is variably subnetted, 7 subnets, 2 masks
D       192.168.1.0/27 [90/2170112] via 192.168.1.98, 02:30:48, 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 [90/2682112] via 192.168.1.98, 02:25:32, 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, 02:30:48, Serial0/0/0

MEDELLIN#

```

Router Bogotá

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

Gateway of last resort is not set

```

192.168.1.0/24 is variably subnetted, 8 subnets, 2 masks
C    192.168.1.0/27 is directly connected, GigabitEthernet0/0
L    192.168.1.1/32 is directly connected, GigabitEthernet0/0
D    192.168.1.32/27 [90/2170112] via 192.168.1.99, 02:33:03, Serial0/0/0
D    192.168.1.64/27 [90/2170112] via 192.168.1.131, 02:27:47, 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#|

Router Cali

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

Gateway of last resort is not set

```

192.168.1.0/24 is variably subnetted, 7 subnets, 2 masks
D    192.168.1.0/27 [90/2170112] via 192.168.1.130, 02:28:34, Serial0/0/0
D    192.168.1.32/27 [90/2682112] via 192.168.1.130, 02:28:34, 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, 02:28:34, 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
```

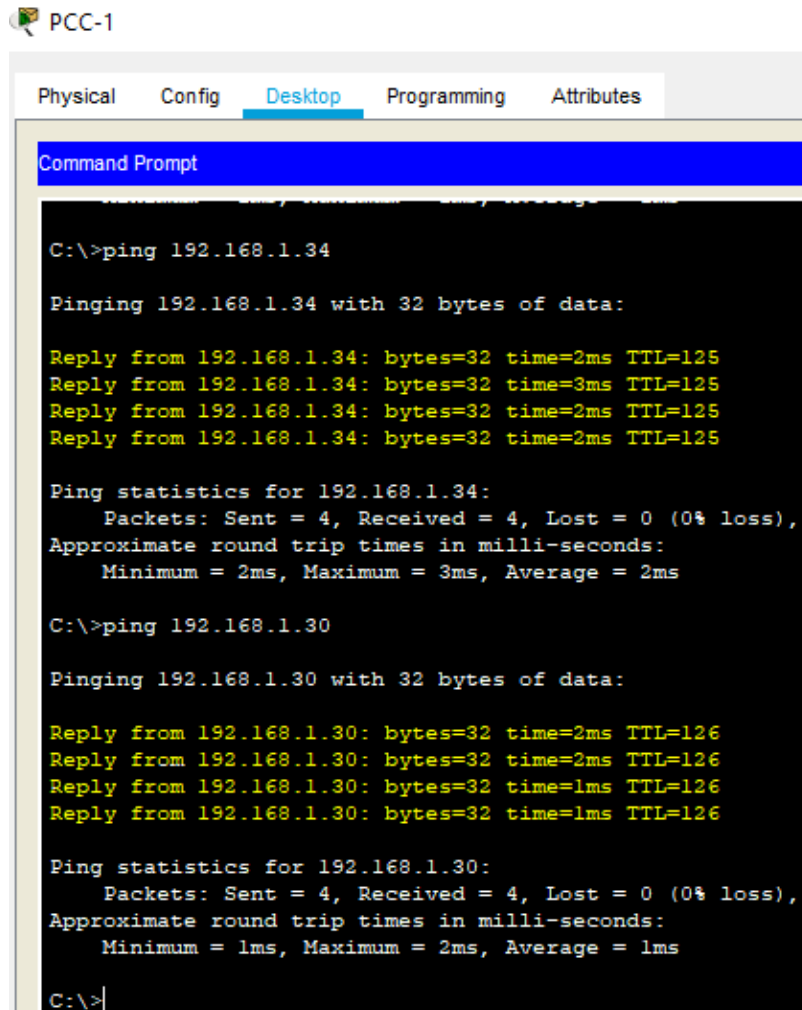
CALI#|

d. Realizar un diagnóstico para comprobar que cada uno de los puntos de la red se puedan ver y tengan conectividad entre sí. Realizar esta prueba desde un host de la red

LAN del router CALI, primero a la red de MEDELLIN y luego al servidor.

Prueba de ping

Se realiza prueba de ping desde de PCC-1 de la red LAN de Cali hacia LAN de Medellín al PCA-1 192.168.1.34 y luego se hace desde la red LAN de Cali hacia el servidor 192.168.1.30 de la red LAN de Bogotá



```
PCC-1
Physical Config Desktop Programming Attributes
Command Prompt
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=3ms 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:
        Minimum = 2ms, Maximum = 3ms, Average = 2ms
C:\>ping 192.168.1.30
Pinging 192.168.1.30 with 32 bytes of data:
Reply from 192.168.1.30: bytes=32 time=2ms TTL=126
Reply from 192.168.1.30: bytes=32 time=2ms TTL=126
Reply from 192.168.1.30: bytes=32 time=1ms TTL=126
Reply from 192.168.1.30: bytes=32 time=1ms TTL=126
Ping statistics for 192.168.1.30:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% 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:

Configuración de ACL en cada Router

ROUTER MEDELLIN

```
MEDELLIN#conf t
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN(config)#access-list 110 permit ip 192.168.1.0 0.0.0.255 host
192.168.1.2
MEDELLIN(config)#access-list 110 permit icmp any any echo-reply
MEDELLIN(config)#access-list 110 deny ip any any
MEDELLIN(config)#int g
MEDELLIN(config)#int gigabitEthernet 0/0
MEDELLIN(config-if)#ip ac
MEDELLIN(config-if)#ip access-group 110 in
```

ROUTER CALI

```
CALI(config)#access-list 110 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.2
CALI(config)#access-list 110 permit icmp any any echo-reply
CALI(config)#access-list 110 deny ip any any
CALI(config)#int gigabitEthernet 0/0
CALI(config-if)#ip access-group 110 in
```

ROUTER BOGOTÁ

```
BOGOTA#conf t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#access-list 110 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.2
BOGOTA(config)#access-list 110 deny ip any any
BOGOTA(config)#int g
BOGOTA(config)#int gigabitEthernet 0/0
BOGOTA(config-if)#ip acce
BOGOTA(config-if)#ip access-group 110 out
BOGOTA(config-if)#
```

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


Telnet Router Medellín

```
R1 Medellin
Physical Config CLI Attributes
IOS Command Line Interface
access-list 101 deny ip any any
!
banner motd ^CSolo personal autorizado por la UNAD^C
!
!
!
!
!
line con 0
password consounad
login
!
line aux 0
!
line vty 0 4
password unad
login
transport input telnet
!
!
!
end
MEDR1.T.TN#
```

Telnet Router Bogotá


```
R2 Bogota
Physical Config CLI Attributes
IOS Command Line Interface
access-list 1 permit any
!
banner motd ^CSolo personal autorizado por la UNAD^C
!
!
!
!
!
line con 0
password conso unad
login
!
line aux 0
!
line vty 0 4
password unad
login
transport input telnet
!
!
!
end
BOGOTA#
```

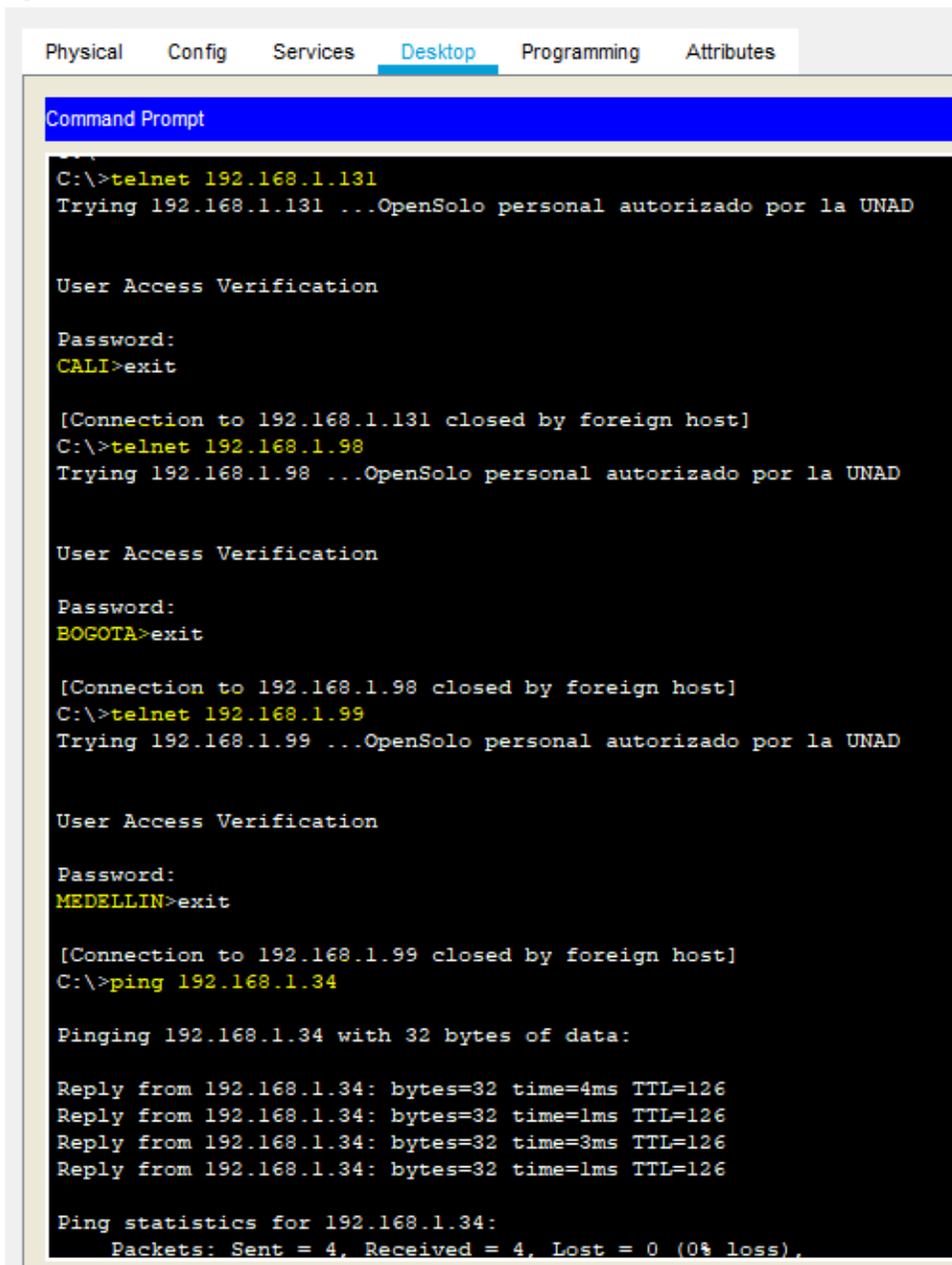

Telnet Router Cali

 R3 Cali

```
Physical  Config  CLI  Attributes
IOS Command Line Interface
access-list 101 deny ip any any
!
banner motd ^CSolo personal autorizado por la UNAD^C
!
!
!
!
!
!
line con 0
  password conso unad
  login
!
line aux 0
!
line vty 0 4
  password unad
  login
  transport input telnet
!
!
!
end
CALI#
```

b. El equipo WS1 y el servidor se encuentran en la subred de administración. Solo el servidor de la subred de administración debe tener acceso a cualquier otro dispositivo en cualquier parte de la red.

 Servidor



The screenshot shows a network device configuration window with tabs for Physical, Config, Services, Desktop, Programming, and Attributes. The Desktop tab is active, displaying a Command Prompt window. The Command Prompt shows the following sequence of commands and outputs:

```
C:\>telnet 192.168.1.131
Trying 192.168.1.131 ...OpenSolo personal autorizado por la UNAD

User Access Verification

Password:
CALI>exit

[Connection to 192.168.1.131 closed by foreign host]
C:\>telnet 192.168.1.98
Trying 192.168.1.98 ...OpenSolo personal autorizado por la UNAD

User Access Verification

Password:
BOGOTA>exit

[Connection to 192.168.1.98 closed by foreign host]
C:\>telnet 192.168.1.99
Trying 192.168.1.99 ...OpenSolo personal autorizado por la UNAD

User Access Verification

Password:
MEDELLIN>exit

[Connection to 192.168.1.99 closed by foreign host]
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=4ms TTL=126
Reply from 192.168.1.34: bytes=32 time=1ms TTL=126
Reply from 192.168.1.34: bytes=32 time=3ms TTL=126
Reply from 192.168.1.34: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.1.34:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```

Physical  Config  Services  Desktop  Programming  Attributes
Command Prompt

C:\>ping 192.168.1.66

Pinging 192.168.1.66 with 32 bytes of data:

Reply from 192.168.1.66: bytes=32 time=2ms TTL=126
Reply from 192.168.1.66: bytes=32 time=1ms TTL=126
Reply from 192.168.1.66: bytes=32 time=1ms TTL=126
Reply from 192.168.1.66: 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 = 2ms, Average = 1ms

C:\>ping 192.168.1.4

Pinging 192.168.1.4 with 32 bytes of data:

Reply from 192.168.1.4: bytes=32 time=3ms TTL=128
Reply from 192.168.1.4: bytes=32 time=1ms TTL=128
Reply from 192.168.1.4: bytes=32 time<1ms TTL=128
Reply from 192.168.1.4: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 3ms, Average = 1ms

```

Se realiza prueba y conectividad del servidor donde tiene conexión a todas las redes y telnet de los routers donde la ip 192.168.1.34 pertenece a la red LAN de Medellín, la ip 192.168.1.66 pertenece a la red LAN de Cali y la ip 192.168.1.4 pertenece a la red la del equipo SW1 de la red LAN de Bogotá.

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

PCA-1

```
Physical  Config  Desktop  Programming  Attributes

Command Prompt

Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.66

Pinging 192.168.1.66 with 32 bytes of data:

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

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

C:\>ping 192.168.1.4

Pinging 192.168.1.4 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.

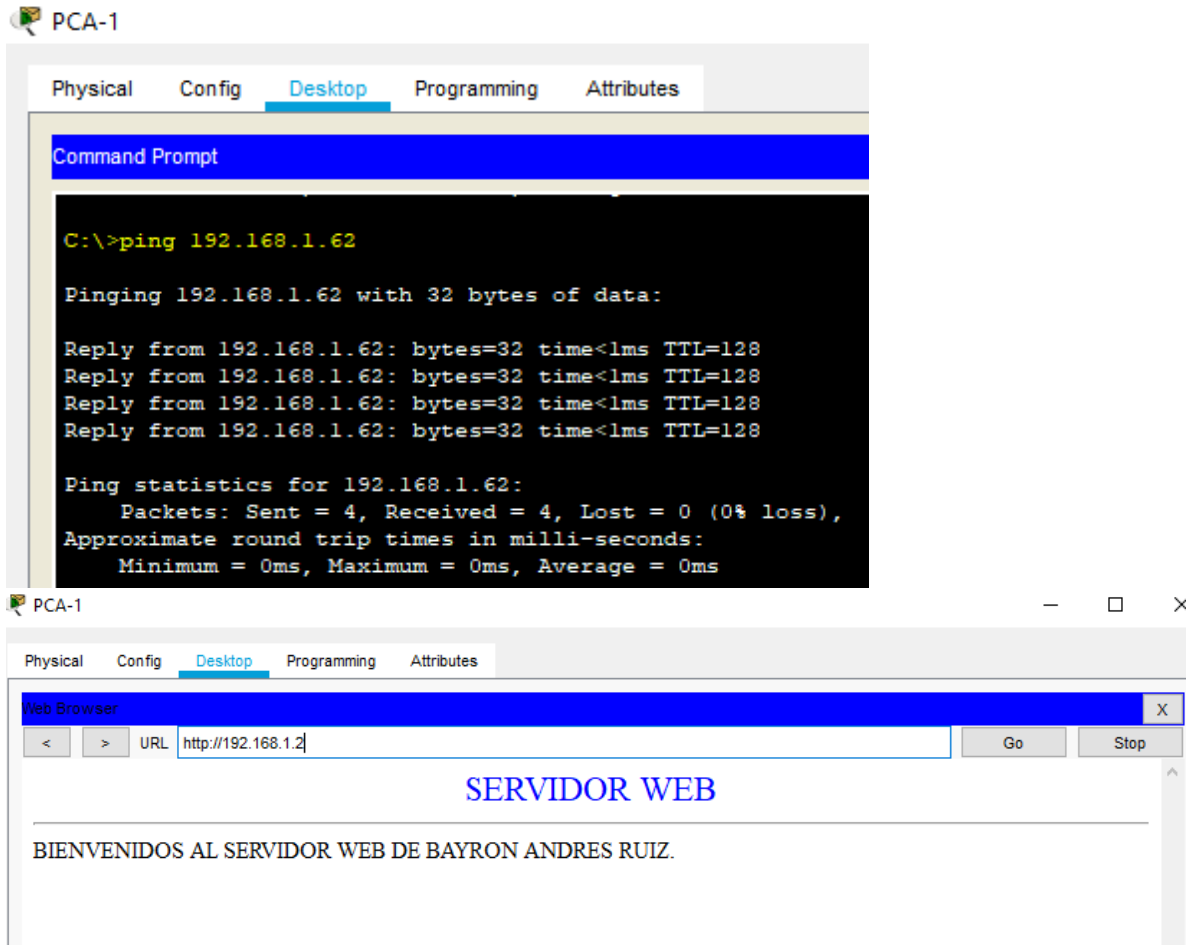
Ping statistics for 192.168.1.4:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

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=1ms 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=1ms 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 = 1ms, Average = 1ms
```



De la PCA-1 de la red LAN de Medellín se realizan las pruebas de ping a la red LAN de Cali con la ip 192.168.1.66 que pertenece al PCC-1 y no se observa respuesta, se hace prueba hacia la red LAN de Bogotá al equipo SW1 con ip 192.168.1.4 y no se observa respuesta luego se hace prueba con la ip del servidor 192.168.1.2 donde tenemos respuesta y conectividad web por ultimo se hace prueba en la misma red LAN de Medellín al PCA-20 con la ip 192.168.1.62 donde tenemos respuesta.

```
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 192.168.1.4

Pinging 192.168.1.4 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 192.168.1.4:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

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=1ms TTL=126
Reply from 192.168.1.2: bytes=32 time=1ms TTL=126
Reply from 192.168.1.2: bytes=32 time=2ms 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 = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms
```

```
Physical  Config  Desktop  Programming  Attributes
Command Prompt

C:\>ping 192.168.1.94

Pinging 192.168.1.94 with 32 bytes of data:

Reply from 192.168.1.94: bytes=32 time<1ms TTL=128
Reply from 192.168.1.94: bytes=32 time<1ms TTL=128
Reply from 192.168.1.94: bytes=32 time<1ms TTL=128
Reply from 192.168.1.94: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.94:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```



De la PCC-1 de la red LAN de Cali se realizan las pruebas de ping a la red LAN de Medellín con la ip 192.168.1.34 que pertenece al PCA-1 y no se observa respuesta, se hace prueba hacia la red LAN de Bogotá al equipo SW1 con ip 192.168.1.4 y no se observa respuesta luego se hace prueba con la ip del servidor 192.168.1.2 donde tenemos respuesta y conectividad web por último se hace prueba en la misma red LAN de Cali al PCC-20 con la ip 192.168.1.94 donde tenemos respuesta.

PARTE 5: Comprobación de la red instalada.

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

```
BOGOTA#sh access-lists
Extended IP access list 110
 10 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.2 (174 match(es))
 20 deny ip any any (114 match(es))

BOGOTA#
```

```
MEDELLIN#sh access-lists
Extended IP access list 110
 10 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.2 (21 match(es))
 20 permit icmp any any echo-reply
 30 deny ip any any (8 match(es))
```

```
CALI#sh access-lists
Extended IP access list 110
 10 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.2 (20 match(es))
 20 permit icmp any any echo-reply
 30 deny ip any any (8 match(es))
```

```
CALI#|
```

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

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

	LAN del Router MEDELLIN	WS_1	
	LAN del Router MEDELLIN	LAN del Router CALI	
PING	LAN del Router CALI	Servidor	OK
	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	

De esta manera se demuestra que la configuración establecida en los routers y Hosts de nuestra red se realizó de manera satisfactoria, con lo que su funcionamiento será óptimo y trabajará según lo solicitado

CONFIGURACIÓN FINAL DE CADA ROUTER

```
MEDELLIN#sh run
Building configuration...
```

```
Current configuration : 1351 bytes
```

```
!
```

```
version 15.1
```

```
no service timestamps log datetime msec
```

```
no service timestamps debug datetime msec
```

```
no service password-encryption
```

```
!
```

```
hostname MEDELLIN
```

```
!
```

```
!
```

```
!
```

```
enable secret 5 $1$mERr$Wyd7EjJiR63ydbH2eXZnL1
```

```
!  
!  
!  
!  
!  
no ip cef  
no ipv6 cef  
!  
!  
!  
license udi pid CISCO1941/K9 sn FTX1524KA97-  
!  
!  
!  
!  
!  
!  
!  
!  
ip ssh version 1  
ip host BOGOTA 192.168.1.130 192.168.1.1  
ip host CALI 192.168.1.131 192.168.1.65  
!  
!  
spanning-tree mode pvst  
!  
!  
!  
!  
!  
interface GigabitEthernet0/0  
description LAN MEDELLIN  
ip address 192.168.1.33 255.255.255.224  
ip access-group 110 in  
duplex auto  
speed auto  
!  
interface GigabitEthernet0/1  
no ip address  
duplex auto  
speed auto  
shutdown  
!
```

```

interface Serial0/0/0
description ENLACE MEDELLIN
ip address 192.168.1.99 255.255.255.224
clock rate 128000
!
interface Serial0/0/1
no ip address
clock rate 2000000
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
!
ip classless
!
ip flow-export version 9
!
!
access-list 110 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.2
access-list 110 permit icmp any any echo-reply
access-list 110 deny ip any any
!
banner motd ^CSolo personal autorizado por la UNAD^C
!
!
!
!
!
line con 0
password unad
login
!
line aux 0
!
line vty 0 4
password unad
login
transport input telnet
!
!
!
End

```

```
CALI#sh run
Building configuration...
```

```
Current configuration : 1278 bytes
```

```
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname CALI
!
!
!
enable secret 5 $1$mERr$Wyd7EjJiR63ydbH2eXZnL1
!
!
!
!
!
no ip cef
no ipv6 cef
!
!
!
!
!
!
license udi pid CISCO1941/K9 sn FTX1524Z3LQ-
!
!
!
!
!
!
!
ip ssh version 1
ip host BOGOTA 192.168.1.130 192.168.1.1
ip host MEDELLIN 192.168.1.99 192.168.1.33
!
!
spanning-tree mode pvst
!
!
```

```

!
!
!
interface GigabitEthernet0/0
ip address 192.168.1.65 255.255.255.224
ip access-group 110 in
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
shutdown
!
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
!
ip classless
!
ip flow-export version 9
!
!
access-list 110 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.2
access-list 110 permit icmp any any echo-reply
access-list 110 deny ip any any
!
banner motd ^CSolo personal autorizado por la UNAD^C
!
!
!
!
!
line con 0

```

```
password unad
login
!
line aux 0
!
line vty 0 4
password unad
login
transport input telnet
!
!
!
End
```

```
BOGOTA#sh run
Building configuration...
```

```
Current configuration : 1331 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname BOGOTA
!
!
!
enable secret 5 $1$mERr$Wyd7EjJiR63ydbH2eXZnL1
!
!
!
!
!
no ip cef
no ipv6 cef
!
!
!
!
license udi pid CISCO1941/K9 sn FTX1524J26P-
!
!
!
!
```

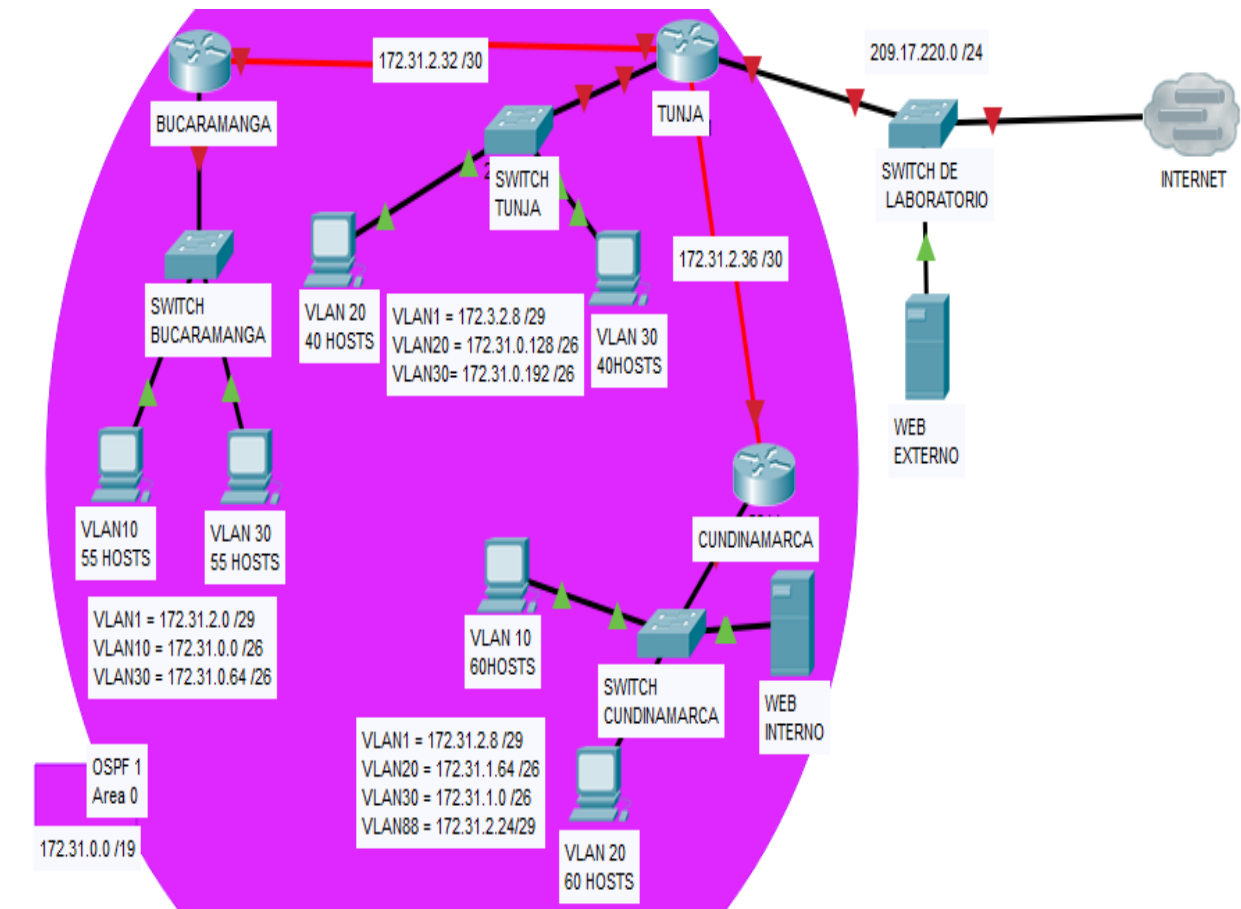
```
!  
!  
!  
!  
ip ssh version 1  
ip host CALI 192.168.1.131 192.168.1.65  
ip host MEDELLIN 192.168.1.99 192.168.1.33  
!  
!  
spanning-tree mode pvst  
!  
!  
!  
!  
!  
interface GigabitEthernet0/0  
ip address 192.168.1.1 255.255.255.224  
ip access-group 110 out  
duplex auto  
speed auto  
!  
interface GigabitEthernet0/1  
no ip address  
duplex auto  
speed auto  
shutdown  
!  
interface Serial0/0/0  
description ENLACE MEDELLIN  
ip address 192.168.1.98 255.255.255.224  
!  
interface Serial0/0/1  
description ENLACE CALI  
ip address 192.168.1.130 255.255.255.224  
clock rate 128000  
!  
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  
!  
ip classless
```

```
!  
ip flow-export version 9  
!  
!  
access-list 110 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.2  
access-list 110 deny ip any any  
!  
banner motd ^CSolo personal autorizado por la UNAD^C  
!  
!  
!  
!  
line con 0  
password unad  
login  
!  
line aux 0  
!  
line vty 0 4  
password unad  
login  
transport input telnet  
!  
!  
!  
End
```

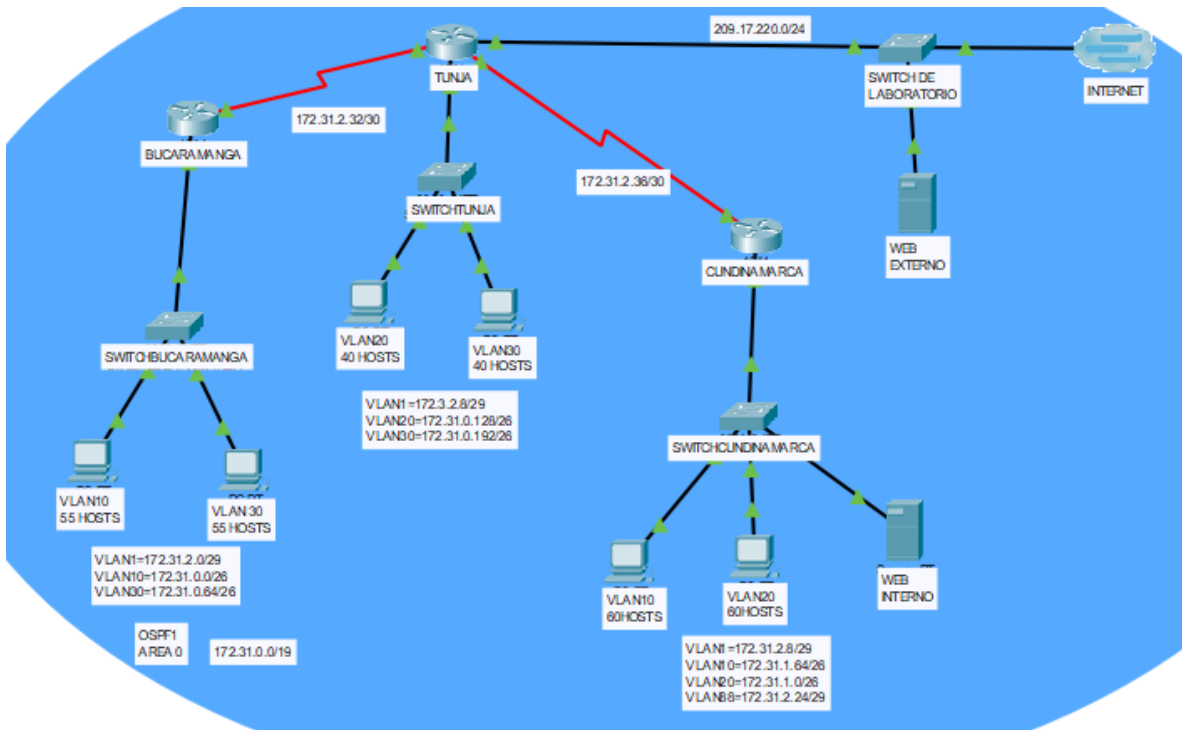
ESCENARIO 2

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

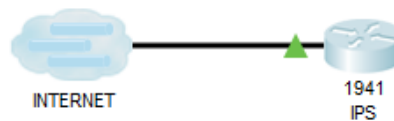
TOPOLOGIA DE LA RED



Topología de la red propuesta desarrollada en packet tracer
Pka 1



Pka 2



Se crean 2 pka el primero donde esta toda la red, el segundo pka se hace con un enlace Multiuser se enlaza con el primer pka para dar salida a internet

Desarrollo

Los siguientes son los requerimientos necesarios:

1. **Todos los routers deberán tener los siguiente:**

Configuración de autenticación

- Autenticación local con AAA.

Configuración autenticación

```
Router(config)#hostname TUNJA
```

```
TUNJA(config)#aaa new-model
```

```
TUNJA(config)#aaa authentication login LOCAL_AUTH local
```

```
Router(config)#hostname BUCARAMANGA
```

```
BUCARAMANGA(config)#aaa new-model
BUCARAMANGA(config)#aaa authentication login LOCAL_AUTH local
```

```
Router(config)#hostname CUNDINAMARCA
CUNDINAMARCA(config)#aaa new-model
CUNDINAMARCA(config)#aaa authentication login LOCAL_AUTH local
```

Configuración de consola

```
TUNJA(config)#line con 0
TUNJA(config-line)#exec-timeout 50
TUNJA(config-line)#logging synchronous
TUNJA(config-line)#login authentication LOCAL_AUTH
```

```
BUCARAMANGA(config)#line con 0
BUCARAMANGA(config-line)#exec-timeout 50
BUCARAMANGA(config-line)#logging synchronous
BUCARAMANGA(config-line)#login authentication LOCAL_AUTH
```

```
CUNDINAMARCA(config)#line con 0
CUNDINAMARCA(config-line)#exec-timeout 50
CUNDINAMARCA(config-line)#logging synchronous
CUNDINAMARCA(config-line)#login authentication LOCAL_AUTH
```

Configuración de terminal virtual

```
TUNJA(config)#line vty 0 4
TUNJA(config-line)#exec-time 5 0
TUNJA(config-line)#login authentication LOCAL_AUTH
```

```
BUCARAMANGA(config)#line vty 0 4
BUCARAMANGA(config-line)#exec-time 5 0
BUCARAMANGA(config-line)#login authentication LOCAL_AUTH
```

```
CUNDINAMARCA(config)#line vty 0 4
CUNDINAMARCA(config-line)#exec-time 5 0
CUNDINAMARCA(config-line)#login authentication LOCAL_AUTH
```

Usuarios registrados en todos los routers

```
TUNJA(config)#username TUNJA privilege 7 password 0 network
TUNJA(config)#username utunja password 0 utunja
TUNJA(config)#username ubucaramanga password 0 ubucaramanga
TUNJA(config)#username ucundinamarca password 0 ucundinamarca
```

```
BUCARAMANGA(config)#username TUNJA privilege 7 password 0 network
BUCARAMANGA(config)#username utunja password 0 utunja
BUCARAMANGA(config)#username ubucaramanga password 0 ubucaramanga
BUCARAMANGA(config)#username ucundinamarca password 0 ucundinamarca
```

```
CUNDINAMARCA(config-line)#username TUNJA privilege 7 password 0 network
CUNDINAMARCA(config)#username utunja password 0 utunja
CUNDINAMARCA(config)#username ubucaramanga password 0 ubucaramanga
CUNDINAMARCA(config)#username ucundinamarca password 0 ucundinamarca
```

Un máximo de internos para acceder al router.

```
TUNJA(config)#login block-for 240 attempts 4 within 120
```

```
BUCARAMANGA(config)#login block-for 240 attempts 4 within 120
```

```
CUNDINAMARCA(config)#login block-for 240 attempts 4 within 120
```

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

```
CUNDINAMARCA#copy running-config tftp
Address or name of remote host []? 172.31.2.26
Destination filename [CUNDINAMARCA-confg]? Backup CUNDINAMARCA
```

```
Writing running-config...!!
[OK - 2491 bytes]
```

```
2491 bytes copied in 0 secs
CUNDINAMARCA#
```

```
TUNJA#copy running-config tftp
Address or name of remote host []? 172.31.2.26
Destination filename [TUNJA-confg]? Bakup_tunja
```

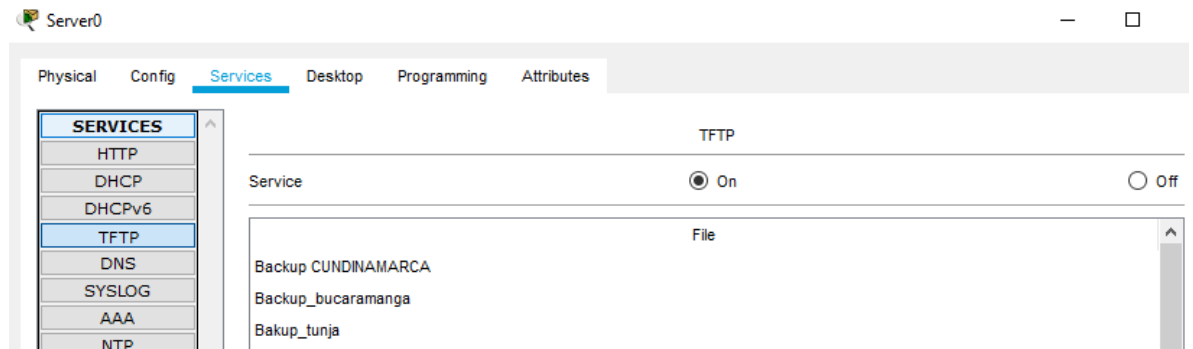
```
Writing running-config...!!
[OK - 3105 bytes]
```

```
3105 bytes copied in 0.003 secs (1035000 bytes/sec)
TUNJA#
```

```
BUCARAMANGA#copy running-config tftp
Address or name of remote host []? 172.31.2.26
Destination filename [BUCARAMANGA-config]? Backup_bucaramanga
```

```
Writing running-config...!!
[OK - 2372 bytes]
```

```
2372 bytes copied in 0.005 secs (474400 bytes/sec)
BUCARAMANGA#
```



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

El Router Tunja será el que realice la más grande configuración para los servicios de los hosts de Bucaramanga y Cundinamarca

```
TUNJA(config)#ip dhcp excluded-address 172.31.1.65 172.31.1.70
TUNJA(config)#ip dhcp excluded-address 172.31.1.1 172.31.1.5
TUNJA(config)#ip dhcp excluded-address 172.31.0.1 172.31.0.5
TUNJA(config)#ip dhcp excluded-address 172.31.0.65 172.31.0.70
```

Se establece los pools de cada VLAN

```
TUNJA#conf t
Enter configuration commands, one per line. End with CNTL/Z.
TUNJA(config)#ip dhcp pool ica-30
TUNJA(dhcp-config)#net
TUNJA(dhcp-config)#network 172.31.0.64 255.255.255.192
TUNJA(dhcp-config)#default-router 172.31.0.65
TUNJA(dhcp-config)#exit
TUNJA(config)#ip dhcp pool t-10
TUNJA(dhcp-config)#network 172.31.1.0 255.255.255.192
TUNJA(dhcp-config)#default-router 172.31.1.1
TUNJA(dhcp-config)#exit
TUNJA(config)#ip dhcp pool t-20
```

```
TUNJA(dhcp-config)#network 172.31.1.64 255.255.255.192
TUNJA(dhcp-config)#default-router 172.31.1.65
TUNJA(dhcp-config)#ip dhcp pool ica-10
TUNJA(dhcp-config)#network 172.31.0.0 255.255.255.192
TUNJA(dhcp-config)#default-router 172.31.0.1
```

Las subinterfaces de los Router Bucaramanga y Cundinamarca se da paso del broadcast DHCP para el Router de Tunja

```
BUCARAMANGA(config)#interface gigabitEthernet 0/0.10
BUCARAMANGA(config-subif)#ip helper-address 172.31.2.34
BUCARAMANGA(config-subif)#interface gigabitEthernet 0/0.30
BUCARAMANGA(config-subif)#ip helper-address 172.31.2.34
```

```
CUNDINAMARCA(config)#interface gigabitEthernet 0/0.10
CUNDINAMARCA(config-subif)#ip helper-address 172.31.2.38
CUNDINAMARCA(config-subif)#interface gigabitEthernet 0/0.30
CUNDINAMARCA(config-subif)#ip helper-address 172.31.2.38
```

3.EL WEB SERVER DEBERÁ TENER NAT ESTÁTICO Y EL RESTO DE LOS EQUIPOS DE LA TOPOLOGÍA EMPLEARAN NAT DE SOBRECARGA (PAT).

Nat en router tunja

```
TUNJA(config)#ip nat inside source list 20 interface gigabitEthernet 0/0 overload
TUNJA(config)#ip nat inside source static 172.31.2.26 209.17.220.10
TUNJA(config)#access-list 20 permit 172.31.0.0 0.0.31.255
```

Se definen las entradas y salidas del servicio en cada interface

```
TUNJA(config)#interface gigabitEthernet 0/0
TUNJA(config-if)#ip nat outside
TUNJA(config-if)#interface gigabitEthernet 0/1
TUNJA(config-if)#ip nat inside
TUNJA(config-if)#interface s0/0/0
TUNJA(config-if)#ip nat inside
TUNJA(config-if)#interface s0/0/1
TUNJA(config-if)#ip nat inside
TUNJA(config-if)#
```

4.EL ENRUTAMIENTO DEBERÁ TENER AUTENTICACIÓN.

```
TUNJA(config)#interface serial0/0/0
TUNJA(config-if)#ip ospf message-digest-key 1 md5 7 network
```

```
TUNJA(config-if)#router ospf 1
TUNJA(config-router)#area 0 authentication message-digest
TUNJA(config-router)#interface serial0/0/1
TUNJA(config-router)#ip ospf message-digest-key 1 md5 7 network
TUNJA(config-if)#router ospf 1
TUNJA(config-router)#area 0 authentication message-digest
```

```
BUCARAMANGA(config)#interface s0/0/0
BUCARAMANGA(config-if)#ip ospf message-digest-key 1 md5 7 network
BUCARAMANGA(config-if)#router ospf 1
BUCARAMANGA(config-router)#area 0 authentication message-digest
BUCARAMANGA(config-router)#
```

```
CUNDINAMARCA(config)#interface s0/0/0
CUNDINAMARCA(config-if)#ip ospf message-digest-key 1 md5 7 network
CUNDINAMARCA(config-if)#router ospf 1
CUNDINAMARCA(config-router)#area 0 authentication message-digest
CUNDINAMARCA(config-router)#
```

Configuración de interfaces

```
TUNJA(config)#interface gigabitEthernet 0/0
TUNJA(config-if)#ip address 209.17.220.200 255.255.255.0
TUNJA(config-if)#ip nat outside
TUNJA(config-if)#no shutdown
TUNJA(config)#interface gigabitEthernet 0/1.1
TUNJA(config-subif)#encapsulation dot1q 1 native
TUNJA(config-subif)#ip address 172.31.2.9 255.255.255.248
TUNJA(config-subif)#ip access-group 102 in
TUNJA(config-subif)#interface gigabitEthernet 0/1.20
TUNJA(config-subif)#encapsulation dot1q 20
TUNJA(config-subif)#ip address 172.31.0.129 255.255.255.192
TUNJA(config-subif)#ip access-group 102 in
TUNJA(config-subif)#interface gigabitEthernet 0/1.30
TUNJA(config-subif)#encapsulation dot1q 30
TUNJA(config-subif)#ip address 172.31.0.193 255.255.255.192
TUNJA(config-subif)#ip access-group 103 in
```

```
TUNJA(config-subif)#interface serial 0/0/0
TUNJA(config-if)#ip address 172.31.2.34 255.255.255.252
TUNJA(config-if)#ip ospf message-digest-key 1 md5 7 network
OSPF: Key 1 already exists
TUNJA(config-if)#ip nat inside
TUNJA(config-if)#clock rate 64000
TUNJA(config-if)#no shutdown
```

```
TUNJA(config-if)#interface serial 0/0/1
TUNJA(config-if)#ip address 172.31.2.38 255.255.255.252
TUNJA(config-if)#ip ospf message-digest-key 1 md5 7 network
TUNJA(config-if)#ip nat inside
TUNJA(config-if)#clock rate 64000
TUNJA(config-if)#no shutdown
```

```
BUCARAMANGA(config)#interface gigabitEthernet 0/0.1
BUCARAMANGA(config-subif)#encapsulation dot1Q 1 native
BUCARAMANGA(config-subif)#ip address 172.31.2.1 255.255.255.248
BUCARAMANGA(config-subif)#interface gigabitEthernet 0/0.10
BUCARAMANGA(config-subif)#encapsulation dot1Q 10
BUCARAMANGA(config-subif)#ip address 172.31.0.1 255.255.255.192
BUCARAMANGA(config-subif)#ip access-group 101 in
BUCARAMANGA(config-subif)#interface gigabitEthernet 0/0.30
BUCARAMANGA(config-subif)#encapsulation dot1Q 30
BUCARAMANGA(config-subif)#ip address 172.31.0.65 255.255.255.192
BUCARAMANGA(config-subif)#ip access-group 103 in
BUCARAMANGA(config-subif)#no shutdown
```

```
BUCARAMANGA(config)#interface serial0/0/0
BUCARAMANGA(config-if)#ip address 172.31.2.33 255.255.255.252
BUCARAMANGA(config-if)#no shutdown
```

```
CUNDINAMARCA(config-if)#interface gigabitEthernet 0/0.1
CUNDINAMARCA(config-subif)#encapsulation dot1Q 1 native
CUNDINAMARCA(config-subif)#ip address 172.31.2.17 255.255.255.248
CUNDINAMARCA(config-subif)#interface gigabitEthernet 0/0.10
CUNDINAMARCA(config-subif)#encapsulation dot1Q 10
CUNDINAMARCA(config-subif)#ip address 172.31.1.65 255.255.255.192
CUNDINAMARCA(config-subif)#interface gigabitEthernet 0/0.20
CUNDINAMARCA(config-subif)#encapsulation dot1Q 20
CUNDINAMARCA(config-subif)#ip address 172.31.1.1 255.255.255.192
CUNDINAMARCA(config-subif)#ip access-group 102 in
CUNDINAMARCA(config-subif)#interface gigabitEthernet 0/0.10
CUNDINAMARCA(config-subif)#ip access-group 101 in
CUNDINAMARCA(config-subif)#interface gigabitEthernet 0/0.88
CUNDINAMARCA(config-subif)#encapsulation dot1Q 88
CUNDINAMARCA(config-subif)#ip address 172.31.2.25 255.255.255.248
CUNDINAMARCA(config-subif)#interface serial0/0/0
CUNDINAMARCA(config-if)#ip address 172.31.2.37 255.255.255.252
CUNDINAMARCA(config-if)#no shutdown
```


5.LISTAS DE CONTROL DE ACCESO:

```
BUCARAMANGA(config)#access-list 101 permit udp host 0.0.0.0 eq bootpc host  
255.255.255.255 eq bootps
```

```
BUCARAMANGA(config)#access-list 101 permit ip 172.31.0.0 0.0.0.63  
172.31.0.128 0.0.0.63
```

```
BUCARAMANGA(config)#access-list 101 permit ip 172.31.0.0 0.0.0.63 172.31.1.0  
0.0.0.63
```

```
BUCARAMANGA(config)#access-list 103 permit udp host 0.0.0.0 eq bootpc host  
255.255.255.255 eq bootps
```

```
BUCARAMANGA(config)#access-list 103 deny ip 172.31.0.64 0.0.0.63 172.31.0.0  
0.0.255.255
```

```
BUCARAMANGA(config)#access-list 103 permit ip 172.31.0.64 0.0.0.63 any  
BUCARAMANGA(config)#
```

```
TUNJA(config)#access-list 20 permit 172.31.0.0 0.0.31.255
```

```
TUNJA(config)#access-list 102 permit ip 172.31.0.128 0.0.0.63 172.31.0.0 0.0.0.63
```

```
TUNJA(config)#access-list 102 permit ip 172.31.0.128 0.0.0.63 172.31.1.0 0.0.0.63
```

```
TUNJA(config)#access-list 103 permit tcp 172.31.0.192 0.0.0.63 any eq www
```

```
TUNJA(config)#access-list 103 permit tcp 172.31.0.192 0.0.0.63 any eq ftp
```

```
CUNDINAMARCA(config)#access-list 102 permit udp host 0.0.0.0 eq bootpc host  
255.255.255.255 eq bootps
```

```
CUNDINAMARCA(config)#access-list 102 permit ip 172.31.1.0 0.0.0.63  
172.31.0.128 0.0.0.63
```

```
CUNDINAMARCA(config)#access-list 102 permit ip 172.31.1.0 0.0.0.63 172.31.0.0  
0.0.0.63
```

```
CUNDINAMARCA(config)#access-list 101 permit udp host 0.0.0.0 eq bootpc host  
255.255.255.255 eq bootps
```

```
CUNDINAMARCA(config)#access-list 101 permit ip 172.31.1.64 0.0.0.63 any
```

```
CUNDINAMARCA(config)#access-list 101 deny ip 172.31.1.64 0.0.0.63 172.31.0.0  
0.0.255.255
```

Configuracion de ospf1 en los Routers

Ospf tuna

```
TUNJA(config)#router ospf 1
```

```
TUNJA(config-router)#log-adjacency-changes
```

```
TUNJA(config-router)#area 0 authentication message-digest
```

```
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 172.31.2.8 0.0.0.7 area 0
TUNJA(config-router)#network 172.31.2.32 0.0.0.7 area 0
TUNJA(config-router)#default-information originate
TUNJA(config-router)#exit
```

Ospf Bucaramanga

```
BUCARAMANGA#conf t
Enter configuration commands, one per line. End with CNTL/Z.
BUCARAMANGA(config)#router ospf 1
BUCARAMANGA(config-router)#log-adjacency-changes
BUCARAMANGA(config-router)#area 0 authentication message-digest
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 0.0.0.7 area 0
BUCARAMANGA(config-router)#exit
BUCARAMANGA(config)#exit
BUCARAMANGA#
```

Ospf Cundinamarca

```
CUNDINAMARCA#conf t
Enter configuration commands, one per line. End with CNTL/Z.
CUNDINAMARCA(config)#router ospf 1
CUNDINAMARCA(config-router)#log-adjacency-changes
CUNDINAMARCA(config-router)#area 0 authentication message-digest
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 172.31.2.16 0.0.0.7 area 0
CUNDINAMARCA(config-router)#network 172.31.2.36 0.0.0.7 area 0
CUNDINAMARCA(config-router)#network 172.31.2.24 0.0.0.7 area 0
CUNDINAMARCA(config-router)#
```

Tabla de vecinos

```
CUNDINAMARCA#sh ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
209.17.220.200	0	FULL/ -	00:00:32	172.31.2.38	Serial0/0/0

```
CUNDINAMARCA#
```

```
TUNJA#sh ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
172.31.2.33	0	FULL/ -	00:00:31	172.31.2.33	Serial0/0/0
172.31.2.37	0	FULL/ -	00:00:31	172.31.2.37	Serial0/0/1

```
TUNJA#|
```

```
BUCARAMANGA#sh ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
209.17.220.200	0	FULL/ -	00:00:33	172.31.2.34	Serial0/0/0

```
BUCARAMANGA#|
```

Base de datos topología

```
CUNDINAMARCA#sh ip ospf database
```

```
OSPF Router with ID (172.31.2.37) (Process ID 1)
```

```
Router Link States (Area 0)
```

Link ID	ADV Router	Age	Seq#	Checksum	Link count
172.31.2.33	172.31.2.33	1770	0x80000009	0x008b9f	5
172.31.2.37	172.31.2.37	1655	0x8000000d	0x009381	6
209.17.220.200	209.17.220.200	1655	0x80000012	0x00ef18	7

```
Type-5 AS External Link States
```

Link ID	ADV Router	Age	Seq#	Checksum	Tag
0.0.0.0	209.17.220.200	1779	0x80000004	0x006fd7	1

```
CUNDINAMARCA#|
```

```
TUNJA#sh ip ospf database
```

```
OSPF Router with ID (209.17.220.200) (Process ID 1)
```

```
Router Link States (Area 0)
```

Link ID	ADV Router	Age	Seq#	Checksum	Link count
172.31.2.33	172.31.2.33	1744	0x8000000c	0x0085a2	5
209.17.220.200	209.17.220.200	1743	0x80000012	0x00ef18	7
172.31.2.37	172.31.2.37	1743	0x8000000d	0x009381	6

```
Type-5 AS External Link States
```

Link ID	ADV Router	Age	Seq#	Checksum	Tag
0.0.0.0	209.17.220.200	65	0x80000005	0x006dd8	1

```
TUNJA#|
```

```
BUCARAMANGA#sh ip ospf database
```

```
OSPF Router with ID (172.31.2.33) (Process ID 1)
```

```
Router Link States (Area 0)
```

Link ID	ADV Router	Age	Seq#	Checksum	Link count
172.31.2.33	172.31.2.33	1799	0x8000000c	0x0085a2	5
172.31.2.37	172.31.2.37	1798	0x8000000d	0x009381	6
209.17.220.200	209.17.220.200	1798	0x80000012	0x00ef18	7

```
Type-5 AS External Link States
```

Link ID	ADV Router	Age	Seq#	Checksum	Tag
0.0.0.0	209.17.220.200	120	0x80000005	0x006dd8	1

```
BUCARAMANGA#|
```

Tabla de enrutamiento

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

Gateway of last resort is 172.31.2.38 to network 0.0.0.0

    172.31.0.0/16 is variably subnetted, 17 subnets, 4 masks
O       172.31.0.0/26 [110/129] via 172.31.2.38, 00:32:42, Serial0/0/0
O       172.31.0.64/26 [110/129] via 172.31.2.38, 00:32:42, Serial0/0/0
O       172.31.0.128/26 [110/65] via 172.31.2.38, 00:32:42, Serial0/0/0
O       172.31.0.192/26 [110/65] via 172.31.2.38, 00:32:42, Serial0/0/0
C       172.31.1.0/26 is directly connected, GigabitEthernet0/0.20
L       172.31.1.1/32 is directly connected, GigabitEthernet0/0.20
C       172.31.1.64/26 is directly connected, GigabitEthernet0/0.10
L       172.31.1.65/32 is directly connected, GigabitEthernet0/0.10
O       172.31.2.0/29 [110/129] via 172.31.2.38, 00:32:42, Serial0/0/0
O       172.31.2.8/29 [110/65] via 172.31.2.38, 00:32:42, Serial0/0/0
C       172.31.2.16/29 is directly connected, GigabitEthernet0/0.1
L       172.31.2.17/32 is directly connected, GigabitEthernet0/0.1
C       172.31.2.24/29 is directly connected, GigabitEthernet0/0.88
L       172.31.2.25/32 is directly connected, GigabitEthernet0/0.88
O       172.31.2.32/30 [110/128] via 172.31.2.38, 00:32:42, Serial0/0/0
C       172.31.2.36/30 is directly connected, Serial0/0/0
L       172.31.2.37/32 is directly connected, Serial0/0/0
O*E2 0.0.0.0/0 [110/1] via 172.31.2.38, 00:32:42, Serial0/0/0

CUNDINAMARCA#
```

```
TUNJA#sh ip route
```

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

```
Gateway of last resort is 0.0.0.0 to network 0.0.0.0
```

```
172.31.0.0/16 is variably subnetted, 17 subnets, 4 masks
O 172.31.0.0/26 [110/65] via 172.31.2.33, 00:34:14, Serial0/0/0
O 172.31.0.64/26 [110/65] via 172.31.2.33, 00:34:14, Serial0/0/0
C 172.31.0.128/26 is directly connected, GigabitEthernet0/1.20
L 172.31.0.129/32 is directly connected, GigabitEthernet0/1.20
C 172.31.0.192/26 is directly connected, GigabitEthernet0/1.30
L 172.31.0.193/32 is directly connected, GigabitEthernet0/1.30
O 172.31.1.0/26 [110/65] via 172.31.2.37, 00:34:14, Serial0/0/1
O 172.31.1.64/26 [110/65] via 172.31.2.37, 00:34:14, Serial0/0/1
O 172.31.2.0/29 [110/65] via 172.31.2.33, 00:34:14, Serial0/0/0
C 172.31.2.8/29 is directly connected, GigabitEthernet0/1.1
L 172.31.2.9/32 is directly connected, GigabitEthernet0/1.1
O 172.31.2.16/29 [110/65] via 172.31.2.37, 00:34:14, Serial0/0/1
O 172.31.2.24/29 [110/65] via 172.31.2.37, 00:34:14, Serial0/0/1
C 172.31.2.32/30 is directly connected, Serial0/0/0
L 172.31.2.34/32 is directly connected, Serial0/0/0
C 172.31.2.36/30 is directly connected, Serial0/0/1
L 172.31.2.38/32 is directly connected, Serial0/0/1
209.17.220.0/24 is variably subnetted, 2 subnets, 2 masks
C 209.17.220.0/24 is directly connected, GigabitEthernet0/0
L 209.17.220.200/32 is directly connected, GigabitEthernet0/0
S* 0.0.0.0/0 is directly connected, GigabitEthernet0/0
```

```
TUNJA#|
```

```
BUCARAMANGA#sh ip route
```

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

```
Gateway of last resort is 172.31.2.34 to network 0.0.0.0
```

```
172.31.0.0/16 is variably subnetted, 16 subnets, 4 masks
C 172.31.0.0/26 is directly connected, GigabitEthernet0/0.10
L 172.31.0.1/32 is directly connected, GigabitEthernet0/0.10
C 172.31.0.64/26 is directly connected, GigabitEthernet0/0.30
L 172.31.0.65/32 is directly connected, GigabitEthernet0/0.30
O 172.31.0.128/26 [110/65] via 172.31.2.34, 00:35:39, Serial0/0/0
O 172.31.0.192/26 [110/65] via 172.31.2.34, 00:35:39, Serial0/0/0
O 172.31.1.0/26 [110/129] via 172.31.2.34, 00:35:39, Serial0/0/0
O 172.31.1.64/26 [110/129] via 172.31.2.34, 00:35:39, Serial0/0/0
C 172.31.2.0/29 is directly connected, GigabitEthernet0/0.1
L 172.31.2.1/32 is directly connected, GigabitEthernet0/0.1
O 172.31.2.8/29 [110/65] via 172.31.2.34, 00:35:39, Serial0/0/0
O 172.31.2.16/29 [110/129] via 172.31.2.34, 00:35:39, Serial0/0/0
O 172.31.2.24/29 [110/129] via 172.31.2.34, 00:35:39, Serial0/0/0
C 172.31.2.32/30 is directly connected, Serial0/0/0
L 172.31.2.33/32 is directly connected, Serial0/0/0
O 172.31.2.36/30 [110/128] via 172.31.2.34, 00:35:39, Serial0/0/0
O*E2 0.0.0.0/0 [110/1] via 172.31.2.34, 00:35:39, Serial0/0/0
```

```
BUCARAMANGA#|
```

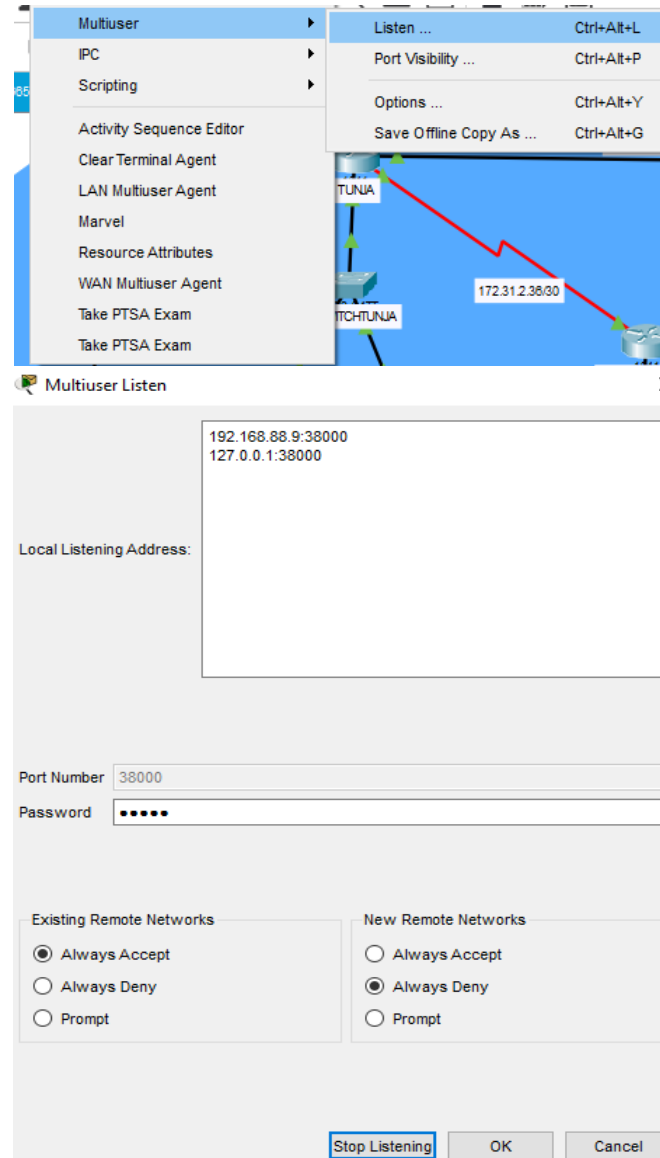
Tabla de NAT

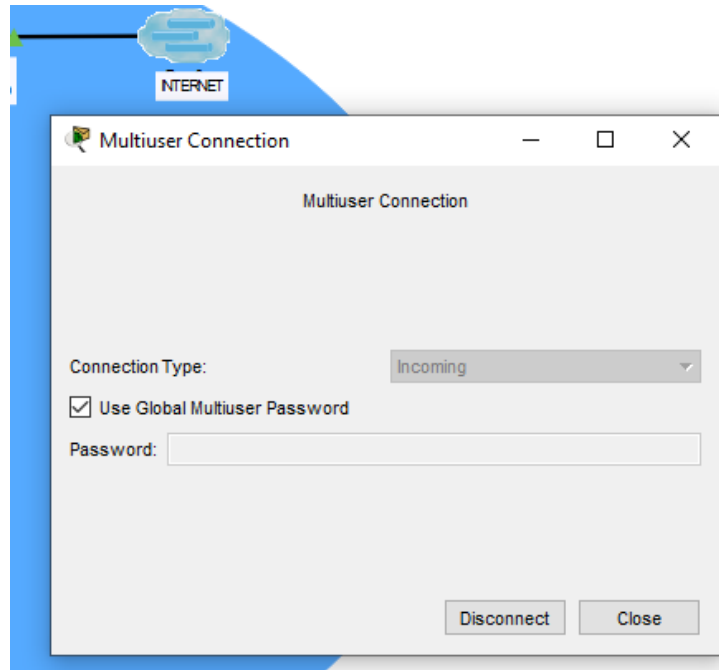
```
TUNJA#sh ip nat translations
Pro  Inside global      Inside local      Outside local      Outside global
---  209.17.220.10      172.31.2.26      ---                ---

TUNJA# |
```

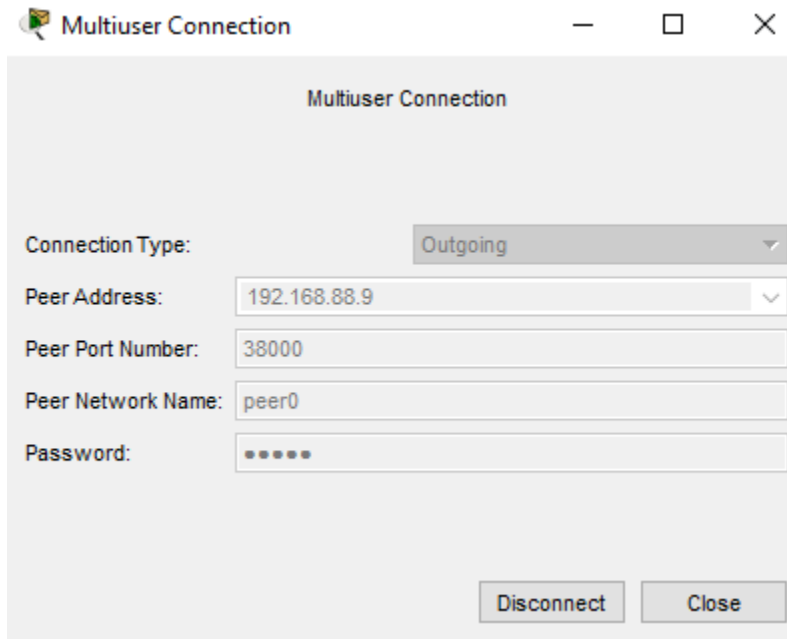
Se configuro en los 2 pka el modo multiuser en el segundo pka se configuró un Router IPS para la salida de internet

Se habilita configura del multiuser





En el segundo pka se configura el otro multiuser con los datos del primer multiuser del primer pka



6.CONFIGURACION ROUTER ISP

ISP#

```
interface GigabitEthernet0/0
```

```
ip address 209.17.220.254 255.255.255.0
```

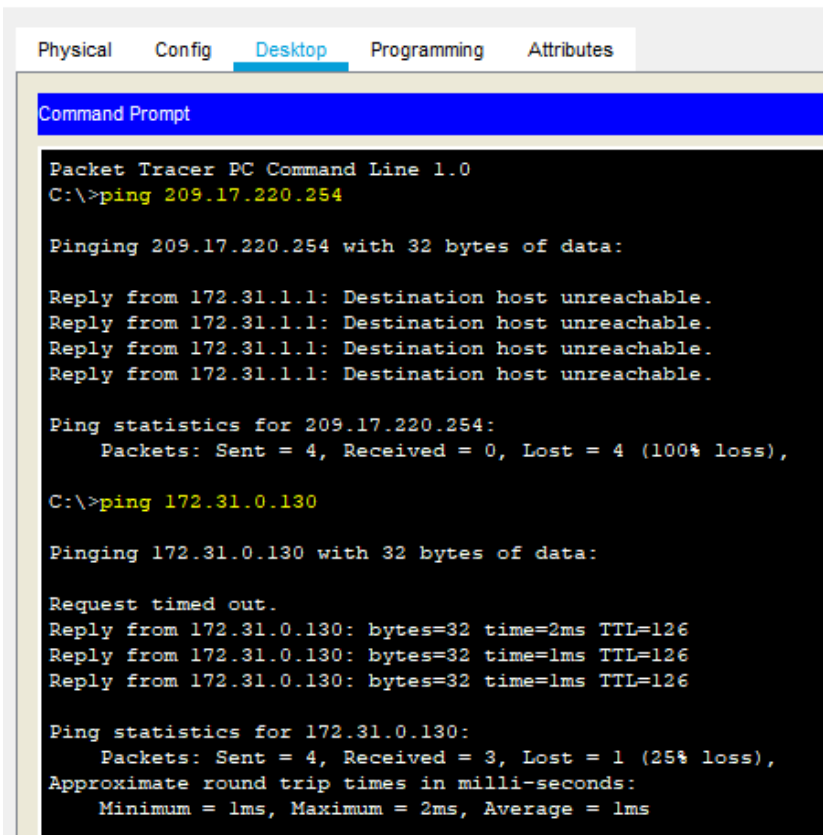
```
ip classless
```

```
ip route 172.31.0.0 255.255.224.0 209.17.220.200
```

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

Prueba de pc VLAN 20 de Cundinamarca se hace ping a la ip de salida a internet 209.17.220.254 no hay respuesta y se hace prueba de ping a la red interna de Tunja a la ip 172.31.0.130 donde si hay respuesta.

PC5



```
Physical  Config  Desktop  Programming  Attributes
Command Prompt
Packet Tracer PC Command Line 1.0
C:\>ping 209.17.220.254

Pinging 209.17.220.254 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 209.17.220.254:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 172.31.0.130

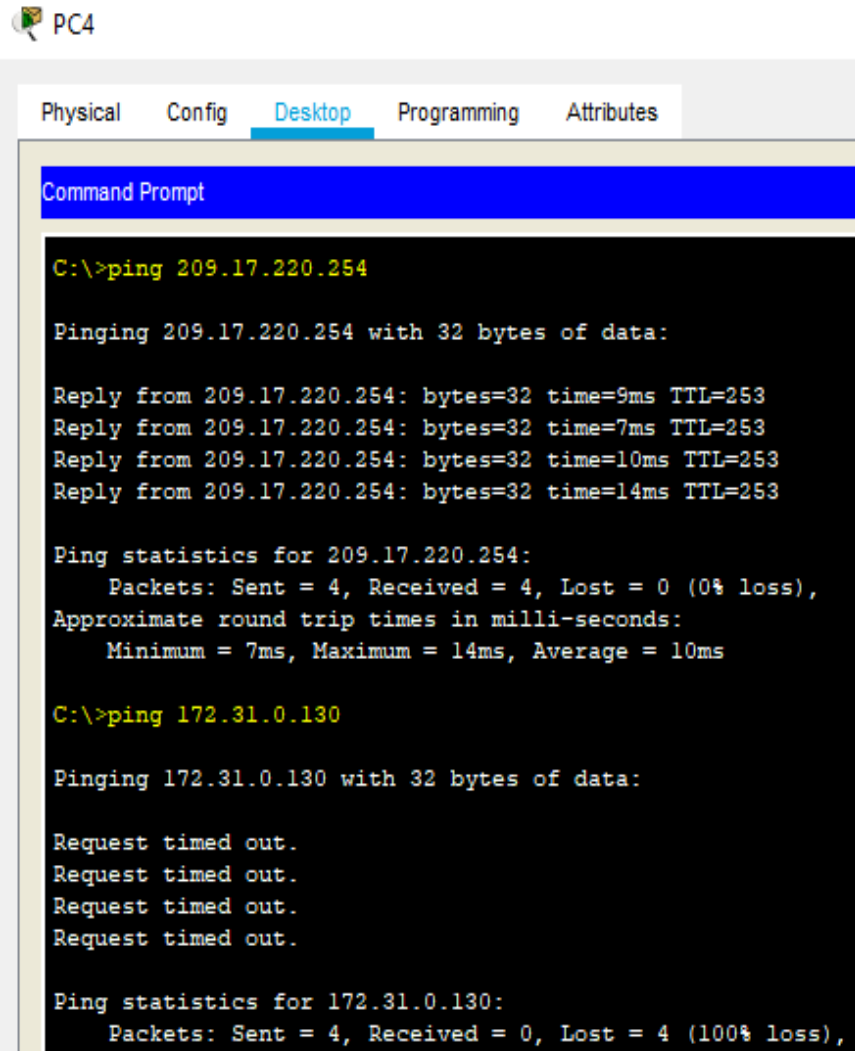
Pinging 172.31.0.130 with 32 bytes of data:

Request timed out.
Reply from 172.31.0.130: bytes=32 time=2ms TTL=126
Reply from 172.31.0.130: bytes=32 time=1ms TTL=126
Reply from 172.31.0.130: bytes=32 time=1ms TTL=126

Ping statistics for 172.31.0.130:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms
```


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

Prueba de pc VLAN 10 de Cundinamarca se hace ping a la ip de salida a internet 209.17.220.254 y se observa que si hay respuesta y se hace prueba de ping a la red interna de Tunja a la ip 172.31.0.130 donde no hay respuesta.



The screenshot shows a PC4 desktop environment with a Command Prompt window open. The window title is "Command Prompt" and it has tabs for "Physical", "Config", "Desktop", "Programming", and "Attributes". The "Desktop" tab is selected. The Command Prompt shows the following output:

```
C:\>ping 209.17.220.254

Pinging 209.17.220.254 with 32 bytes of data:

Reply from 209.17.220.254: bytes=32 time=9ms TTL=253
Reply from 209.17.220.254: bytes=32 time=7ms TTL=253
Reply from 209.17.220.254: bytes=32 time=10ms TTL=253
Reply from 209.17.220.254: bytes=32 time=14ms TTL=253

Ping statistics for 209.17.220.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 7ms, Maximum = 14ms, Average = 10ms

C:\>ping 172.31.0.130

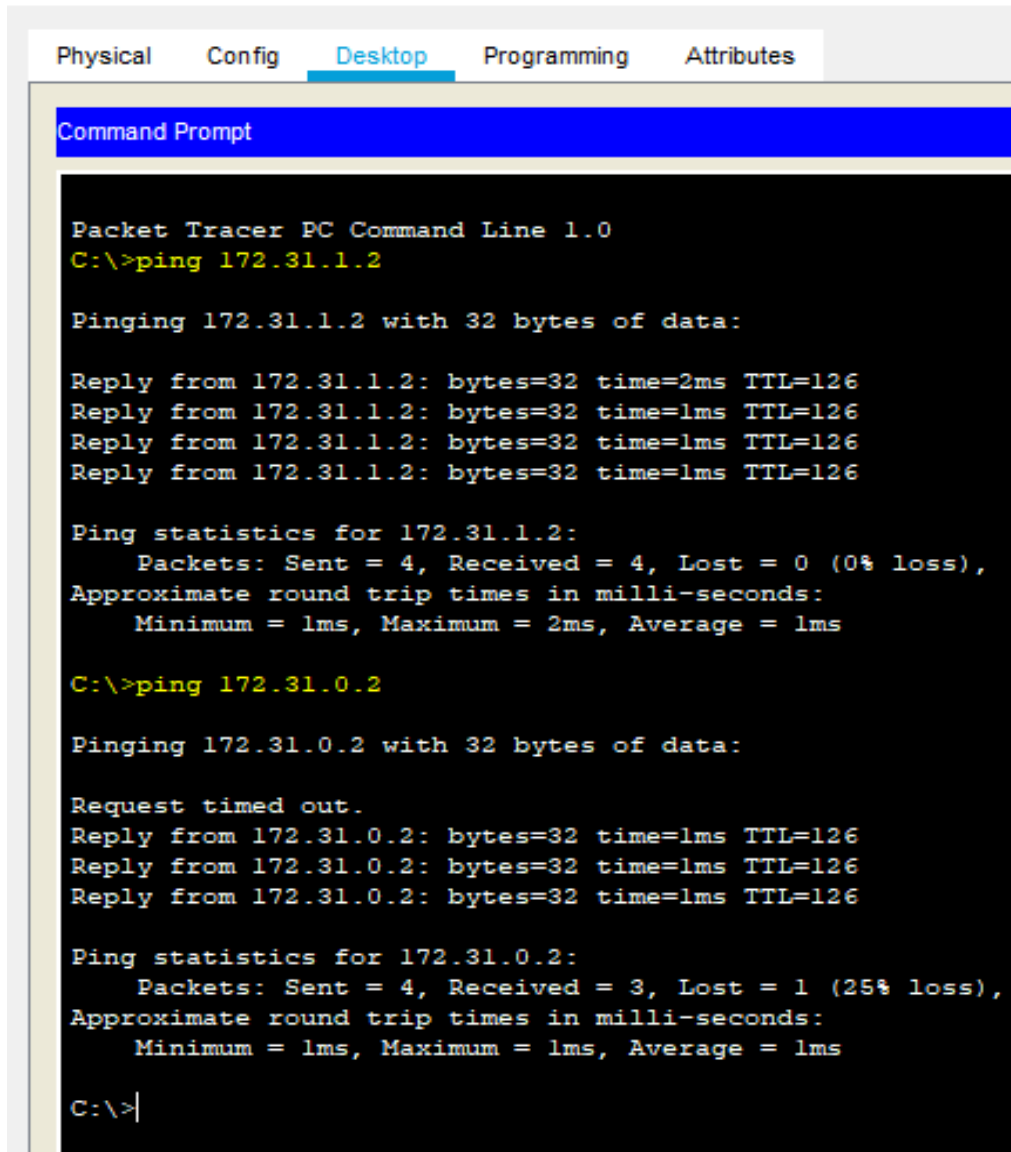
Pinging 172.31.0.130 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

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

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

PC2



```
Physical  Config  Desktop  Programming  Attributes
Command Prompt

Packet Tracer PC Command Line 1.0
C:\>ping 172.31.1.2

Pinging 172.31.1.2 with 32 bytes of data:

Reply from 172.31.1.2: bytes=32 time=2ms TTL=126
Reply from 172.31.1.2: bytes=32 time=1ms TTL=126
Reply from 172.31.1.2: bytes=32 time=1ms TTL=126
Reply from 172.31.1.2: bytes=32 time=1ms TTL=126

Ping statistics for 172.31.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\>ping 172.31.0.2

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=1ms TTL=126

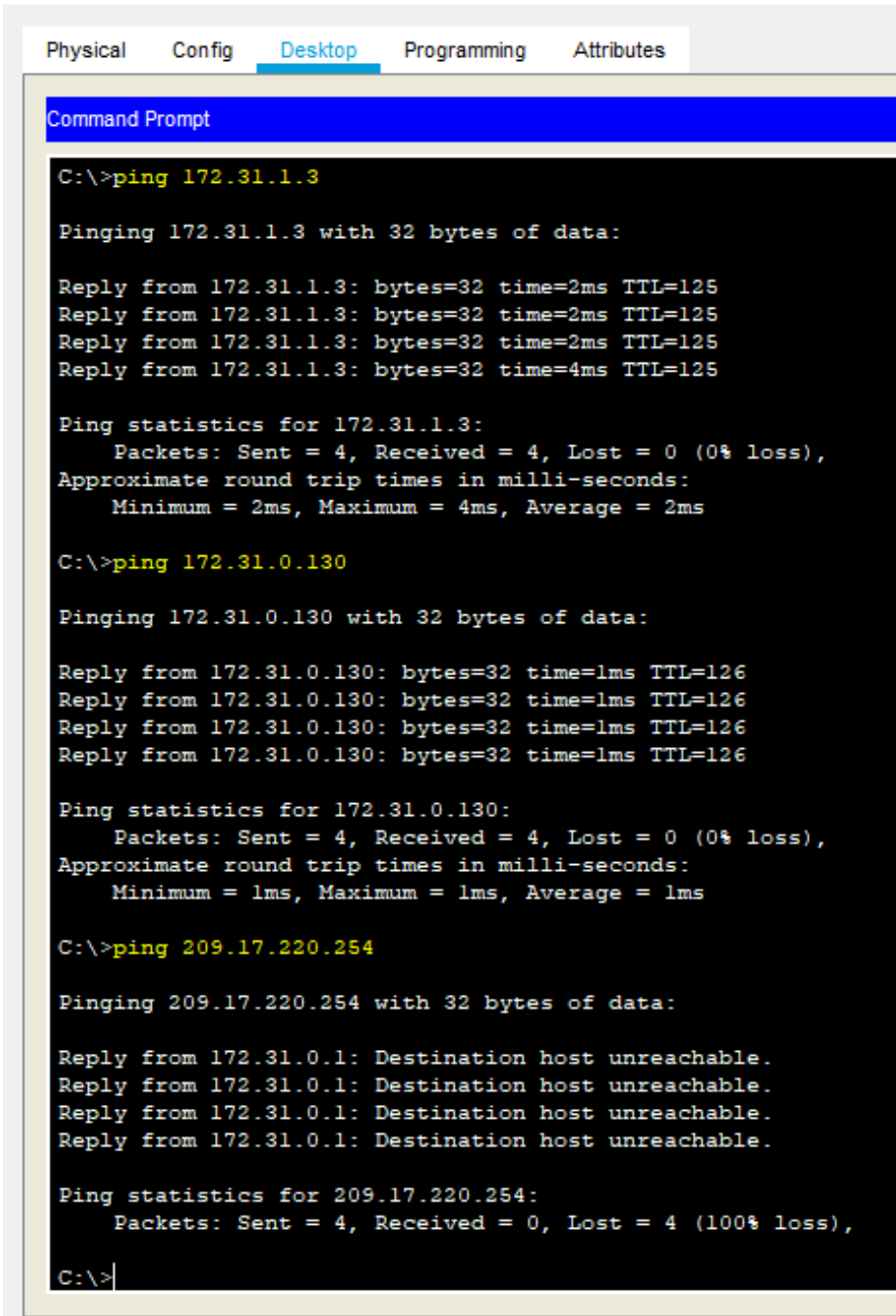
Ping statistics for 172.31.0.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>|
```

Se hace pruebas de ping de la VLAN 20 de Tunja a ip de la VLAN 20 de Cundinamarca ip 172.31.1.2 y a la VLAN 10 de Bucaramanga ip 172.31.0.2 y se observa respuesta.

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

PC0



```
Physical  Config  Desktop  Programming  Attributes
Command Prompt
C:\>ping 172.31.1.3

Pinging 172.31.1.3 with 32 bytes of data:

Reply from 172.31.1.3: bytes=32 time=2ms TTL=125
Reply from 172.31.1.3: bytes=32 time=2ms TTL=125
Reply from 172.31.1.3: bytes=32 time=2ms TTL=125
Reply from 172.31.1.3: bytes=32 time=4ms TTL=125

Ping statistics for 172.31.1.3:
    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=1ms TTL=126
Reply from 172.31.0.130: bytes=32 time=1ms TTL=126
Reply from 172.31.0.130: bytes=32 time=1ms TTL=126
Reply from 172.31.0.130: bytes=32 time=1ms TTL=126

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

C:\>ping 209.17.220.254

Pinging 209.17.220.254 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 209.17.220.254:
    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.

Pruebas de VLAN en CUNDINAMARCA de VLAN 10 a VLAN 20

PC4

```

Physical  Config  Desktop  Programming  Attributes
Command Prompt
C:\>ping 172.31.1.3

Pinging 172.31.1.3 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 172.31.1.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
  
```

Se activan las vlan en cada switch

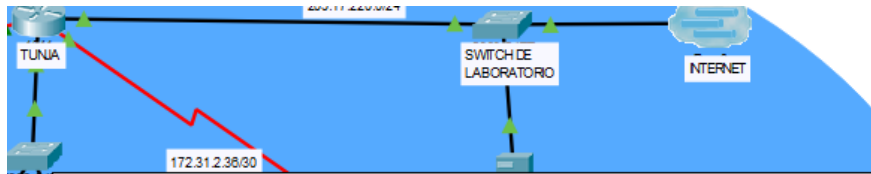
Port	Link	VLAN	IP Address	MAC Address
FastEthernet0/1	Up	10	--	00D0.5828.C201
FastEthernet0/2	Down	10	--	00D0.5828.C202
FastEthernet0/3	Down	10	--	00D0.5828.C203
FastEthernet0/4	Down	10	--	00D0.5828.C204
FastEthernet0/5	Down	10	--	00D0.5828.C205
FastEthernet0/6	Down	10	--	00D0.5828.C206
FastEthernet0/7	Down	10	--	00D0.5828.C207
FastEthernet0/8	Down	10	--	00D0.5828.C208
FastEthernet0/9	Down	10	--	00D0.5828.C209
FastEthernet0/10	Down	10	--	00D0.5828.C20A
FastEthernet0/11	Up	20	--	00D0.5828.C20B
FastEthernet0/12	Down	20	--	00D0.5828.C20C
FastEthernet0/13	Down	20	--	00D0.5828.C20D
FastEthernet0/14	Down	20	--	00D0.5828.C20E
FastEthernet0/15	Down	20	--	00D0.5828.C20F
FastEthernet0/16	Down	20	--	00D0.5828.C210
FastEthernet0/17	Down	20	--	00D0.5828.C211
FastEthernet0/18	Down	20	--	00D0.5828.C212
FastEthernet0/19	Down	20	--	00D0.5828.C213
FastEthernet0/20	Down	20	--	00D0.5828.C214
FastEthernet0/21	Up	88	--	00D0.5828.C215
FastEthernet0/22	Down	88	--	00D0.5828.C216
FastEthernet0/23	Up	--	--	00D0.5828.C217
FastEthernet0/24	Down	1	--	00D0.5828.C218
GigabitEthernet0/1	Down	1	--	00D0.5828.C219
GigabitEthernet0/2	Down	1	--	00D0.5828.C21A
Vlan1	Down	1	<not set>	0040.0BC4.3E80
Vlan10	Up	10	<not set>	0040.0BC4.3E01
Vlan20	Up	20	<not set>	0040.0BC4.3E02
Vlan88	Up	88	<not set>	0040.0BC4.3E03

Hostname: S3
Physical Location: Intercity, Home City, Corporate Office, Main Wiring Closet

Port	Link	VLAN	IP Address	MAC Address
FastEthernet0/1	Up	10	--	0001.C93D.9C01
FastEthernet0/2	Down	10	--	0001.C93D.9C02
FastEthernet0/3	Down	10	--	0001.C93D.9C03
FastEthernet0/4	Down	10	--	0001.C93D.9C04
FastEthernet0/5	Down	10	--	0001.C93D.9C05
FastEthernet0/6	Down	10	--	0001.C93D.9C06
FastEthernet0/7	Down	10	--	0001.C93D.9C07
FastEthernet0/8	Down	10	--	0001.C93D.9C08
FastEthernet0/9	Down	10	--	0001.C93D.9C09
FastEthernet0/10	Up	30	--	0001.C93D.9C0A
FastEthernet0/11	Down	30	--	0001.C93D.9C0B
FastEthernet0/12	Down	30	--	0001.C93D.9C0C
FastEthernet0/13	Down	30	--	0001.C93D.9C0D
FastEthernet0/14	Down	30	--	0001.C93D.9C0E
FastEthernet0/15	Down	30	--	0001.C93D.9C0F
FastEthernet0/16	Down	30	--	0001.C93D.9C10
FastEthernet0/17	Down	30	--	0001.C93D.9C11
FastEthernet0/18	Down	30	--	0001.C93D.9C12
FastEthernet0/19	Down	30	--	0001.C93D.9C13
FastEthernet0/20	Down	30	--	0001.C93D.9C14
FastEthernet0/21	Down	1	--	0001.C93D.9C15
FastEthernet0/22	Down	1	--	0001.C93D.9C16
FastEthernet0/23	Up	--	--	0001.C93D.9C17
FastEthernet0/24	Down	1	--	0001.C93D.9C18
GigabitEthernet0/1	Down	1	--	0001.C93D.9C19
GigabitEthernet0/2	Down	1	--	0001.C93D.9C1A
Vlan1	Down	1	<not set>	0002.4A31.7424
Vlan10	Up	10	<not set>	0002.4A31.7401
Vlan30	Up	30	<not set>	0002.4A31.7402

Hostname: S1

Physical Location: Intercity, Home City, Corporate Office, Main Wiring Closet



Port	Link	VLAN	IP Address	MAC Address
FastEthernet0/1	Up	20	--	0090.213B.7001
FastEthernet0/2	Down	20	--	0090.213B.7002
FastEthernet0/3	Down	20	--	0090.213B.7003
FastEthernet0/4	Down	20	--	0090.213B.7004
FastEthernet0/5	Down	20	--	0090.213B.7005
FastEthernet0/6	Down	20	--	0090.213B.7006
FastEthernet0/7	Down	20	--	0090.213B.7007
FastEthernet0/8	Down	20	--	0090.213B.7008
FastEthernet0/9	Down	20	--	0090.213B.7009
FastEthernet0/10	Down	20	--	0090.213B.700A
FastEthernet0/11	Down	30	--	0090.213B.700B
FastEthernet0/12	Down	30	--	0090.213B.700C
FastEthernet0/13	Up	30	--	0090.213B.700D
FastEthernet0/14	Down	30	--	0090.213B.700E
FastEthernet0/15	Down	30	--	0090.213B.700F
FastEthernet0/16	Down	30	--	0090.213B.7010
FastEthernet0/17	Down	30	--	0090.213B.7011
FastEthernet0/18	Down	30	--	0090.213B.7012
FastEthernet0/19	Down	30	--	0090.213B.7013
FastEthernet0/20	Down	30	--	0090.213B.7014
FastEthernet0/21	Down	1	--	0090.213B.7015
FastEthernet0/22	Down	1	--	0090.213B.7016
FastEthernet0/23	Up	--	--	0090.213B.7017
FastEthernet0/24	Down	1	--	0090.213B.7018
GigabitEthernet0/1	Down	1	--	0090.213B.7019
GigabitEthernet0/2	Down	1	--	0090.213B.701A
Vlan1	Down	1	<not set>	0030.A3D4.4929
Vlan20	Up	20	<not set>	0030.A3D4.4901
Vlan30	Up	30	<not set>	0030.A3D4.4902

Hostname: S2

Physical Location: Intercity, Home City, Corporate Office, Main Wiring Closet

7. CONFIGURACIÓN FINAL DE CADA ROUTER

```
BUCARAMANGA#sh run
Building configuration...

Current configuration : 2372 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname BUCARAMANGA
!
login block-for 240 attempts 4 within 120
!
!
!
!
!
!
aaa new-model
!
aaa authentication login LOCAL_AUTH local
!
!
!
!
!
!
no ip cef
no ipv6 cef
!
!
!
username TUNJA privilege 7 password 0 network
username ubucaramanga password 0 ubucaramanga
username ucundinamarca password 0 ucundinamarca
username utunja password 0 utunja
!
!
license udi pid CISCO1941/K9 sn FTX152496MO-
!
```

```
!  
!  
!  
!  
!  
!  
!  
!  
!  
!  
spanning-tree mode pvst  
!  
!  
!  
!  
interface GigabitEthernet0/0  
no ip address  
duplex auto  
speed auto  
!  
interface GigabitEthernet0/0.1  
encapsulation dot1Q 1 native  
ip address 172.31.2.1 255.255.255.248  
!  
interface GigabitEthernet0/0.10  
encapsulation dot1Q 10  
ip address 172.31.0.1 255.255.255.192  
ip helper-address 172.31.2.34  
ip access-group 101 in  
!  
interface GigabitEthernet0/0.30  
encapsulation dot1Q 30  
ip address 172.31.0.65 255.255.255.192  
ip helper-address 172.31.2.34  
ip access-group 103 in  
!  
interface GigabitEthernet0/1  
no ip address  
duplex auto  
speed auto  
shutdown  
!  
interface Serial0/0/0  
ip address 172.31.2.33 255.255.255.252  
ip ospf message-digest-key 1 md5 7 network
```

```

!
interface Serial0/0/1
no ip address
clock rate 2000000
shutdown
!
interface Vlan1
no ip address
shutdown
!
router ospf 1
log-adjacency-changes
area 0 authentication message-digest
network 172.31.0.0 0.0.0.63 area 0
network 172.31.0.64 0.0.0.63 area 0
network 172.31.2.0 0.0.0.7 area 0
network 172.31.2.32 0.0.0.7 area 0
!
ip classless
!
ip flow-export version 9
!
!
ip access-list extended sl_def_acl
deny tcp any any eq telnet
deny tcp any any eq www
deny tcp any any eq 22
permit tcp any any eq 22
access-list 101 permit udp host 0.0.0.0 eq bootpc host 255.255.255.255 eq bootps
access-list 101 permit ip 172.31.0.0 0.0.0.63 172.31.0.128 0.0.0.63
access-list 101 permit ip 172.31.0.0 0.0.0.63 172.31.1.0 0.0.0.63
access-list 103 permit udp host 0.0.0.0 eq bootpc host 255.255.255.255 eq bootps
access-list 103 deny ip 172.31.0.64 0.0.0.63 172.31.0.0 0.0.255.255
access-list 103 permit ip 172.31.0.64 0.0.0.63 any
!
!
!
!
!
!
line con 0
exec-timeout 50 0
logging synchronous
login authentication LOCAL_AUTH
!
line aux 0
!

```



```
line vty 0 4
exec-timeout 5 0
login authentication LOCAL_AUTH
!
!
!
end
```

```
TUNJA#sh run
Building configuration...
```

```
Current configuration : 3105 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname TUNJA
!
login block-for 240 attempts 4 within 120
!
!
!
ip dhcp excluded-address 172.31.1.65 172.31.1.70
ip dhcp excluded-address 172.31.1.1 172.31.1.5
ip dhcp excluded-address 172.31.0.1 172.31.0.5
ip dhcp excluded-address 172.31.0.65 172.31.0.70
!
ip dhcp pool ica-30
network 172.31.0.64 255.255.255.192
default-router 172.31.0.65
ip dhcp pool t-10
network 172.31.1.0 255.255.255.192
default-router 172.31.1.1
ip dhcp pool t-20
network 172.31.1.64 255.255.255.192
default-router 172.31.1.65
ip dhcp pool ica-10
network 172.31.0.0 255.255.255.192
default-router 172.31.0.1
!
!
aaa new-model
!
aaa authentication login LOCAL_AUTH local
```

```
!  
!  
!  
!  
!  
!  
no ip cef  
no ipv6 cef  
!  
!  
username TUNJA privilege 7 password 0 network  
username ubucaramanga password 0 ubucaramanga  
username ucundinamarca password 0 ucundinamarca  
username utunja password 0 utunja  
!  
license udi pid CISCO1941/K9 sn FTX15249BK3-  
!  
!  
!  
!  
!  
!  
!  
!  
!  
spanning-tree mode pvst  
!  
!  
!  
!  
interface GigabitEthernet0/0  
ip address 209.17.220.200 255.255.255.0  
ip nat outside  
duplex auto  
speed auto  
!  
interface GigabitEthernet0/1  
no ip address  
ip nat inside  
duplex auto
```

```

speed auto
!
interface GigabitEthernet0/1.1
encapsulation dot1Q 1 native
ip address 172.31.2.9 255.255.255.248
ip access-group 102 in
!
interface GigabitEthernet0/1.20
encapsulation dot1Q 20
ip address 172.31.0.129 255.255.255.192
ip access-group 102 in
!
interface GigabitEthernet0/1.30
encapsulation dot1Q 30
ip address 172.31.0.193 255.255.255.192
ip access-group 103 in
!
interface Serial0/0/0
ip address 172.31.2.34 255.255.255.252
ip ospf message-digest-key 1 md5 7 network
ip nat inside
clock rate 64000
!
interface Serial0/0/1
ip address 172.31.2.38 255.255.255.252
ip ospf message-digest-key 1 md5 7 network
ip nat inside
clock rate 64000
!
interface Vlan1
no ip address
shutdown
!
router ospf 1
log-adjacency-changes
area 0 authentication message-digest
network 172.31.0.128 0.0.0.63 area 0
network 172.31.0.192 0.0.0.63 area 0
network 172.31.2.8 0.0.0.7 area 0
network 172.31.2.32 0.0.0.7 area 0
default-information originate
!
ip nat inside source list 20 interface GigabitEthernet0/0 overload
ip nat inside source static 172.31.2.26 209.17.220.10
ip classless
ip route 0.0.0.0 0.0.0.0 GigabitEthernet0/0
!

```

```
ip flow-export version 9
!
!
ip access-list extended sl_def_acl
deny tcp any any eq telnet
deny tcp any any eq www
deny tcp any any eq 22
permit tcp any any eq 22
access-list 20 permit 172.31.0.0 0.0.31.255
access-list 102 permit ip 172.31.0.128 0.0.0.63 172.31.0.0 0.0.0.63
access-list 102 permit ip 172.31.0.128 0.0.0.63 172.31.1.0 0.0.0.63
access-list 103 permit tcp 172.31.0.192 0.0.0.63 any eq www
access-list 103 permit tcp 172.31.0.192 0.0.0.63 any eq ftp
!
no cdp run
!
!
!
!
!
!
line con 0
exec-timeout 5 0
logging synchronous
login authentication LOCAL_AUTH
!
line aux 0
!
line vty 0 4
exec-timeout 5 0
login authentication LOCAL_AUTH
!
!
!
End
```

```
CUNDINAMARCA#sh run
Building configuration...
```

```
Current configuration : 2491 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
```

```
hostname CUNDINAMARCA
!  
login block-for 240 attempts 4 within 120
!  
!  
!  
!  
!  
!  
aaa new-model
!  
aaa authentication login LOCAL_AUTH local
!  
!  
!  
!  
!  
no ip cef
no ipv6 cef
!  
!  
username TUNJA privilege 7 password 0 network
username ubucaramanga password 0 ubucaramanga
username ucundinamarca password 0 ucundinamarca
username utunja password 0 utunja
!  
!  
license udi pid CISCO1941/K9 sn FTX1524NX93-
!  
!  
!  
!  
!  
!  
!  
!  
spanning-tree mode pvst
!  
!  
!
```

```
!  
!  
interface GigabitEthernet0/0  
no ip address  
duplex auto  
speed auto  
!  
interface GigabitEthernet0/0.1  
encapsulation dot1Q 1 native  
ip address 172.31.2.17 255.255.255.248  
!  
interface GigabitEthernet0/0.10  
encapsulation dot1Q 10  
ip address 172.31.1.65 255.255.255.192  
ip helper-address 172.31.2.38  
ip access-group 101 in  
!  
interface GigabitEthernet0/0.20  
encapsulation dot1Q 20  
ip address 172.31.1.1 255.255.255.192  
ip access-group 102 in  
!  
interface GigabitEthernet0/0.88  
encapsulation dot1Q 88  
ip address 172.31.2.25 255.255.255.248  
!  
interface GigabitEthernet0/1  
no ip address  
duplex auto  
speed auto  
shutdown  
!  
interface Serial0/0/0  
ip address 172.31.2.37 255.255.255.252  
ip ospf message-digest-key 1 md5 7 network  
!  
interface Serial0/0/1  
no ip address  
clock rate 2000000  
shutdown  
!  
interface Vlan1  
no ip address  
shutdown  
!  
router ospf 1  
log-adjacency-changes
```

```
area 0 authentication message-digest
network 172.31.1.0 0.0.0.63 area 0
network 172.31.1.64 0.0.0.63 area 0
network 172.31.2.16 0.0.0.7 area 0
network 172.31.2.32 0.0.0.7 area 0
network 172.31.2.24 0.0.0.7 area 0
!
ip classless
!
ip flow-export version 9
!
!
ip access-list extended sl_def_acl
deny tcp any any eq telnet
deny tcp any any eq www
deny tcp any any eq 22
permit tcp any any eq 22
access-list 102 permit udp host 0.0.0.0 eq bootpc host 255.255.255.255 eq bootps
access-list 102 permit ip 172.31.1.0 0.0.0.63 172.31.0.128 0.0.0.63
access-list 102 permit ip 172.31.1.0 0.0.0.63 172.31.0.0 0.0.0.63
access-list 101 permit udp host 0.0.0.0 eq bootpc host 255.255.255.255 eq bootps
access-list 101 permit ip 172.31.1.64 0.0.0.63 any
access-list 101 deny ip 172.31.1.64 0.0.0.63 172.31.0.0 0.0.255.255
!
no cdp run
!
!
!
!
!
!
line con 0
exec-timeout 50 0
logging synchronous
login authentication LOCAL_AUTH
!
line aux 0
!
line vty 0 4
exec-timeout 5 0
login authentication LOCAL_AUTH
!
!
!
end
```

```
ISP#sh run
Building configuration...
```

```
Current configuration : 673 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname ISP
!
!
ip cef
no ipv6 cef
!
!
!
license udi pid CISCO1941/K9 sn FTX1524G3LV-
!
!
spanning-tree mode pvst
!
!
interface GigabitEthernet0/0
ip address 209.17.220.254 255.255.255.0
duplex auto
speed auto
!
interface GigabitEthernet0/1
no ip address
duplex auto
speed auto
shutdown
!
interface Vlan1
no ip address
shutdown
!
ip classless
ip route 172.31.0.0 255.255.224.0 209.17.220.200
!
ip flow-export version 9
!
!
!
```



```
!  
line con 0  
!  
line aux 0  
!  
line vty 0 4  
login  
!  
!  
!  
end
```

CONCLUSIONES

Se llego a la conclusión que para esta actividad de habilidades practicas se realizo varias tareas importantes para el buen desarrollo de los ejercicios propuestos configuraciones importantes en el tema de seguridad con protocolos de enrutamiento como ACL, OSPF, EIGRP.

Donde las soluciones propuestas por cada caso nos permiten solucionar problemas dentro de una red donde las podemos encontrar a diario en nuestro entorno de trabajo donde encontrando la falla nos permite establecer posibles soluciones a los inconvenientes que se pueden encontrar en la red.

ANEXOS

Simulaciones en Google drive

https://drive.google.com/open?id=1n_subvIHskPSCM6UQisEo-F-LoOXCD8E

BIBLIOGRAFIA

Temática: Asignación de direcciones IP

CISCO. (2014). Asignación de direcciones IP. Fundamentos de Networking.

Recuperado de <https://static-course-assets.s3.amazonaws.com/ITN50ES/module8/index.html#8.0.1.1>

Temática: SubNetting

CISCO. (2014). SubNetting. Fundamentos de Networking. Recuperado de <https://static-course-assets.s3.amazonaws.com/ITN50ES/module9/index.html#9.0.1.1>

Temática: Enrutamiento Estático

CISCO. (2014). Enrutamiento Estático. Principios de Enrutamiento y Conmutación. Recuperado de <https://static-course-assets.s3.amazonaws.com/RSE50ES/module6/index.html#6.0.1.1>

Temática: Enrutamiento Dinámico

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>

Temática: OSPF de una sola área

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>

Temática: Listas de control de acceso

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>

Temática: DHCP

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>