PRUEBA DE HABILIDADES PRÁCTICAS CCNA

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UNIVERSIDAD NACIONAL ABIERTA Y A DISTNACIA - UNAD
ECBTI – ESCUELA DE CIENCIAS BÁSICAS, TECNOLOGÍA E INGENIERÍA
INGENIERÍA DE SISTEMAS
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ARLEX FELIPE LLANOS BETANCOURT

DIPLOMADO DE PROFUNDIZACIÓN CISCO (DISEÑO E IMPLEMENTACIÓN DE SOLUCIONES INTEGRADAS LAN / WAN)

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Nota de Aceptación

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Jurado

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Jurado

Palmira, 12 de diciembre del 2019

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RESUMEN

Durante la realización del diplomado de Profundización Cisco orientado al diseño e implementación de soluciones integradas LAN / WAN, como opción de grado para la consecución de la carrera de Ingeniería de Sistema de la Universidad Nacional Abierta y a Distancia, se tiene como objetivo la demostración de habilidades prácticas adquiridas durante el desarrollo del mismo, mediante el desarrollo y aplicación de 2 diferentes escenarios.

Con la utilización de un software simulador denominado Packet Tracer, se procedió a realizar las respectivas configuraciones básicas de seguridad en los dispositivos, enrutamientos OSPF, interconexión de VLAN, generación de DHCP y control de tráfico mediante la respectiva configuración de ACL's entre las diversas redes, cumpliendo con lo requerido por la guía de requerimientos proporcionada para la práctica

Se realizaron pruebas de funcionalidad y conectividad obteniendo los resultados esperados al realizar procesos de Telnet entre equipos remotos, ping y pruebas de paquetes, además de verificación en la implementación de password cifrados, banners, líneas VTY y SSH.

PALABRAS CLAVE: Packet Tracer, VLAN, DHCP, ACL, OSPF, NAT, PAT, Telnet.

ABSTRACT

During the completion of the Cisco Deepening Diploma aimed at the design and implementation of integrated LAN / WAN solutions, as a degree option for the achievement of the System Engineering degree at the National Open and Distance University, the objective is to demonstrate skills practices acquired during its development, through the development and application of two different scenarios.

With the use of a simulator software called Packet Tracer, the respective basic security configurations in the devices, OSPF routing, VLAN interconnection, DHCP generation and traffic control were carried out through the respective ACL configuration between the various networks, complying with the requirements of the requirements guide provided for practice

Functionality and connectivity tests were performed obtaining the expected results when performing Telnet processes between remote computers, ping and packet tests, as well as verification in the implementation of encrypted password, banners, VTY and SSH lines.

KEYWORDS: Packet Tracer, VLAN, DHCP, ACL, OSPF, NAT, PAT, Telnet.

1. INTRODUCCIÓN

Cada día, las personas utilizamos redes de información y comunicación, desde escuchar el noticiero hasta buscar el valor de moneda extranjera del momento, consciente o inconscientemente estamos haciendo uso de topologías de redes implementadas y configuradas para hacer más placentero el proceso de consulta de datos

El continuo crecimiento de información hace necesario que estemos más y mejor capacitados en la composición de una red, funcionamiento y escalamiento de la misma, generando un óptimo desempeño y productividad para la empresa donde haya sido implementada

Con este trabajo, se logra comprender y aplicar los conocimientos adquiridos durante el desarrollo del diplomado de Cisco reconociendo cada uno de los elementos de los cuales se encuentra compuesto una red, desde su tipología y la manera en como interactúan los diversos dispositivos dentro de ella

2. OBJETIVOS

2.1 OBJETIVO GENERAL

Demostrar habilidades, teóricas y empíricas adquiridas durante el desarrollo de este curso, que permitan identificar y aplicar soluciones a una problemática de red

2.2 OBJETIVOS ESPECÍFICOS

Determinar los dispositivos necesarios para cada topología de red

Realizar configuraciones básicas a los dispositivos implementados en la topología

Implementar seguridad básica en dispositivos de comunicación

Crear servicios DHCP y NAT en dispositivos de administración

3. MATERIALES Y MÉTODOS

3.1 MATERIALES

- Software Packet Tracer versión 7.2

4 DESARROLLO

La evaluación denominada “Prueba de habilidades prácticas”, forma parte de las actividades evaluativas del Diplomado de Profundización CCNA, y busca identificar el grado de desarrollo de competencias y habilidades que fueron adquiridas a lo largo del diplomado. Lo esencial es poner a prueba los niveles de comprensión y solución de problemas relacionados con diversos aspectos de Networking.

4.1 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

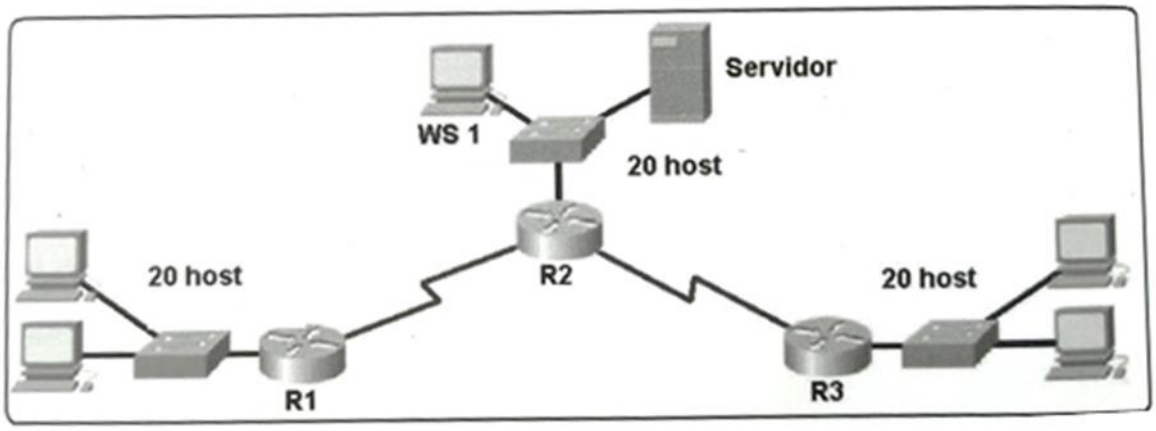

Figura 1. Red Host ejercicio

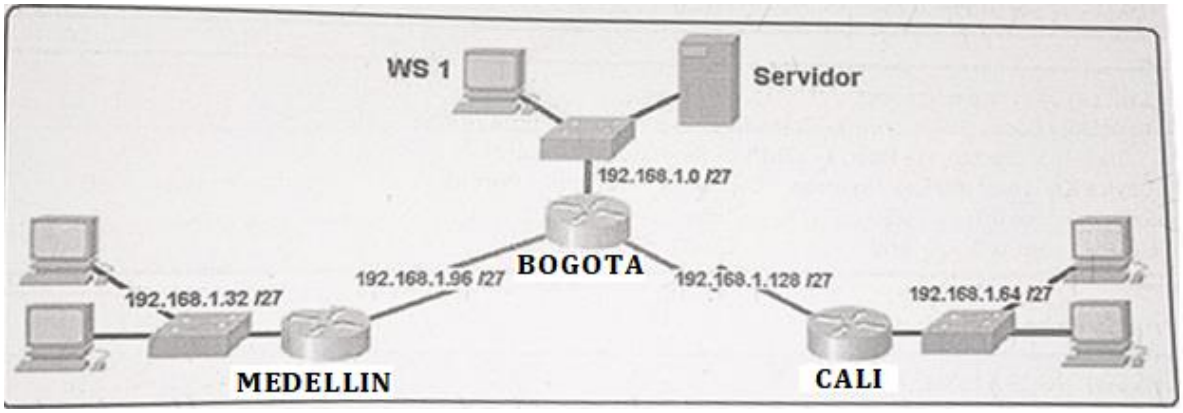

Figura 2. Red IP ejercicio

Como trabajo inicial se debe realizar lo siguiente.

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

Router MEDELLIN

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname MEDELLIN
MEDELLIN(config)#enable secret cl4ss
MEDELLIN(config)#line con 0
MEDELLIN(config-line)#password c1sc0
MEDELLIN(config-line)#login
```

```
MEDELLIN(config-line)#line vty 0 4
MEDELLIN(config-line)#password c1sc0
MEDELLIN(config-line)#login
MEDELLIN(config-line)#exit
MEDELLIN(config)#service password-encryption
MEDELLIN(config)#banner motd #Acceso personal autorizado#
MEDELLIN(config)#
```

Router BOGOTA

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname BOGOTA
BOGOTA(config)#enable secret cl4ss
BOGOTA(config)#line con 0
BOGOTA(config-line)#password c1sc0
BOGOTA(config-line)#login
BOGOTA(config-line)#line vty 0 4
BOGOTA(config-line)#password c1sc0
BOGOTA(config-line)#login
BOGOTA(config-line)#exit
BOGOTA(config)#service password-encryption
BOGOTA(config)#banner motd #Acceso personal autorizado#
BOGOTA(config)#
```

Router CALI

```
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname CALI
CALI(config)#enable secret cl4ss
CALI(config)#line con 0
CALI(config-line)#password c1sc0
CALI(config-line)#login
CALI(config-line)#line vty 0 4
CALI(config-line)#password c1sc0
CALI(config-line)#login
CALI(config-line)#exit
CALI(config)#service password-encryption
CALI(config)#banner motd #Acceso personal autorizado#
CALI(config)#
```

Switch SW_MEDELLIN

```
Switch>en
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname SW_MEDELLIN
SW_MEDELLIN(config)#line console 0
SW_MEDELLIN(config-line)#password c1sc0
SW_MEDELLIN(config-line)#logging synchronous
SW_MEDELLIN(config-line)#login
SW_MEDELLIN(config-line)#exit
SW_MEDELLIN(config)#line vty 0 4
SW_MEDELLIN(config-line)#password c1sc0
SW_MEDELLIN(config-line)#exit
SW_MEDELLIN(config)#enable secret cl4ss
SW_MEDELLIN(config)#banner motd #Acceso personal autorizado#
SW_MEDELLIN(config)#service password-encryption
SW_MEDELLIN(config)#
```

Switch SW_BOGOTA

```
Switch>en
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname SW_BOGOTA
SW_BOGOTA(config)#line console 0
SW_BOGOTA(config-line)#password c1sc0
SW_BOGOTA(config-line)#logging synchronous
SW_BOGOTA(config-line)#login
SW_BOGOTA(config-line)#exit
SW_BOGOTA(config)#line vty 0 4
SW_BOGOTA(config-line)#password c1sc0
SW_BOGOTA(config-line)#exit
SW_BOGOTA(config)#enable secret cl4ss
SW_BOGOTA(config)#banner motd #Acceso personal autorizado#
SW_BOGOTA(config)#service password-encryption
SW_BOGOTA(config)#
```

Switch SW_CALI

```
Switch>en
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname SW_CALI
```

SW_CALI(config)#line console 0
SW_CALI(config-line)#password c1sc0
SW_CALI(config-line)#logging synchronous
SW_CALI(config-line)#login
SW_CALI(config-line)#exit
SW_CALI(config)#line vty 0 4
SW_CALI(config-line)#password c1sc0
SW_CALI(config-line)#exit
SW_CALI(config)#enable secret cl4ss
SW_CALI(config)#banner motd #Acceso personal autorizado#
SW_CALI(config)#

- Realizar la conexión física de los equipos con base en la topología de red

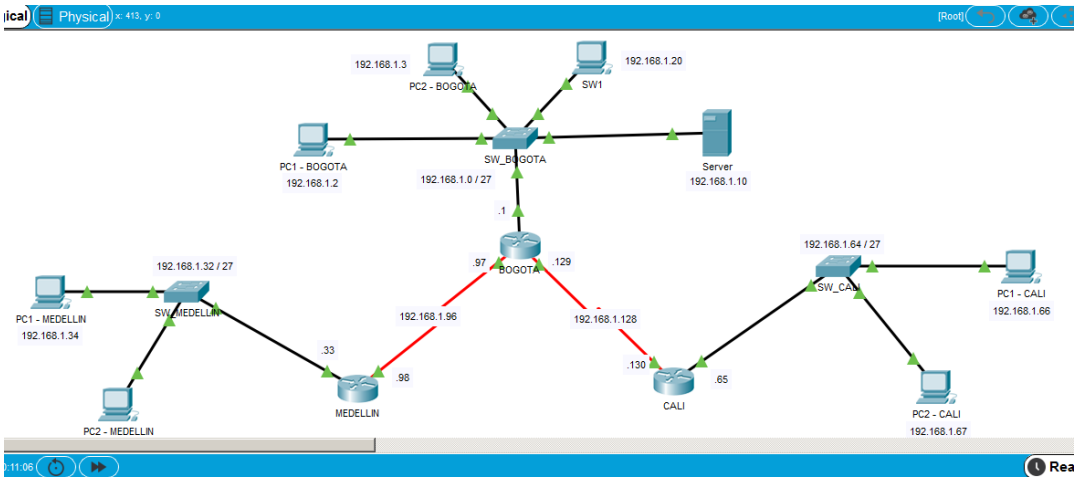

Figura 3. Conexión Física

Configurar la topología de red, de acuerdo con las siguientes especificaciones.

Parte 1: Asignación de direcciones IP:

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

Dirección de red: 192.168.1.0 / 24
Mascara: 255.255.255.0

Segmentación: 8

$\mathbf{2^3 = 8}$

Binario: 11111111.11111111.11111111.11100000
Mascara: 255.255.255.224
Dirección de red: 192.168.1.0 / 27

Subredes generadas:

NOMBRE	**Network**	**Host Min**	**Host Max**	**Broadcast**
RED 1	192.168.1.0 / 27	192.168.1.1	192.168.1.30	192.168.1.31
RED 2	192.168.1.32 / 27	192.168.1.33	192.168.1.62	192.168.1.63
RED 3	192.168.1.64 / 27	192.168.1.65	192.168.1.94	192.168.1.95
RED 4	192.168.1.96 / 27	192.168.1.97	192.168.1.126	192.168.1.127
RED 5	192.168.1.128 / 27	192.168.1.129	192.168.1.158	192.168.1.159
RED 6	192.168.1.160 / 27	192.168.1.161	192.168.1.190	192.168.1.191
RED 7	192.168.1.192 / 27	192.168.1.193	192.168.1.222	192.168.1.223
RED 8	192.168.1.224 / 27	192.168.1.225	192.168.1.254	192.168.1.255

Tabla 1. Subredes

Para la topología utilizaremos las siguientes subredes

BOGOTA – RED 1

1	Dirección de subred	192.168.1.0
2	Dirección IP Gateway	192.168.1.1
3	Primera IP	192.168.1.2
4	Ultima IP	192.168.1.30
5	SW1	192.168.1.20
6	IP Servidor	192.168.1.10

Tabla 2. Red 1 Bogotá

MEDELLIN – RED 2

1	Dirección de red	192.168.1.32
2	Dirección IP Gateway	192.168.1.33
3	Primera IP	192.168.1.34
4	Ultima IP	192.168.1.62

Tabla 3. Red 2 Medellín

CALI – RED 3

1	Dirección de red	192.168.1.64
2	Dirección IP Gateway	192.168.1.65
3	Primera IP	192.168.1.66
4	Ultima IP	192.168.1.94

Tabla 4. Red 3 Cali

b. Asignar una dirección IP a la red.

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	192.168.1.98	192.168.1.97	192.168.1.130
Dirección de Ip en interfaz Serial 0/1		192.168.1.129	
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	1	1	1
Afirmaciones de red	192.168.1.0	192.168.1.0	192.168.1.0

Tabla 5. Configuración Básica

Configuración Interfaz g0/0 Del Router MEDELLIN al SWITCH MEDELLIN

MEDELLIN#en
MEDELLIN#config t
Enter configuration commands, one per line. End with CNTL/Z.

MEDELLIN(config)#int g0/0
MEDELLIN(config-if)#ip address 192.168.1.33 255.255.255.240
MEDELLIN(config-if)#no shut

MEDELLIN(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

MEDELLIN(config-if)#exit

Configuración Interfaz s0/0/0 Del Router MEDELLIN al Router BOGOTA

MEDELLIN#en
MEDELLIN#config t
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN(config)#int s0/0/0
MEDELLIN(config-if)#ip address 192.168.1.98 255.255.255.240
MEDELLIN(config-if)#no shut

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

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

Configuración Interfaz s0/0/0 Del Router BOGOTA al Router MEDELLIN

BOGOTA>en
BOGOTA#config t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#int s0/0/0
BOGOTA(config-if)#ip address 192.168.1.97 255.255.255.240
BOGOTA(config-if)#no shut
BOGOTA(config-if)#exit

Configuración Interfaz g0/0 del Router BOGOTA al Switch BOGOTA

BOGOTA#en

```
BOGOTA#config t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#int g0/0
BOGOTA(config-if)#ip address 192.168.1.1 255.255.255.224
BOGOTA(config-if)#no shut

BOGOTA(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0,
changed state to up

BOGOTA(config-if)#exit
```

Configuración Interfaz s0/0/1 del Router BOGOTA al Router CALI

```
BOGOTA#en
BOGOTA#config t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#int s0/0/1
BOGOTA(config-if)#ip address 192.168.1.129 255.255.255.240
BOGOTA(config-if)#no shut

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

Configuración Interfaz s0/0/0 del Router CALI al Router BOGOTA

```
CALI>en
CALI#config t
Enter configuration commands, one per line. End with CNTL/Z.
CALI(config)#int s0/0/0
CALI(config-if)#ip address 192.168.1.130 255.255.255.240
CALI(config-if)#no shut

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

CALI(config-if)#exit
CALI(config)#
```

Configuración Interfaz g0/0 Del Router CALI al Swtich CALI

CALI#en
CALI#config t
Enter configuration commands, one per line. End with CNTL/Z.
CALI(config)#int g0/0
CALI(config-if)#ip address 192.168.1.65 255.255.255.240
CALI(config-if)#no shut

CALI(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

CALI(config-if)#exit
CALI(config)#

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 enrutamiento del Router MEDELLIN

```
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, 4 subnets, 2 masks
C       192.168.1.32/28 is directly connected, GigabitEthernet0/0
L       192.168.1.33/32 is directly connected, GigabitEthernet0/0
C       192.168.1.96/28 is directly connected, Serial0/0/0
L       192.168.1.98/32 is directly connected, Serial0/0/0

MEDELLIN#
```

Figura 4. Enrutamiento Router Medellín

Tabla enrutamiento del Router BOGOTA

```
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, 6 subnets, 3 masks
C       192.168.1.0/27 is directly connected, GigabitEthernet0/0
L       192.168.1.1/32 is directly connected, GigabitEthernet0/0
C       192.168.1.96/28 is directly connected, Serial0/0/0
L       192.168.1.97/32 is directly connected, Serial0/0/0
C       192.168.1.128/28 is directly connected, Serial0/0/1
L       192.168.1.129/32 is directly connected, Serial0/0/1

BOGOTA#
```

Figura 5. Enrutamiento Router Bogotá

Tabla enrutamiento del Router CALI

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

Gateway of last resort is not set

     192.168.1.0/24 is variably subnetted, 4 subnets, 2 masks
C       192.168.1.128/28 is directly connected, Serial0/0/0
L       192.168.1.130/32 is directly connected, Serial0/0/0
C       192.168.1.160/28 is directly connected, GigabitEthernet0/0
L       192.168.1.165/32 is directly connected, GigabitEthernet0/0

CALI#
```

Figura 6. Enrutamiento Router Cali

c. Verificar el balanceo de carga que presentan los Routers

Balanceo de carga Router MEDELLIN a Router BOGOTA

```
MEDELLIN#show ip route 192.168.1.97
Routing entry for 192.168.1.96/28
Known via "connected", distance 0, metric 0 (connected, via interface)
  Redistributing via eigrp 1
  Routing Descriptor Blocks:
  * directly connected, via Serial0/0/0
      Route metric is 0, traffic share count is 1

MEDELLIN#
```

Figura 7. Balanceo Router Medellín - Bogotá

Balanceo de carga Router BOGOTA a Router MEDELLIN

```
BOGOTA#show ip route 192.168.1.98
Routing entry for 192.168.1.96/28
Known via "connected", distance 0, metric 0 (connected, via interface)
  Redistributing via eigrp 1
  Routing Descriptor Blocks:
  * directly connected, via Serial0/0/0
      Route metric is 0, traffic share count is 1

BOGOTA#
```

Figura 8. Balanceo Router Bogotá - Medellín

Balanceo de carga Router BOGOTA a Router CALI

```
BOGOTA#show ip route 192.168.1.130
Routing entry for 192.168.1.128/28
Known via "connected", distance 0, metric 0 (connected, via interface)
  Redistributing via eigrp 1
  Routing Descriptor Blocks:
  * directly connected, via Serial0/0/1
      Route metric is 0, traffic share count is 1

BOGOTA#
```

Figura 9. Balanceo Router Bogotá - Cali

Balanceo de carga Router CALI a Router BOGOTA

```
CALI#show ip route 192.168.1.129
Routing entry for 192.168.1.128/28
Known via "connected", distance 0, metric 0 (connected, via interface)
  Redistributing via eigrp 1
  Routing Descriptor Blocks:
  * directly connected, via Serial0/0/0
      Route metric is 0, traffic share count is 1

CALI#
```

Figura 10. Balanceo Router Cali - Bogotá

d. Realizar un diagnóstico de vecinos usando el comando cdp

Router MEDELLIN – CDP

MEDELLIN#show cdp
Global CDP information:
Sending CDP packets every 60 seconds
Sending a holdtime value of 180 seconds
Sending CDPv2 advertisements is enabled
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 0/0 139 S 2950 Fas 0/1
BOGOTA Ser 0/0/0 163 R C2900 Ser 0/0/0
MEDELLIN#

```
MEDELLIN#show cdp
Global CDP information:
    Sending CDP packets every 60 seconds
    Sending a holdtime value of 180 seconds
    Sending CDPv2 advertisements is enabled
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          139            S       2950        Fas 0/1
BOGOTA       Ser 0/0/0        163            R       C2900       Ser 0/0/0
MEDELLIN#
```

Figura 11. Medellín CDP

Router BOGOTA – CDP

BOGOTA#show cdp
Global CDP information:
Sending CDP packets every 60 seconds
Sending a holdtime value of 180 seconds
Sending CDPv2 advertisements is enabled
BOGOTA#show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone
Device ID Local Intrfce Holdtme Capability Platform Port ID
Switch Gig 0/0 170 S 2950 Fas 0/1
MEDELLIN Ser 0/0/0 147 R C2900 Ser 0/0/0
CALI Ser 0/0/1 147 R C2900 Ser 0/0/0
BOGOTA#

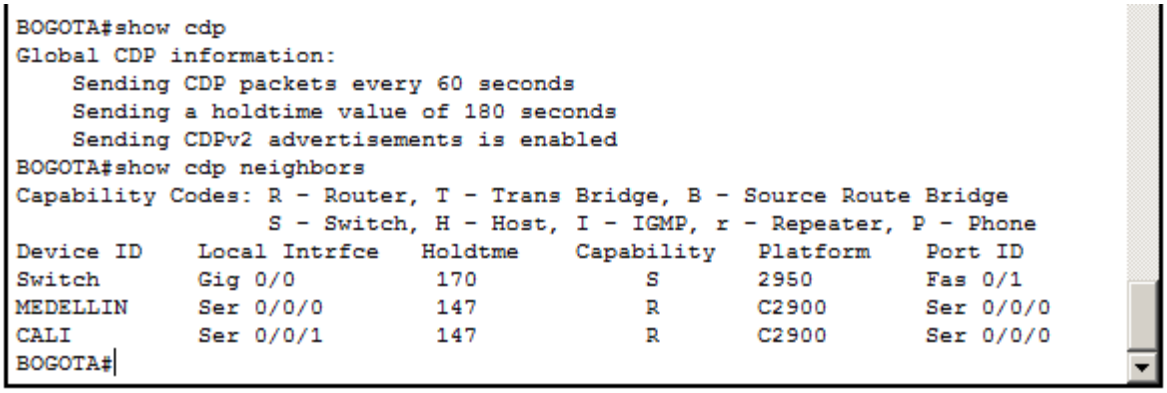

Figura 12. Bogotá CDP

Router CALI – CDP

CALI#show cdp
Global CDP information:
Sending CDP packets every 60 seconds
Sending a holdtime value of 180 seconds
Sending CDPv2 advertisements is enabled
CALI#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 0/0 169 S 2950 Fas 0/1
BOGOTA Ser 0/0/0 140 R C2900 Ser 0/0/1
CALI#

```
CALI#show cdp
Global CDP information:
    Sending CDP packets every 60 seconds
    Sending a holdtime value of 180 seconds
    Sending CDPv2 advertisements is enabled
CALI#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          169            S       2950        Fas 0/1
BOGOTA       Ser 0/0/0        140            R       C2900       Ser 0/0/1
CALI#
```

Figura 13. Cali CDP

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

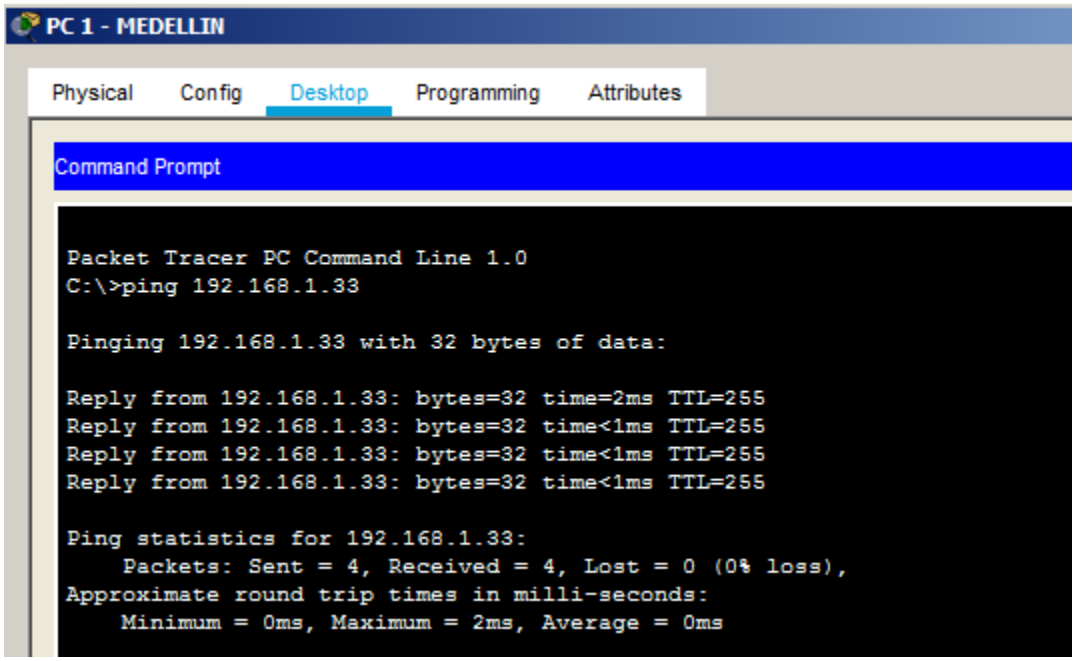

Figura 14. Ping PC1-MEDELLIN a Router MEDELLIN

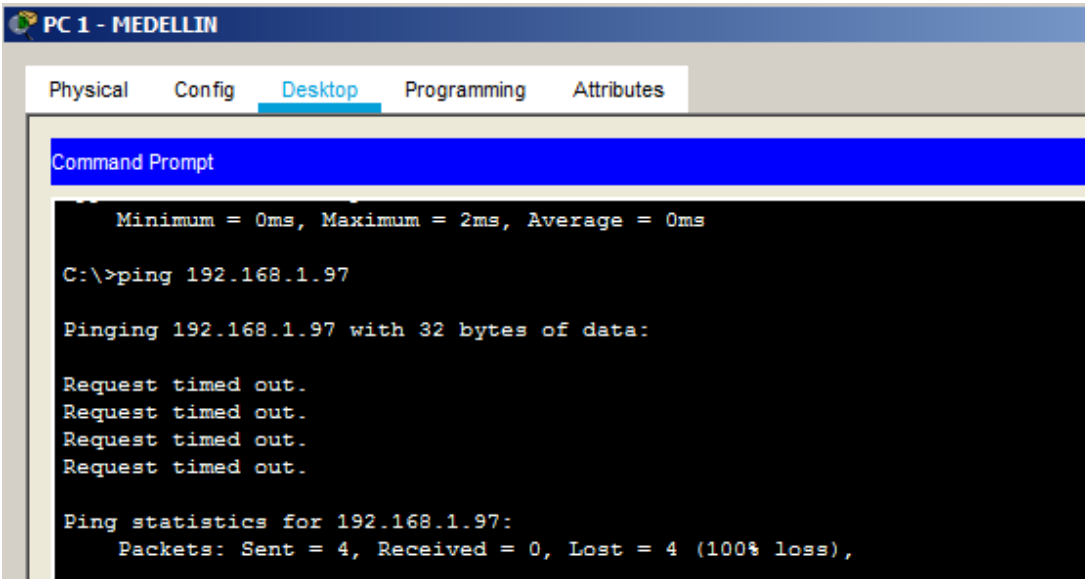

Figura 15. Ping PC1–MEDELLIN a Router BOGOTA

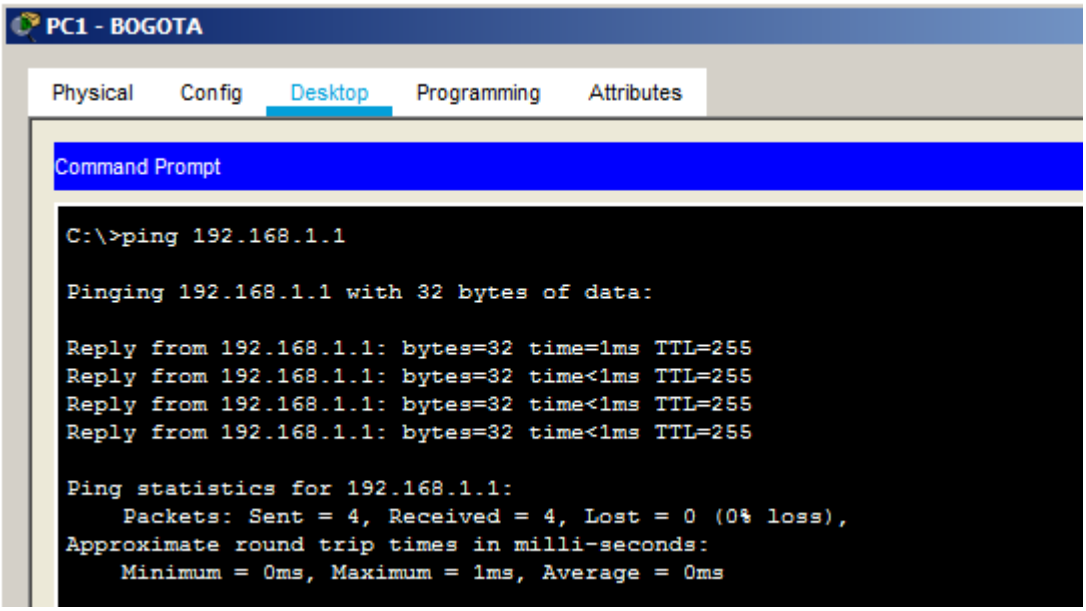

Figura 16. Ping PC1–BOGOTA a Router BOGOTA

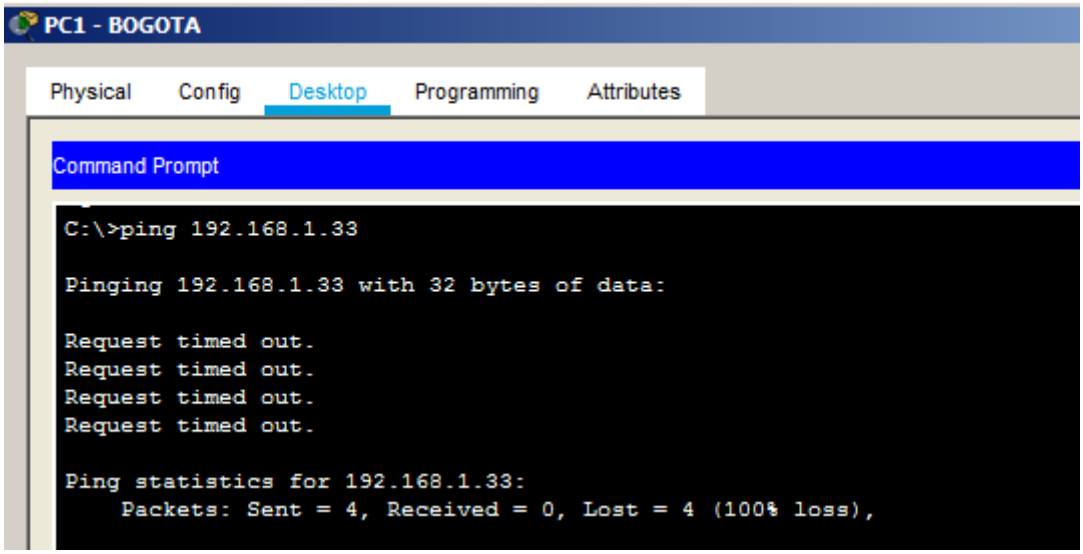

Figura 17. Ping PC1-BOGOTA a Router MEDELLIN

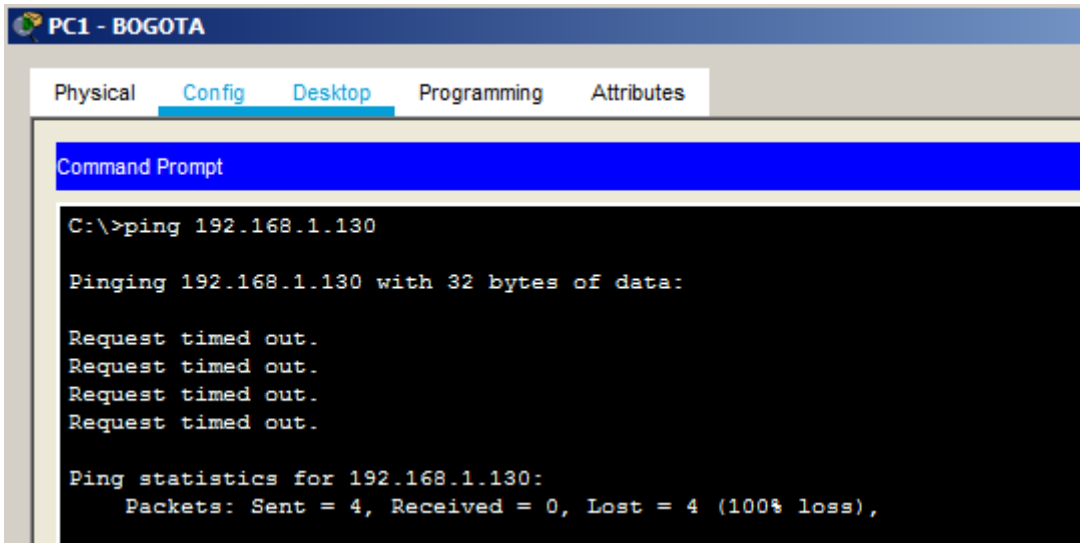

Figura 18. Ping PC1-BOGOTA a Router CALI

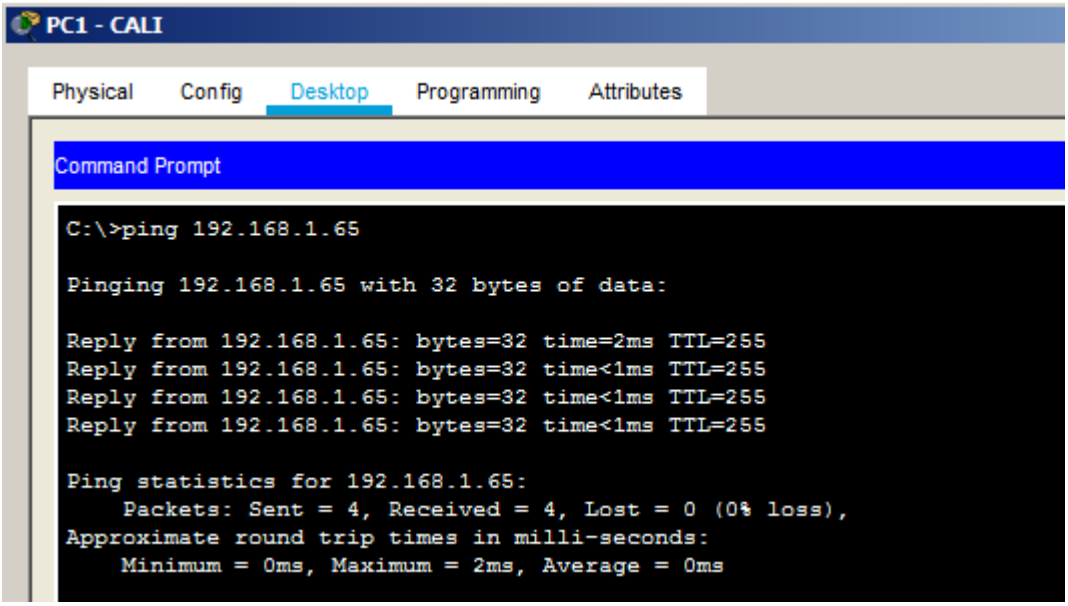

Figura 19. Ping PC1-CALI a Router CALI

Parte 3: Configuración de Enrutamiento.

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

EIGRP Router MEDELLIN

MEDELLIN#config t
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN(config)#router eigrp 1
MEDELLIN(config-router)#network 192.168.1.32 0.0.0.255
MEDELLIN(config-router)#network 192.168.1.96 0.0.0.255
MEDELLIN(config-router)#no auto-summary
MEDELLIN(config-router)#exit
MEDELLIN(config)#

EIGRP Router CALI

CALI#config t
Enter configuration commands, one per line. End with CNTL/Z.
CALI(config)#router eigrp 1
CALI(config-router)#network 192.168.1.64 0.0.0.255
CALI(config-router)#network 192.168.1.128 0.0.0.255
CALI(config-router)#no auto-summary

CALI(config-router)#exit
CALI(config)#

EIGRP Router BOGOTA

BOGOTA#config t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#router eigrp 1
BOGOTA(config-router)#network 192.168.1.0 0.0.0.255
BOGOTA(config-router)#
%DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 192.168.1.130 (Serial0/0/1) is up: new adjacency

%DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 192.168.1.98 (Serial0/0/0) is up: new adjacency

BOGOTA(config-router)#network 192.168.1.96 0.0.0.255
BOGOTA(config-router)#network 192.168.1.128 0.0.0.255
BOGOTA(config-router)#no auto-summary
BOGOTA(config-router)#exit
BOGOTA(config)#

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

Router MEDELLIN - CDP EIGRP

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 0/0 160 S 2950 Fas 0/1
BOGOTA Ser 0/0/0 169 R C2900 Ser 0/0/0
MEDELLIN#

Router BOGOTA – CDP EIGRP

BOGOTA#show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone
Device ID Local Intrfce Holdtme Capability Platform Port ID
Switch Gig 0/0 158 S 2950 Fas 0/1
CALI Ser 0/0/1 165 R C2900 Ser 0/0/0
MEDELLIN Ser 0/0/0 158 R C2900 Ser 0/0/0

BOGOTA#

Router CALI – CDP EIGRP

CALI#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 0/0 126 S 2950 Fas 0/2
BOGOTA Ser 0/0/0 135 R C2900 Ser 0/0/1
CALI#

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

Router MEDELLIN – ip route eigrp

MEDELLIN#show ip route eigrp
192.168.1.0/24 is variably subnetted, 7 subnets, 3 masks
D 192.168.1.0/27 [90/2172416] via 192.168.1.97, 00:49:31, Serial0/0/0
D 192.168.1.64/28 [90/2684416] via 192.168.1.97, 00:49:30, Serial0/0/0
D 192.168.1.128/28 [90/2681856] via 192.168.1.97, 00:49:31, Serial0/0/0

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, 3 masks
D 192.168.1.0/27 [90/2172416] via 192.168.1.97, 00:55:00, Serial0/0/0
C 192.168.1.32/28 is directly connected, GigabitEthernet0/0
L 192.168.1.33/32 is directly connected, GigabitEthernet0/0
D 192.168.1.64/28 [90/2684416] via 192.168.1.97, 00:54:59, Serial0/0/0
C 192.168.1.96/28 is directly connected, Serial0/0/0
L 192.168.1.98/32 is directly connected, Serial0/0/0
D 192.168.1.128/28 [90/2681856] via 192.168.1.97, 00:55:00, Serial0/0/0

MEDELLIN#

Router BOGOTA – ip route eigrp

```
BOGOTA#show ip route eigrp
192.168.1.0/24 is variably subnetted, 8 subnets, 3 masks
D 192.168.1.32/28 [90/2172416] via 192.168.1.98, 00:51:35, Serial0/0/0
D 192.168.1.64/28 [90/2172416] via 192.168.1.130, 00:51:34, Serial0/0/1

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, 3 masks
C 192.168.1.0/27 is directly connected, GigabitEthernet0/0
L 192.168.1.1/32 is directly connected, GigabitEthernet0/0
D 192.168.1.32/28 [90/2172416] via 192.168.1.98, 00:55:29, Serial0/0/0
D 192.168.1.64/28 [90/2172416] via 192.168.1.130, 00:55:28, Serial0/0/1
C 192.168.1.96/28 is directly connected, Serial0/0/0
L 192.168.1.97/32 is directly connected, Serial0/0/0
C 192.168.1.128/28 is directly connected, Serial0/0/1
L 192.168.1.129/32 is directly connected, Serial0/0/1

BOGOTA#
```

Router CALI – ip route eigrp

```
CALI#show ip route eigrp
192.168.1.0/24 is variably subnetted, 7 subnets, 3 masks
D 192.168.1.0/27 [90/2172416] via 192.168.1.129, 00:52:40, Serial0/0/0
D 192.168.1.32/28 [90/2684416] via 192.168.1.129, 00:52:40, Serial0/0/0
D 192.168.1.96/28 [90/2681856] via 192.168.1.129, 00:52:40, Serial0/0/0

CALI#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
```

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is not set

192.168.1.0/24 is variably subnetted, 7 subnets, 3 masks
D 192.168.1.0/27 [90/2172416] via 192.168.1.129, 00:55:54, Serial0/0/0
D 192.168.1.32/28 [90/2684416] via 192.168.1.129, 00:55:54, Serial0/0/0
C 192.168.1.64/28 is directly connected, GigabitEthernet0/0
L 192.168.1.65/32 is directly connected, GigabitEthernet0/0
D 192.168.1.96/28 [90/2681856] via 192.168.1.129, 00:55:54, Serial0/0/0
C 192.168.1.128/28 is directly connected, Serial0/0/0
L 192.168.1.130/32 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

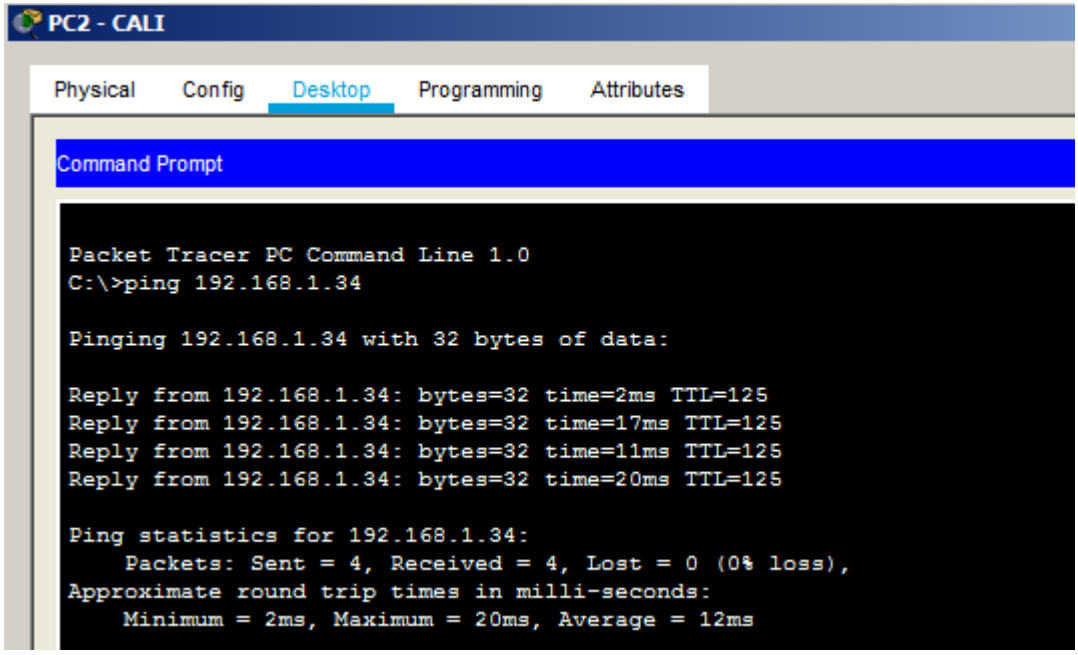

Figura 20. Ping PC2 – CALI al PC1 – MEDELLIN

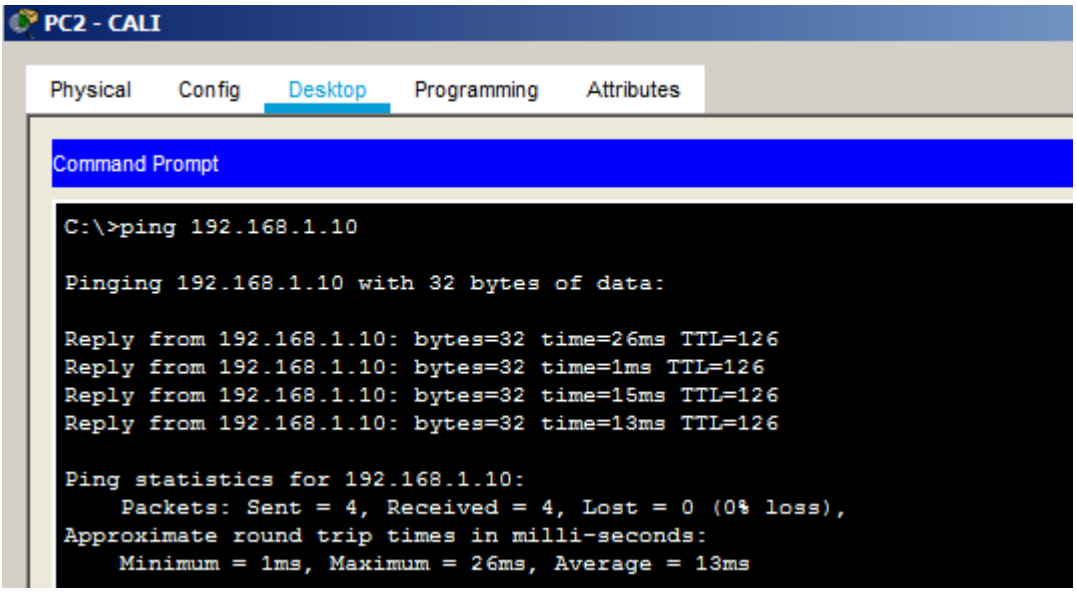

Figura 21. Ping PC2 – CALI al SERVER – BOGOTA

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

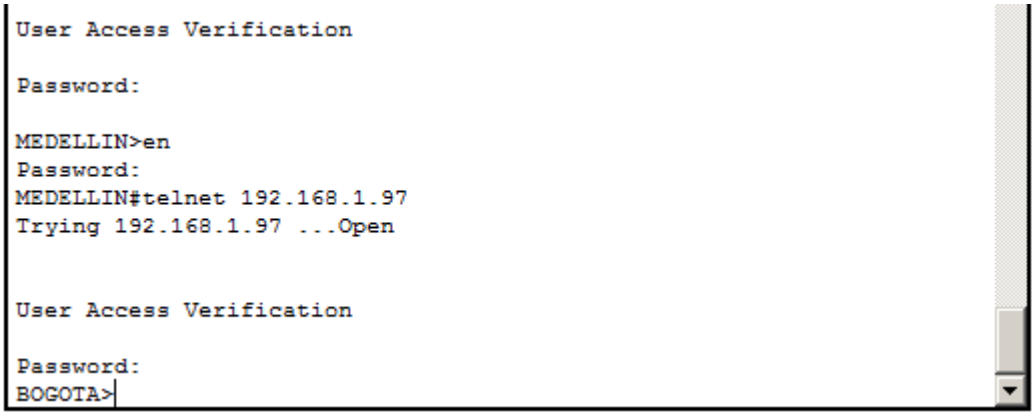

Figura 22. Telnet Router MEDELLIN a Router BOGOTA

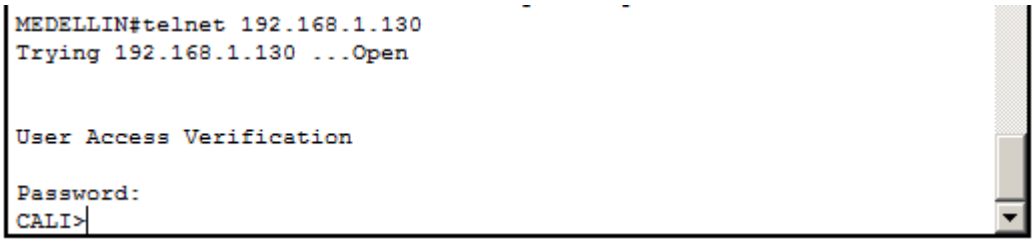

Figura 23. Telnet Router MEDELLIN a Router CALI

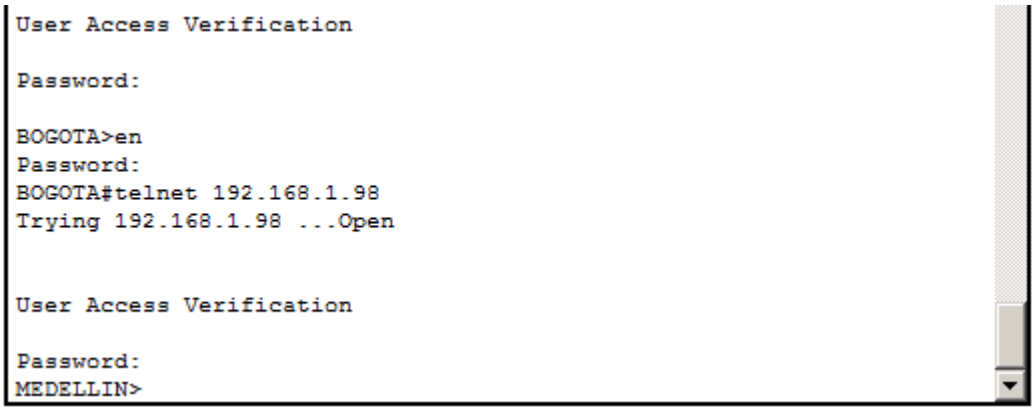

Figura 24. Telnet Router BOGOTA a Router MEDELLIN

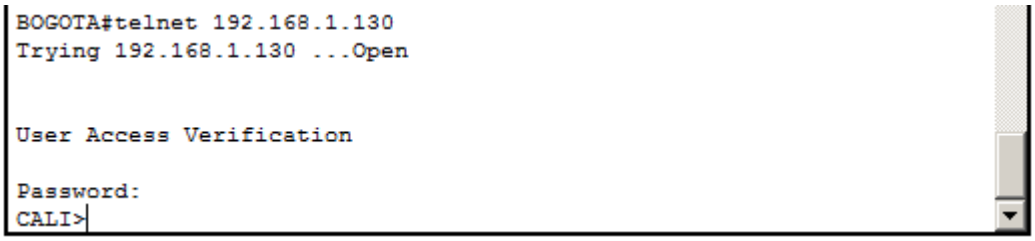

Figura 25. Telnet Router BOGOTA a Router CALI

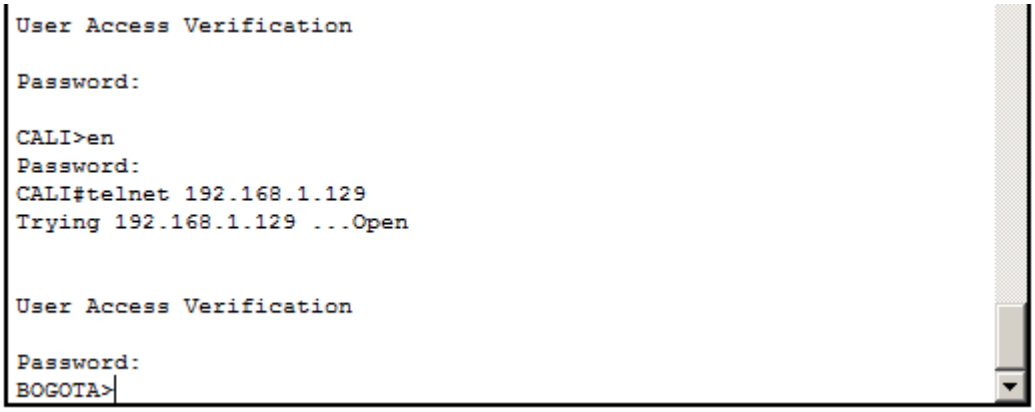

Figura 26. Telnet Router CALI a Router BOGOTA

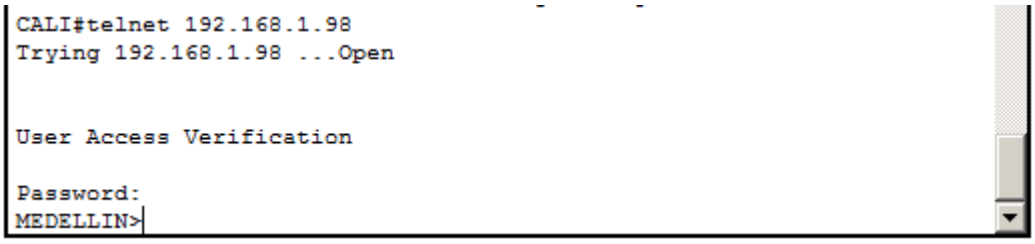

Figura 27. Telnet Router CALI a Router MEDELLIN

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

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

Configuración ACL 100 Router MEDELLIN

MEDELLIN#config t
Enter configuration commands, one per line. End with CNTL/Z.
MEDELLIN(config)#access-list 100 permit ip 192.168.1.32 0.0.0.255 192.168.1.33 0.0.0.0
MEDELLIN(config)#access-list 100 permit ip 192.168.1.32 0.0.0.255 192.168.1.97 0.0.0.0
MEDELLIN(config)#access-list 100 permit ip 192.168.1.32 0.0.0.255 192.168.1.130 0.0.0.0
MEDELLIN(config)#access-list 100 permit ip 192.168.1.32 0.0.0.255 192.168.1.10 0.0.0.0
MEDELLIN(config)#access-list 100 deny ip any any
MEDELLIN(config)#int g0/0
MEDELLIN(config-if)#ip access-group 100 in
MEDELLIN(config-if)#exit
MEDELLIN(config)#

Configuración ACL 101 Router BOGOTA

BOGOTA#config t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#access-list 101 permit ip 192.168.1.0 0.0.0.255 192.168.1.1 0.0.0.0
BOGOTA(config)#access-list 101 permit ip 192.168.1.0 0.0.0.255 192.168.1.98 0.0.0.0

BOGOTA(config)#access-list 101 permit ip 192.168.1.0 0.0.0.255 192.168.1.130 0.0.0.0
BOGOTA(config)#access-list 101 permit ip 192.168.1.10 0.0.0.0 192.168.1.32 0.0.0.255
BOGOTA(config)#access-list 101 permit ip 192.168.1.10 0.0.0.0 192.168.1.64 0.0.0.255
BOGOTA(config)#access-list 101 deny ip any any
BOGOTA(config)#int g0/0
BOGOTA(config-if)#ip access-group 101 in
BOGOTA(config-if)#exit
BOGOTA(config)#

Configuración ACL 102 Router CALI

CALI#config t
Enter configuration commands, one per line. End with CNTL/Z.
CALI(config)#access-list 102 permit ip 192.168.1.64 0.0.0.255 192.168.1.65 0.0.0.0
CALI(config)#access-list 102 permit ip 192.168.1.64 0.0.0.255 192.168.1.129 0.0.0.0
CALI(config)#access-list 102 permit ip 192.168.1.64 0.0.0.255 192.168.1.98 0.0.0.0
CALI(config)#access-list 102 permit ip 192.168.1.64 0.0.0.255 192.168.1.10 0.0.0.0
CALI(config)#access-list 102 deny ip any any
CALI(config)#int g0/0
CALI(config-if)#ip access-group 102 in
CALI(config-if)#exit
CALI(config)#

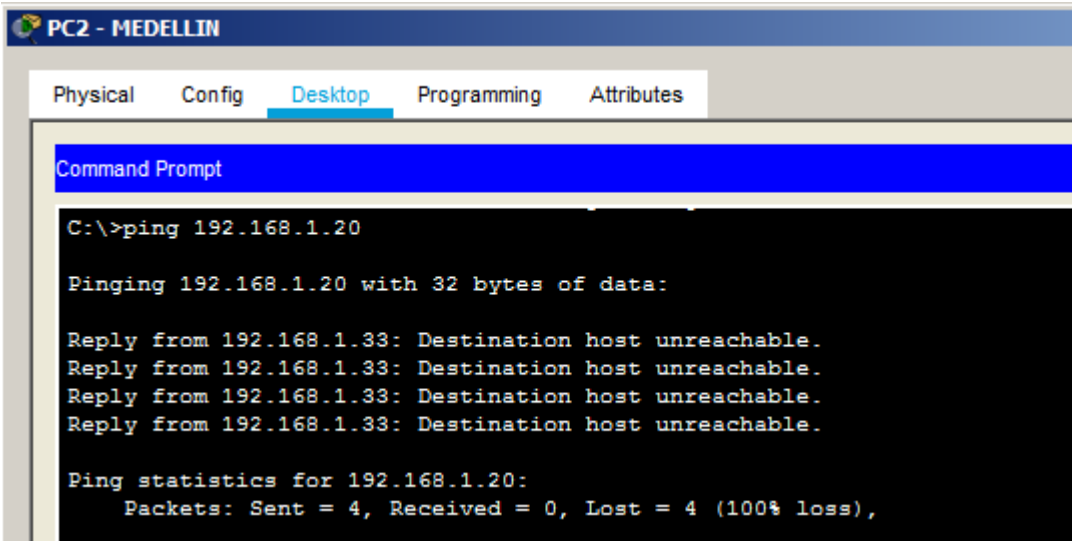

Figura 28. Ping PC2 - MEDELLIN al SW1 de BOGOTA

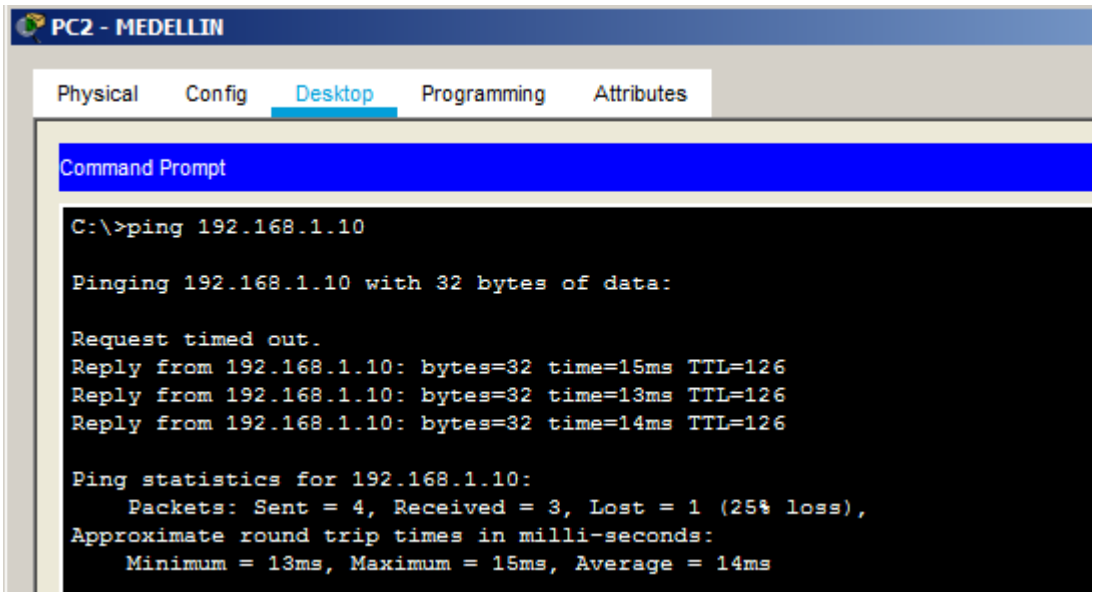

Figura 29. Ping PC2 - MEDELLIN al SERVER de BOGOTA

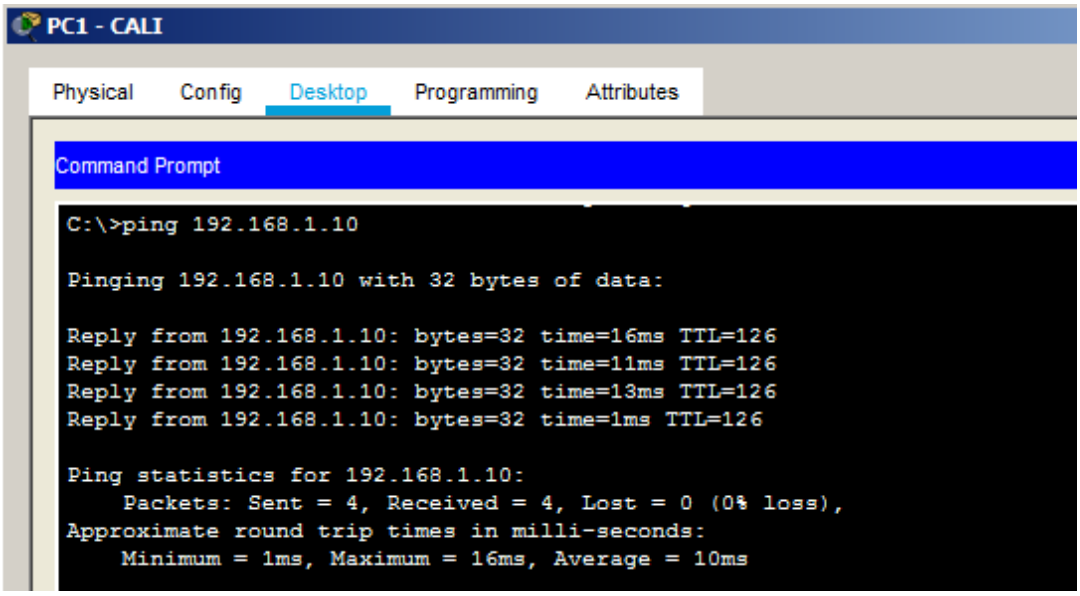

Figura 30. Ping PC1 - CALI al SERVER de BOGOTA

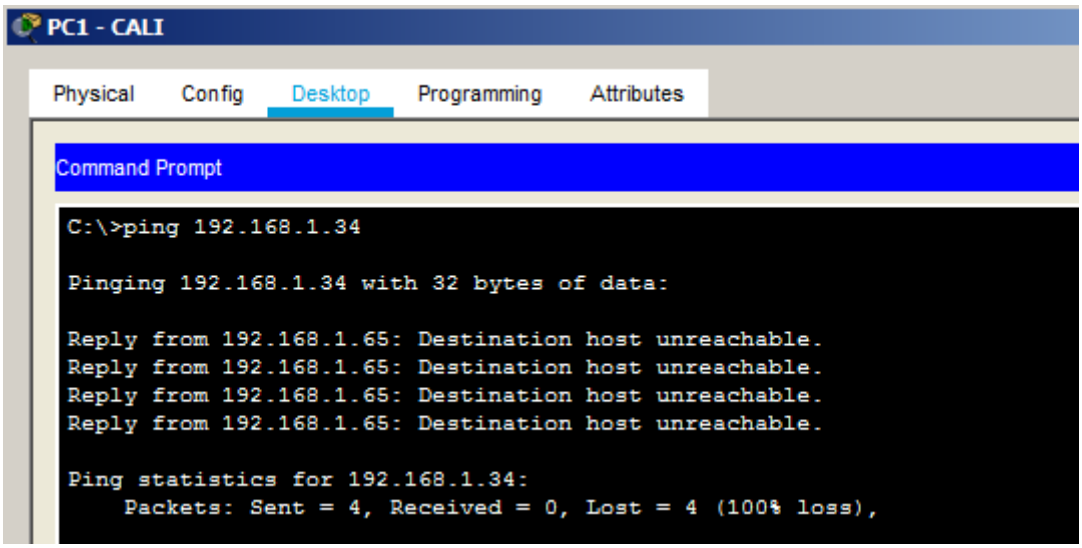

Figura 31. Ping PC1 - CALI al PC2 - MEDELLIN

Parte 5: Comprobación de la red instalada.

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

```
User Access Verification

Password:

MEDELLIN>en
Password:
MEDELLIN#show access-list
Extended IP access list 100
    10 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.33 (4 match(es))
    20 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.97 (4 match(es))
    30 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.130 (4 match(es))
    40 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.10 (11 match(es))
    50 deny ip any any (8 match(es))

MEDELLIN#
```

Figura 32. Router MEDELLIN – show access-list

```
User Access Verification

Password:

CALI>en
Password:
CALI#show access-list
Extended IP access list 102
    10 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.65
    20 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.129
    30 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.98
    40 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.10 (4 match(es))
    50 deny ip any any (8 match(es))

CALI#
```

Figura 33. Router CALI – show Access-list

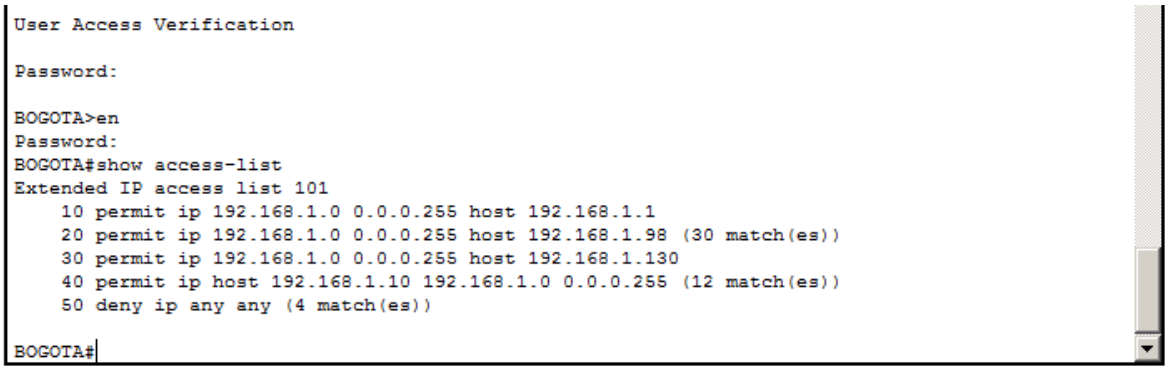

Figura 34. Router BOGOTA – show Access-list

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**	OK
	WS_1	**Router BOGOTA**	OK
	Servidor	**Router CALI**	OK
	Servidor	**Router MEDELLIN**	OK
TELNET	**LAN del Router MEDELLIN**	**Router CALI**	OK
	LAN del Router CALI	**Router CALI**	OK
	LAN del Router MEDELLIN	**Router MEDELLIN**	OK
	LAN del Router CALI	**Router MEDELLIN**	OK
PING	**LAN del Router CALI**	**WS_1**	OK - Unreachable
	LAN del Router MEDELLIN	**WS_1**	OK - Unreachable
	LAN del Router MEDELLIN	**LAN del Router CALI**	OK - Unreachable
PING	**LAN del Router CALI**	**Servidor**	OK
	LAN del Router MEDELLIN	**Servidor**	OK

	Servidor	**LAN del Router MEDELLIN**	OK
	Servidor	**LAN del Router CALI**	OK
	Router CALI	**LAN del Router MEDELLIN**	OK
	Router MEDELLIN	**LAN del Router CALI**	OK

Tabla 6. Resultados finales

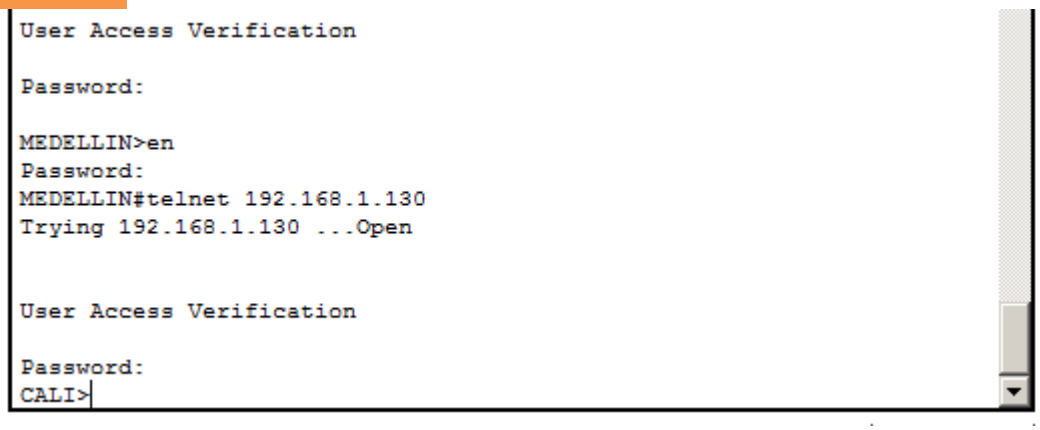

Figura 35. Telnet Router MEDELLIN al Router CALI

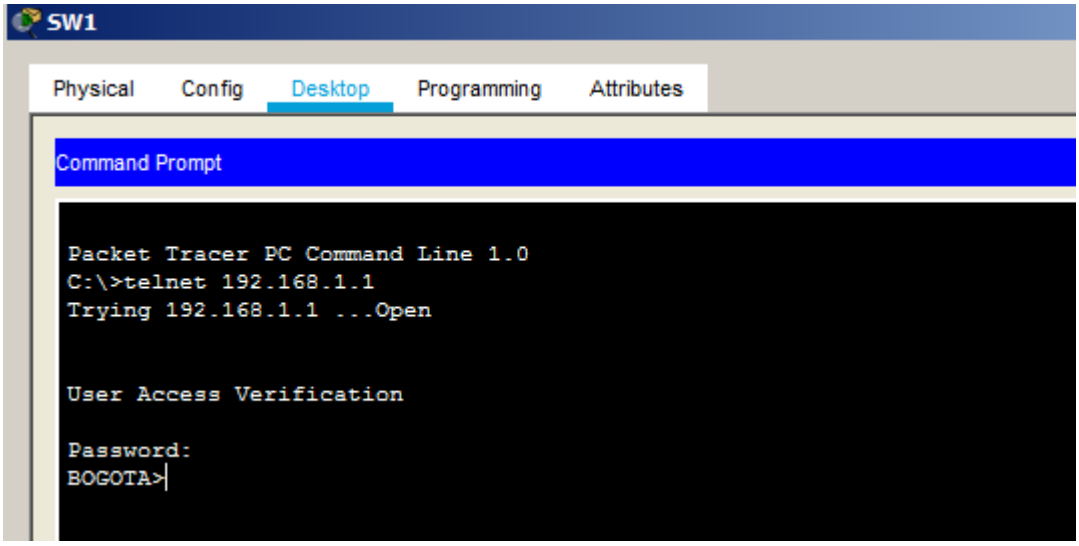

Figura 36. Telnet SW1 al Router BOGOTA

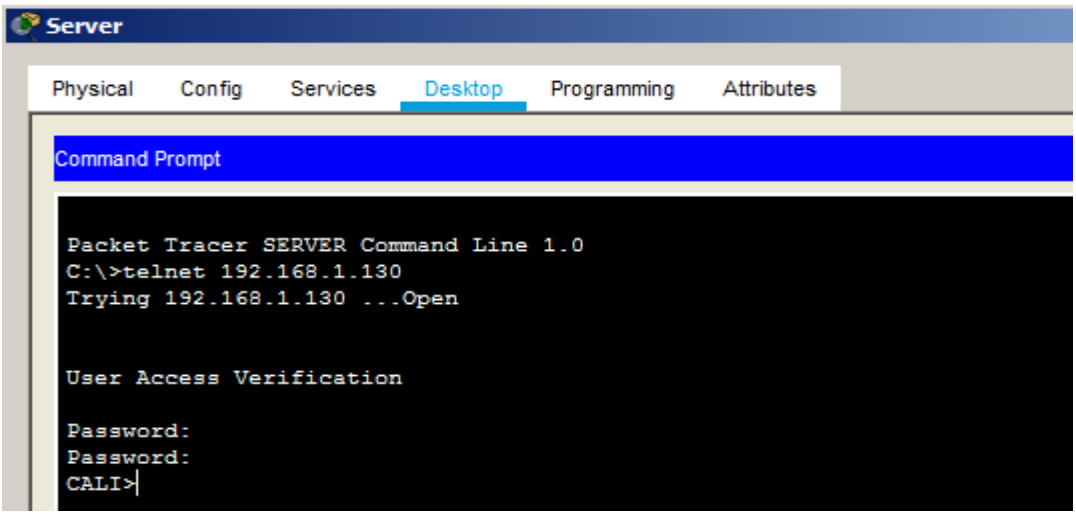

Figura 37. Telnet Servidor al Router CALI

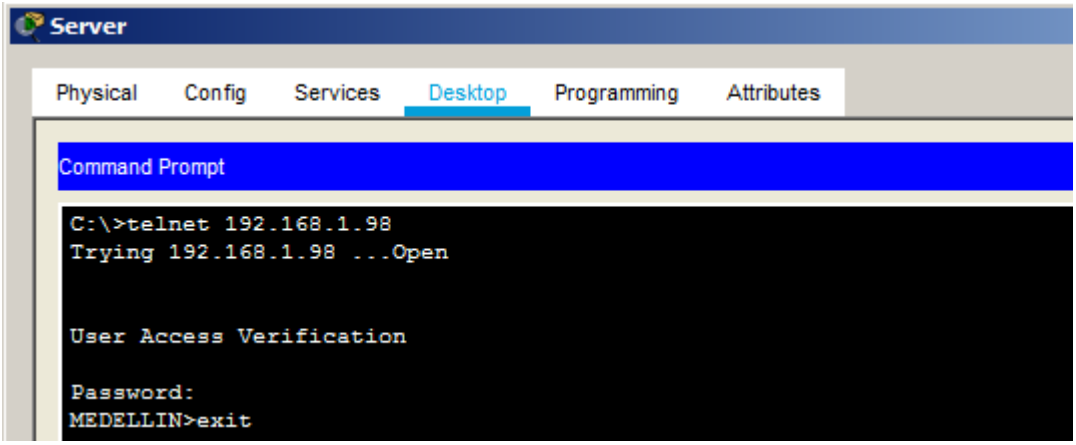

Figura 38. Telnet Servidor al Router MEDELLIN

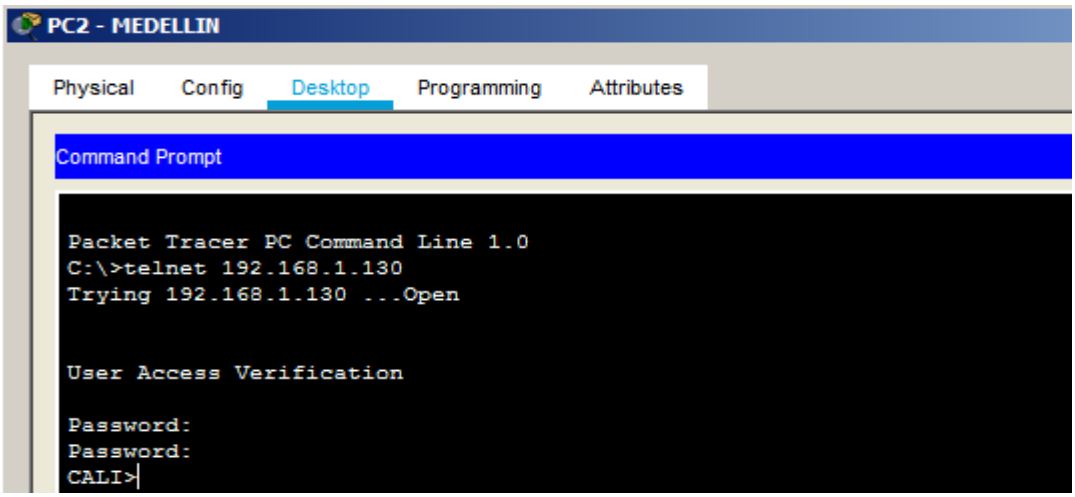

Figura 39. Telnet LAN MEDELLIN al Router CALI

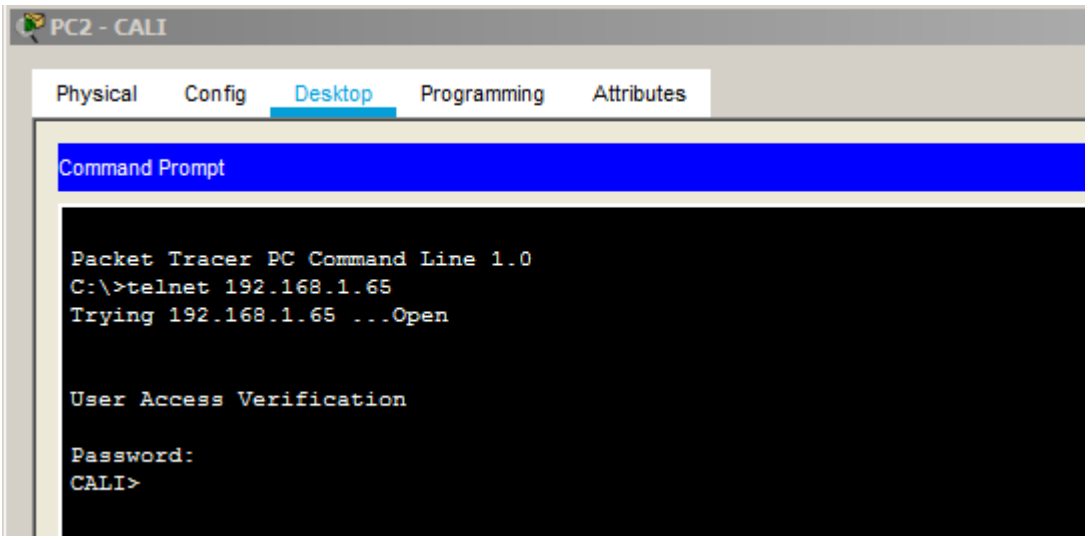

Figura 40. Telnet LAN CALI al Router CALI

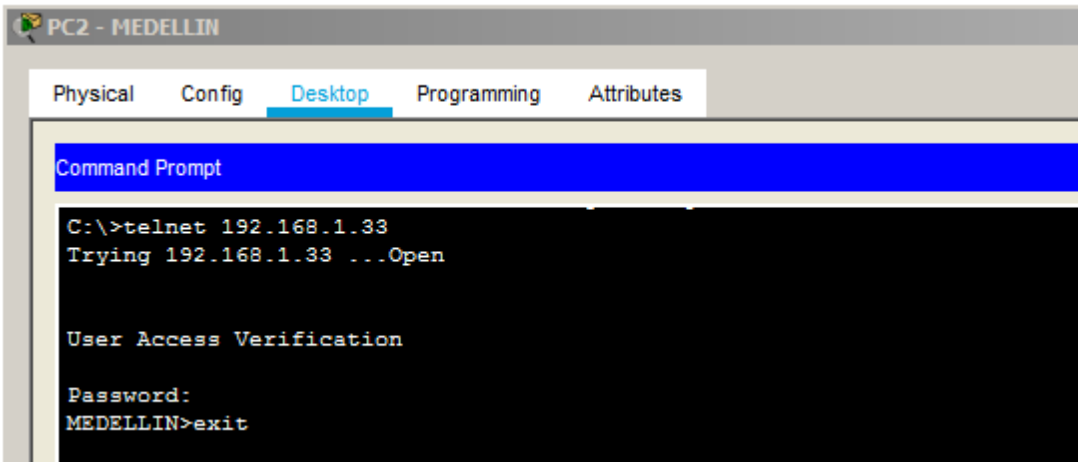

Figura 41. Telnet LAN MEDELLIN al Router MEDELLIN

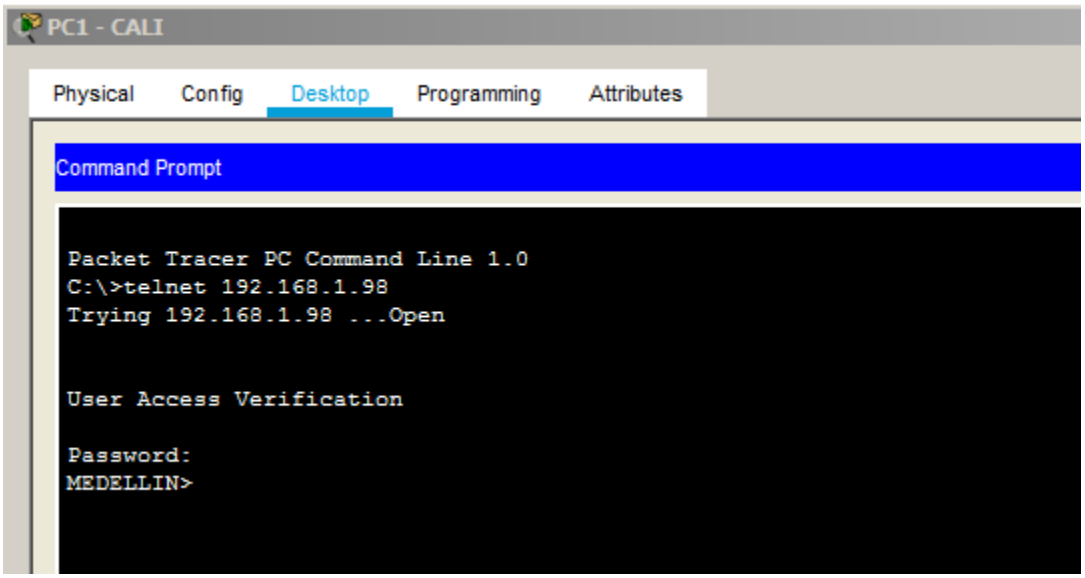

Figura 42. Telnet LAN CALI al Router MEDELLIN

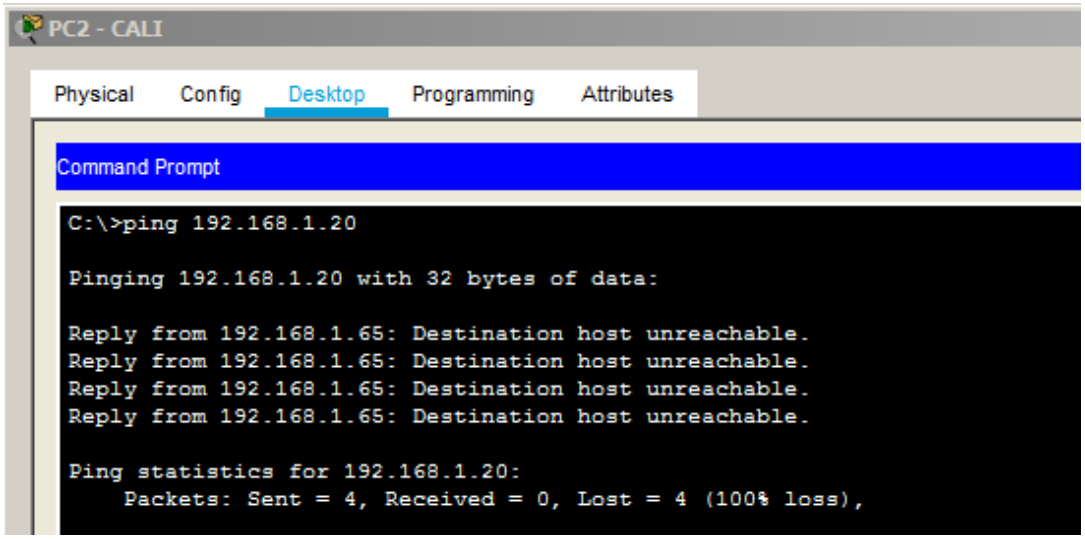

Figura 43. Ping LAN CALI al SW1

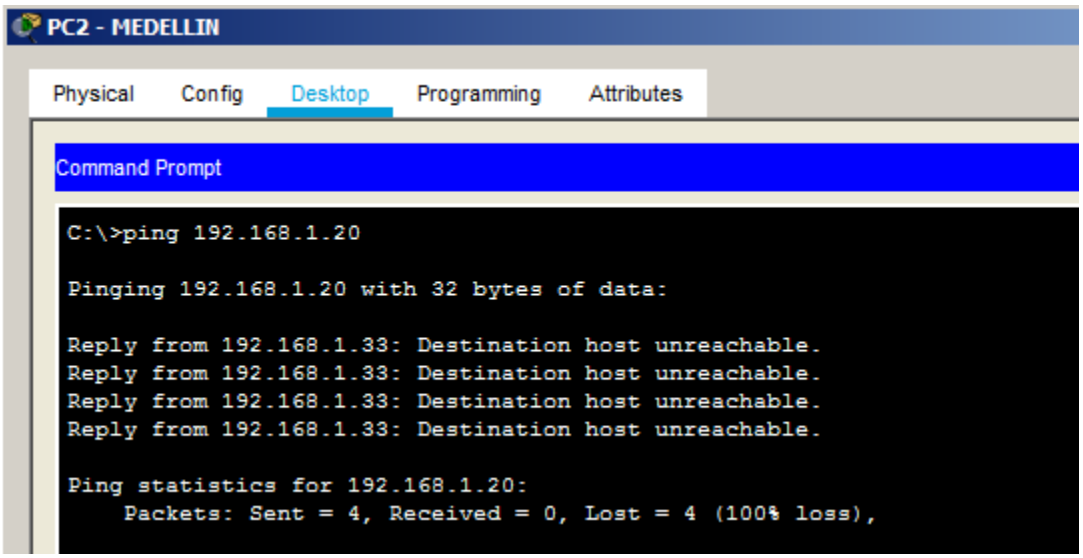

Figura 44. Ping LAN MEDELIN al SW1

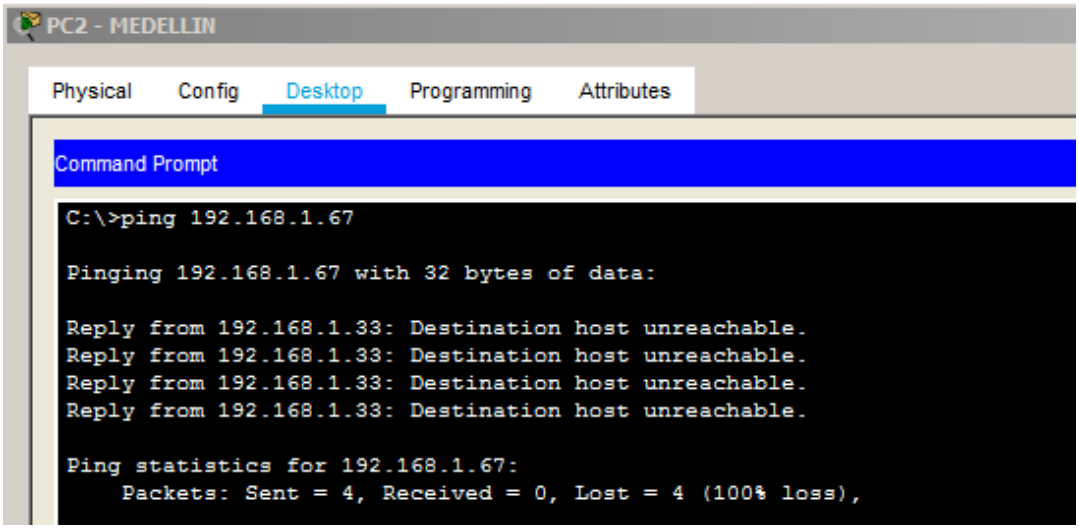

Figura 45. Ping LAN MEDELLIN a LAN CALI

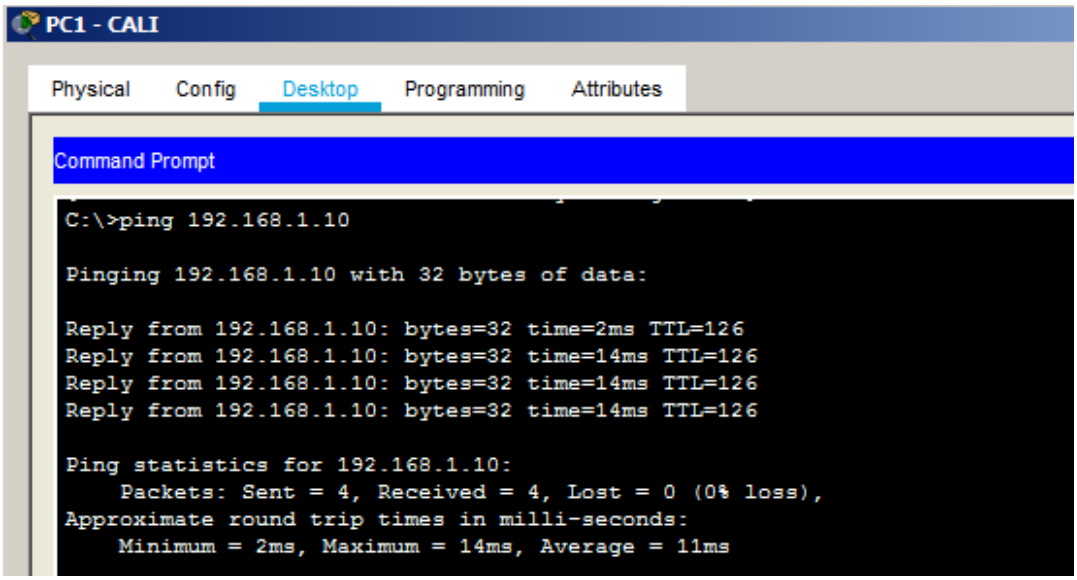

Figura 46. Ping LAN CALI al Servidor

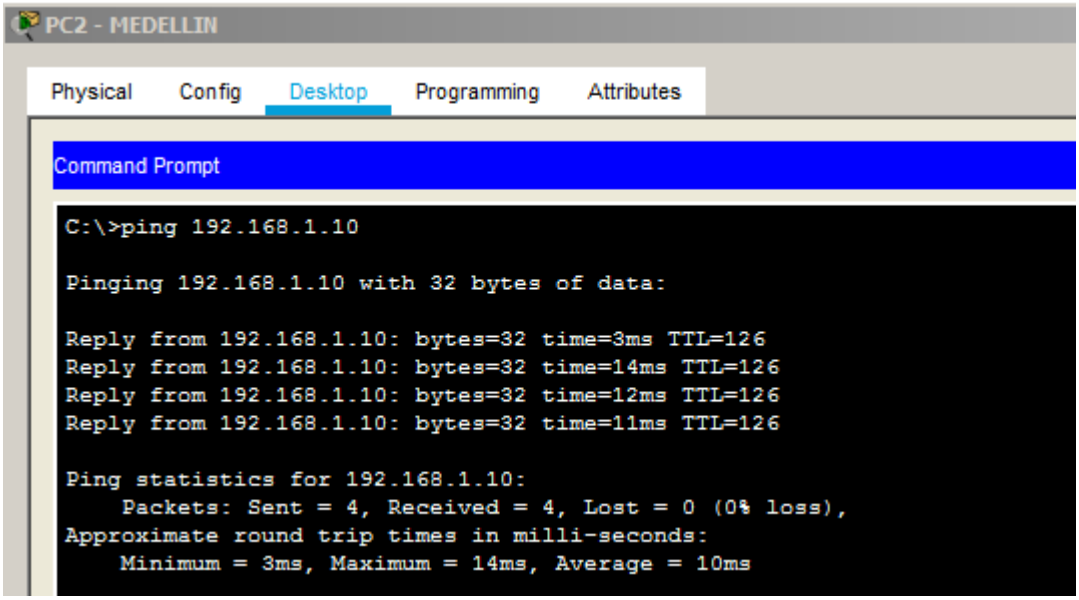

Figura 47. Ping LAN MEDELLIN al Servidor

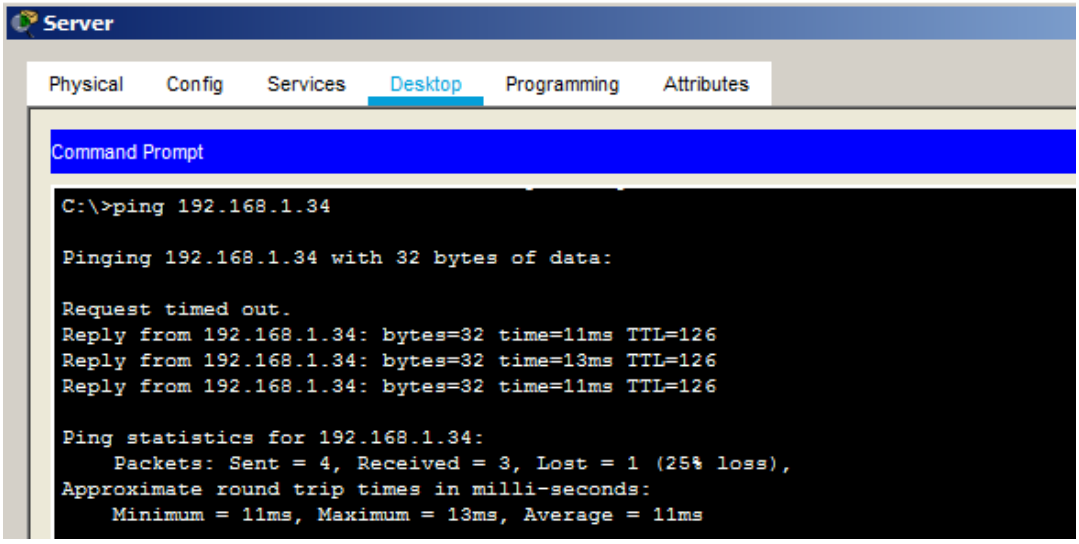

Figura 48. Ping Servidor a LAN MEDELLIN

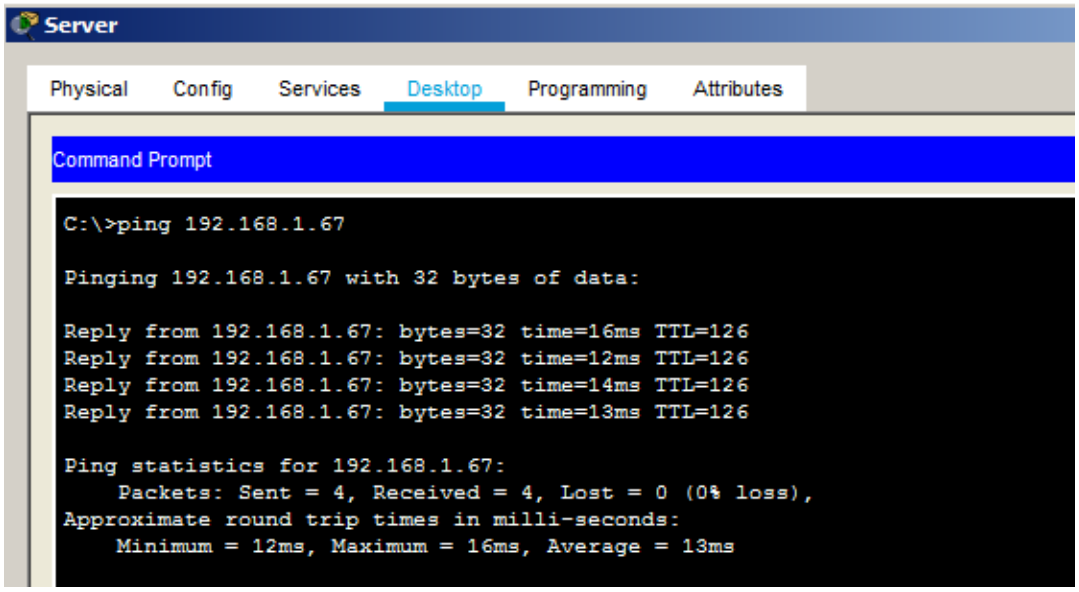

Figura 49. Ping Servidor a LAN CALI

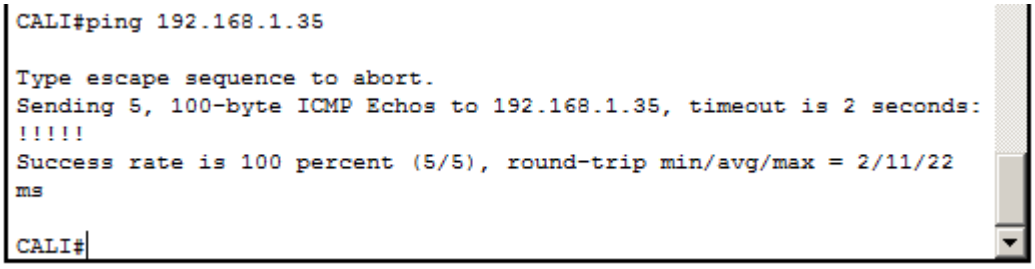

Figura 50. Ping Router CALI a LAN MEDELLIN

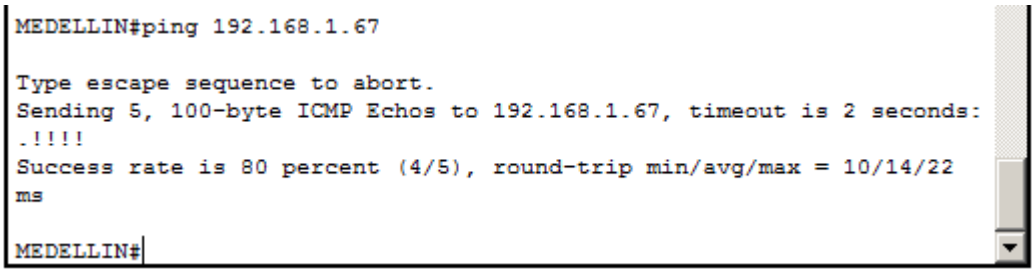

Figura 51. Ping Router MEDELLIN a LAN CALI

4.2 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

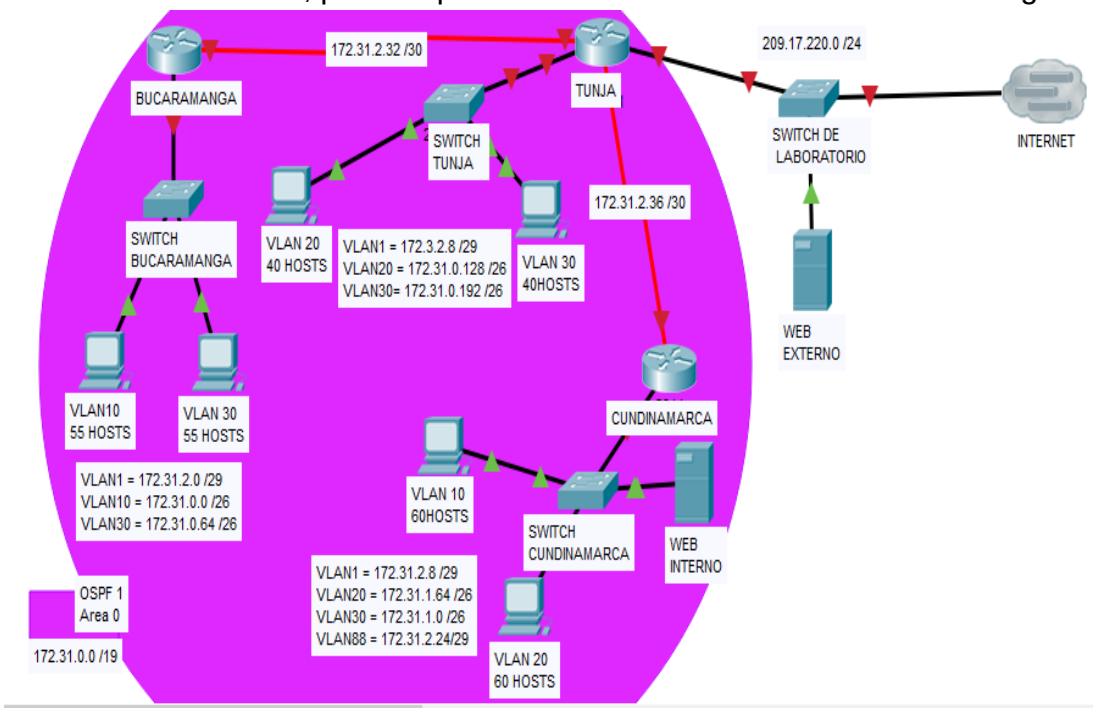

Figura 52. Esquema escenario 2

Desarrollo

Los siguientes son los requerimientos necesarios:

1. Todos los routers deberán tener los siguiente:

   - Configuración básica.

     Configuración Router BUCARAMANGA

     Router>en
     Router#config t
     Enter configuration commands, one per line. End with CNTL/Z.
     Router(config)#hostname BUCARAMANGA
     BUCARAMANGA(config)#enable secret cl4ss
     BUCARAMANGA(config)#line con 0

```
BUCARAMANGA(config-line)#password c1sc0
BUCARAMANGA(config-line)#login
BUCARAMANGA(config-line)#line vty 0 4
BUCARAMANGA(config-line)#password c1sc0
BUCARAMANGA(config-line)#login
BUCARAMANGA(config-line)#exit
BUCARAMANGA(config)#service password-encryption
BUCARAMANGA(config)#exit
BUCARAMANGA#
```

Configuración Router CUNDINAMARCA

```
Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname CUNDINAMARCA
CUNDINAMARCA(config)#enable secret cl4ss
CUNDINAMARCA(config)#line con 0
CUNDINAMARCA(config-line)#password c1sc0
CUNDINAMARCA(config-line)#login
CUNDINAMARCA(config-line)#line vty 0 4
CUNDINAMARCA(config-line)#password c1sc0
CUNDINAMARCA(config-line)#login
CUNDINAMARCA(config-line)#exit
CUNDINAMARCA(config)#service password-encryption
CUNDINAMARCA(config)#exit
CUNDINAMARCA#
```

Configuración Router TUNJA

```
Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname TUNJA
TUNJA(config)#enable secret cl4ss
TUNJA(config)#line con 0
TUNJA(config-line)#password c1sc0
TUNJA(config-line)#login
TUNJA(config-line)#line vty 0 4
TUNJA(config-line)#password c1sc0
TUNJA(config-line)#login
```

```
TUNJA(config-line)#exit
TUNJA(config)#service password-encryption
TUNJA(config)#exit
TUNJA#
```

Configuración Switch de Bucaramanga SW_BUC

```
Switch>en
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname SW_BUC
SW_BUC(config)#enable password c1sc0
SW_BUC(config)#enable secret cl4ss
SW_BUC(config)#line vty 0 7
SW_BUC(config-line)#login
% Login disabled on line 1, until 'password' is set
% Login disabled on line 2, until 'password' is set
% Login disabled on line 3, until 'password' is set
% Login disabled on line 4, until 'password' is set
% Login disabled on line 5, until 'password' is set
% Login disabled on line 6, until 'password' is set
% Login disabled on line 7, until 'password' is set
% Login disabled on line 8, until 'password' is set
SW_BUC(config-line)#password c1sc0
SW_BUC(config-line)#line console 0
SW_BUC(config-line)#password c1sc0
SW_BUC(config-line)#login
SW_BUC(config-line)#service password-encryption
SW_BUC(config)#banner motd #Acceso personal autorizado#
SW_BUC(config)#
```

Configuración Switch de Tunja SW_TUNJA

```
Switch>en
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname SW_TUNJA
SW_TUNJA(config)#enable password c1sc0
SW_TUNJA(config)#enable secret cl4ss
SW_TUNJA(config)#line vty 0 7
SW_TUNJA(config-line)#login
```

```
% Login disabled on line 1, until 'password' is set
% Login disabled on line 2, until 'password' is set
% Login disabled on line 3, until 'password' is set
% Login disabled on line 4, until 'password' is set
% Login disabled on line 5, until 'password' is set
% Login disabled on line 6, until 'password' is set
% Login disabled on line 7, until 'password' is set
% Login disabled on line 8, until 'password' is set
SW_TUNJA(config-line)#password c1sc0
SW_TUNJA(config-line)#line console 0
SW_TUNJA(config-line)#password c1sc0
SW_TUNJA(config-line)#login
SW_TUNJA(config-line)#service password-encryption
SW_TUNJA(config)#banner motd #Acceso personal autorizado#
SW_TUNJA(config)#
```

Configuración Switch de Cundinamarca SW_CUND

```
Switch>en
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname SW_CUND
SW_CUND(config)#enable password c1sc0
SW_CUND(config)#enable secret cl4ss
SW_CUND(config)#line vty 0 7
SW_CUND(config-line)#login
% Login disabled on line 1, until 'password' is set
% Login disabled on line 2, until 'password' is set
% Login disabled on line 3, until 'password' is set
% Login disabled on line 4, until 'password' is set
% Login disabled on line 5, until 'password' is set
% Login disabled on line 6, until 'password' is set
% Login disabled on line 7, until 'password' is set
% Login disabled on line 8, until 'password' is set
SW_CUND(config-line)#password c1sc0
SW_CUND(config-line)#line console 0
SW_CUND(config-line)#password c1sc0
SW_CUND(config-line)#login
SW_CUND(config-line)#service password-encryption
SW_CUND(config)#banner motd #Acceso personal autorizado#
SW_CUND(config)#
```

Configuración Switch de Laboratorio SWITCH_LABORATORIO

```
Switch>en
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname SWITCH_LABORATORIO
SWITCH_LABORATORIO(config)#enable password c1sc0
SWITCH_LABORATORIO(config)#enable secret cl4ss
SWITCH_LABORATORIO(config)#line vty 0 7
SWITCH_LABORATORIO(config-line)#login
% Login disabled on line 1, until 'password' is set
% Login disabled on line 2, until 'password' is set
% Login disabled on line 3, until 'password' is set
% Login disabled on line 4, until 'password' is set
% Login disabled on line 5, until 'password' is set
% Login disabled on line 6, until 'password' is set
% Login disabled on line 7, until 'password' is set
% Login disabled on line 8, until 'password' is set
SWITCH_LABORATORIO(config-line)#password c1sc0
SWITCH_LABORATORIO(config-line)#line console 0
SWITCH_LABORATORIO(config-line)#password c1sc0
SWITCH_LABORATORIO(config-line)#login
SWITCH_LABORATORIO(config-line)#service password-encryption
SWITCH_LABORATORIO(config)#banner motd #Acceso personal autorizado#
SWITCH_LABORATORIO(config)#
```

- Autenticación local con AAA.

Configuración AAA Router BUCARAMANGA

```
BUCARAMANGA#config t
Enter configuration commands, one per line.  End with CNTL/Z.
BUCARAMANGA(config)#aaa new-model
BUCARAMANGA(config)#username cisco secret unad
BUCARAMANGA(config)#aaa authentication login default local
BUCARAMANGA(config)#aaa authentication login default enable
BUCARAMANGA(config)#enable secret c1sc0
BUCARAMANGA(config)#aaa authentication login console local
BUCARAMANGA(config)#line console 0
BUCARAMANGA(config-line)#login authentication console
BUCARAMANGA(config-line)#exit
```

```
BUCARAMANGA(config)#aaa authentication login vty local
BUCARAMANGA(config)#line vty 0 4
BUCARAMANGA(config-line)#password cl4ss
BUCARAMANGA(config-line)#login authentication vty
BUCARAMANGA(config-line)#end
BUCARAMANGA#
```

Configuración AAA Router CUNDINAMARCA

```
CUNDINAMARCA#config t
Enter configuration commands, one per line.  End with CNTL/Z.
CUNDINAMARCA(config)#aaa new-model
CUNDINAMARCA(config)#username cisco secret unad
CUNDINAMARCA(config)#aaa authentication login default local
CUNDINAMARCA(config)#aaa authentication login default enable
CUNDINAMARCA(config)#enable secret c1sc0
CUNDINAMARCA(config)#aaa authentication login console local
CUNDINAMARCA(config)#line console 0
CUNDINAMARCA(config-line)#login authentication console
CUNDINAMARCA(config-line)#exit
CUNDINAMARCA(config)#aaa authentication login vty local
CUNDINAMARCA(config)#line vty 0 4
CUNDINAMARCA(config-line)#password cl4ss
CUNDINAMARCA(config-line)#login authentication vty
CUNDINAMARCA(config-line)#end
CUNDINAMARCA#
```

Configuración AAA Router TUNJA

```
TUNJA#config t
Enter configuration commands, one per line.  End with CNTL/Z.
TUNJA(config)#aaa new-model
TUNJA(config)#username cisco secret unad
TUNJA(config)#aaa authentication login default local
TUNJA(config)#aaa authentication login default enable
TUNJA(config)#enable secret c1sc0
TUNJA(config)#aaa authentication login console local
TUNJA(config)#line console 0
TUNJA(config-line)#login authentication console
TUNJA(config-line)#exit
TUNJA(config)#aaa authentication login vty local
```

```
TUNJA(config)#line vty 0 4
TUNJA(config-line)#password cl4ss
TUNJA(config-line)#login authentication vty
TUNJA(config-line)#end
TUNJA#
```

- Cifrado de contraseñas.
- Un máximo de internos para acceder al router.

SSH Router BUCARAMANGA

```
BUCARAMANGA#config t
Enter configuration commands, one per line.  End with CNTL/Z.
BUCARAMANGA(config)#ip domain name BUCARAMANGA.DOMAIN
BUCARAMANGA(config)#crypto key generate rsa
The name for the keys will be:
BUCARAMANGA.BUCARAMANGA.DOMAIN
Choose the size of the key modulus in the range of 360 to 2048 for your
  General Purpose Keys. Choosing a key modulus greater than 512 may take
  a few minutes.

How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

BUCARAMANGA(config)#ip ssh authentication-retries 3
*mar 1 0:13:15.55: %SSH-5-ENABLED: SSH 1.99 has been enabled
BUCARAMANGA(config)#ip ssh time-out 120
BUCARAMANGA(config)#line vty 0 15
BUCARAMANGA(config-line)#transport input ssh
BUCARAMANGA(config-line)#exit
BUCARAMANGA(config)#
```

SSH Router CUNDINAMARCA

```
CUNDINAMARCA#config t
Enter configuration commands, one per line.  End with CNTL/Z.
CUNDINAMARCA(config)#ip domain name CUNDINAMARCA.DOMAIN
CUNDINAMARCA(config)#crypto key generate rsa
The name for the keys will be:
CUNDINAMARCA.CUNDINAMARCA.DOMAIN
Choose the size of the key modulus in the range of 360 to 2048 for your
```

```
General Purpose Keys. Choosing a key modulus greater than 512 may take
a few minutes.

How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

CUNDINAMARCA(config)#ip ssh authentication-retries 3
*mar 1 0:14:19.703: %SSH-5-ENABLED: SSH 1.99 has been enabled
CUNDINAMARCA(config)#ip ssh time-out 120
CUNDINAMARCA(config)#line vty 0 15
CUNDINAMARCA(config-line)#transport input ssh
CUNDINAMARCA(config-line)#exit
CUNDINAMARCA(config)#
```

SSH Router TUNJA

```
TUNJA#config t
Enter configuration commands, one per line.  End with CNTL/Z.
TUNJA(config)#ip domain name TUNJA.DOMAIN
TUNJA(config)#crypto key generate rsa
The name for the keys will be: TUNJA.TUNJA.DOMAIN
Choose the size of the key modulus in the range of 360 to 2048 for your
  General Purpose Keys. Choosing a key modulus greater than 512 may take
  a few minutes.

How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-exportable...[OK]

TUNJA(config)#ip ssh authentication-retries 3
*mar 1 0:14:8.910: %SSH-5-ENABLED: SSH 1.99 has been enabled
TUNJA(config)#ip ssh time-out 120
TUNJA(config)#line vty 0 15
TUNJA(config-line)#transport input ssh
TUNJA(config-line)#exit
TUNJA(config)#
```

- Máximo tiempo de acceso al detectar ataques.

Login Block Router BUCARAMANGA

```
BUCARAMANGA#config t
```

Enter configuration commands, one per line. End with CNTL/Z.
BUCARAMANGA(config)#banner motd #Acceso solo para personal autorizado#
BUCARAMANGA(config)#login block-for 10 attempts 2 within 60
BUCARAMANGA(config)#exit
BUCARAMANGA#

Login Block Router CUNDINAMARCA

CUNDINAMARCA#config t
Enter configuration commands, one per line. End with CNTL/Z.
CUNDINAMARCA(config)#banner motd #Acceso solo para personal autorizado#
CUNDINAMARCA(config)#login block-for 10 attempts 2 within 60
CUNDINAMARCA(config)#exit
CUNDINAMARCA#

Login Block Router TUNJA

TUNJA#config t
Enter configuration commands, one per line. End with CNTL/Z.
TUNJA(config)#banner motd #Acceso solo para personal autorizado#
TUNJA(config)#login block-for 10 attempts 2 within 60
TUNJA(config)#exit
TUNJA#

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

Configuración Interfaz s0/0/0 Del Router BUCARAMANGA

BUCARAMANGA#config t
Enter configuration commands, one per line. End with CNTL/Z.
BUCARAMANGA(config)#int s0/0/0
BUCARAMANGA(config-if)#ip address 172.31.2.33 255.255.255.252
BUCARAMANGA(config-if)#no shut

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

Configuración Interfaz g0/0 Del Router BUCARAMANGA

BUCARAMANGA(config)#int g0/0
BUCARAMANGA(config-if)#ip address 172.31.2.1 255.255.255.248
BUCARAMANGA(config-if)#no shut

BUCARAMANGA(config-if)#exit
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

BUCARAMANGA(config)#

Configuración Interfaz s0/0/0 Del Router TUNJA

TUNJA#config t
Enter configuration commands, one per line. End with CNTL/Z.
TUNJA(config)#int s0/0/0
TUNJA(config-if)#ip address 172.31.2.33 255.255.255.252
TUNJA(config-if)#no shut

TUNJA(config-if)#exit
TUNJA(config)#

Configuración Interfaz s0/0/1 Del Router TUNJA

TUNJA(config)#int s0/0/1
TUNJA(config-if)#ip address 172.31.2.38 255.255.255.252
TUNJA(config-if)#no shut

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

Configuración Interfaz g0/0 Del Router TUNJA

TUNJA(config)#int g0/0
TUNJA(config-if)#ip address 172.3.2.9 255.255.255.248
TUNJA(config-if)#no shut

TUNJA(config-if)#exit

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

%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

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

TUNJA(config)#

Configuración Interfaz g0/1 Del Router TUNJA

TUNJA(config)#int g0/1
TUNJA(config-if)#ip address 209.17.220.3 255.255.255.0
TUNJA(config-if)#no shut

TUNJA(config-if)#exit
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

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

TUNJA(config)#

Configuración Interfaz s0/0/1 Del Router CUNDINAMARCA

CUNDINAMARCA#config t
Enter configuration commands, one per line. End with CNTL/Z.
CUNDINAMARCA(config)#int s0/0/1
CUNDINAMARCA(config-if)#ip address 172.31.2.37 255.255.255.252
CUNDINAMARCA(config-if)#no shut
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

CUNDINAMARCA(config-if)#exit
CUNDINAMARCA(config)#

Configuración Interfaz g0/0 Del Router CUNDINAMARCA

CUNDINAMARCA(config-if)#int g0/0
CUNDINAMARCA(config-if)#ip address 172.31.2.9 255.255.255.248

CUNDINAMARCA(config-if)#no shut
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

CUNDINAMARCA(config-if)#exit
CUNDINAMARCA(config)#

Configuración de rutas Router CUNDINAMARCA

CUNDINAMARCA#config t
Enter configuration commands, one per line. End with CNTL/Z.
CUNDINAMARCA(config)#ip route 172.31.2.32 255.255.255.252 172.31.2.38
CUNDINAMARCA(config)#end
CUNDINAMARCA#

Configuración de rutas Router TUNJA

TUNJA#config t
Enter configuration commands, one per line. End with CNTL/Z.
TUNJA(config)#ip route 172.31.2.10 255.255.255.254 172.31.2.37
TUNJA(config)#end
TUNJA#

Configuración de rutas Router BUCARAMANGA

BUCARAMANGA#config t
Enter configuration commands, one per line. End with CNTL/Z.
BUCARAMANGA(config)#ip route 172.31.2.10 255.255.255.254 172.31.2.37
BUCARAMANGA(config)#end
BUCARAMANGA#

Registro en el Servidor WEB INTERNO TFTP del Router CUNDINAMARCA

CUNDINAMARCA#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
CUNDINAMARCA#copy startup-config tftp
Address or name of remote host []? 172.31.2.10

Destination filename [CUNDINAMARCA-confg]?

Writing startup-config...!!
[OK - 1534 bytes]

1534 bytes copied in 0.012 secs (127833 bytes/sec)
CUNDINAMARCA#

Registro en el Servidor WEB INTERNO TFTP del Router TUNJA

TUNJA#config t
Enter configuration commands, one per line. End with CNTL/Z.
TUNJA(config)#ip route 172.31.2.10 255.255.255.254 172.31.2.37
TUNJA(config)#

TUNJA#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
TUNJA#copy startup-config tftp
Address or name of remote host []? 172.31.2.10
Destination filename [TUNJA-confg]?

Writing startup-config...!!
[OK - 1578 bytes]

1578 bytes copied in 0.018 secs (87666 bytes/sec)
TUNJA#

Registro en el Servidor WEB INTERNO TFTP del Router BUCARAMANGA

BUCARAMANGA#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
BUCARAMANGA#copy startup-config tftp
Address or name of remote host []? 172.31.2.10
Destination filename [BUCARAMANGA-confg]?

Writing startup-config...!!

[OK - 1612 bytes]

1612 bytes copied in 0.008 secs (201500 bytes/sec)
BUCARAMANGA#

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

Configuración Interfaces Switch Bucaramanga

SW_BUC#config t
Enter configuration commands, one per line. End with CNTL/Z.
SW_BUC(config)#int f0/1
SW_BUC(config-if)#switchport mode trunk

SW_BUC(config-if)#exit
%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

SW_BUC(config)#int f0/2
SW_BUC(config-if)#switchport mode access
SW_BUC(config-if)#switchport access vlan 10
% Access VLAN does not exist. Creating vlan 10
SW_BUC(config-if)#exit
SW_BUC(config)#int f0/3
SW_BUC(config-if)#switchport mode access
SW_BUC(config-if)#switchport access vlan 30
% Access VLAN does not exist. Creating vlan 30
SW_BUC(config-if)#

Configuración Interfaces Switch CUNDINAMARCA

SW_CUND#config t
Enter configuration commands, one per line. End with CNTL/Z.
SW_CUND(config)#int f0/1
SW_CUND(config-if)#switchport mode trunk
SW_CUND(config-if)#exit
SW_CUND(config)#int f0/2
SW_CUND(config-if)#switchport mode access

SW_CUND(config-if)#switchport access vlan 20
% Access VLAN does not exist. Creating vlan 20
SW_CUND(config-if)#exit
SW_CUND(config)#int f0/3
SW_CUND(config-if)#switchport mode access
SW_CUND(config-if)#switchport access vlan 30
%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

% Access VLAN does not exist. Creating vlan 30
SW_CUND(config-if)#

Configuración Interfaz Switch TUNJA

SW_TUNJA#config t
SW_TUNJA(config)#interface FastEthernet0/1
SW_TUNJA(config-if)#
SW_TUNJA(config-if)#switchport mode trunk

SW_TUNJA(config-if)#
%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

SW_TUNJA(config-if)#

Configuración de Helper-address Router BUCARAMANGA

BUCARAMANGA#config t
Enter configuration commands, one per line. End with CNTL/Z.
BUCARAMANGA(config)#int g0/0
BUCARAMANGA(config-if)#ip helper-address 172.31.2.34
BUCARAMANGA(config-if)#int g0/0.10
BUCARAMANGA(config-subif)#ip helper-address 172.31.2.34
BUCARAMANGA(config-subif)#int g0/0.30
BUCARAMANGA(config-subif)#ip helper-address 172.31.2.34
BUCARAMANGA(config-subif)#exit
BUCARAMANGA(config)#

BUCARAMANGA(config)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.10, changed state to up

%LINK-5-CHANGED: Interface GigabitEthernet0/0.30, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.30, changed state to up

BUCARAMANGA(config)#int g0/0.10
BUCARAMANGA(config-subif)#encapsulation dot1q 10
BUCARAMANGA(config-subif)#ip address 172.31.0.1 255.255.255.248
BUCARAMANGA(config-subif)#int g0/0.30
BUCARAMANGA(config-subif)#encapsulation dot1q 30
BUCARAMANGA(config-subif)#ip address 172.31.0.65 255.255.255.248
BUCARAMANGA(config-subif)#

Configuración de Helper-address Router CUNDINAMARCA

CUNDINAMARCA#config t
Enter configuration commands, one per line. End with CNTL/Z.
CUNDINAMARCA(config)#int g0/0
CUNDINAMARCA(config-if)#ip helper-address 172.31.2.38
CUNDINAMARCA(config-if)#int g0/0.20
CUNDINAMARCA(config-subif)#ip helper-address 172.31.2.38
CUNDINAMARCA(config-subif)#int g0/0.30
CUNDINAMARCA(config-subif)#ip helper-address 172.31.2.38
CUNDINAMARCA(config-subif)#int g0/0.88
CUNDINAMARCA(config-subif)#ip helper-address 172.31.2.38
CUNDINAMARCA(config-subif)#exit
CUNDINAMARCA(config)#int g0/0.10
CUNDINAMARCA(config-subif)#encapsulation dot1q 20
CUNDINAMARCA(config-subif)#ip address 172.31.1.65 255.255.255.192
CUNDINAMARCA(config-subif)#int g0/0.20
CUNDINAMARCA(config-subif)#encapsulation dot1q 30
CUNDINAMARCA(config-subif)#ip address 172.31.1.1 255.255.255.192
CUNDINAMARCA(config-subif)#int g0/0.88
CUNDINAMARCA(config-subif)#encapsulation dot1q 88
CUNDINAMARCA(config-subif)#ip address 172.31.2.25 255.255.255.248

%LINK-5-CHANGED: Interface GigabitEthernet0/0.20, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.20, changed state to up

%LINK-5-CHANGED: Interface GigabitEthernet0/0.30, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.30, changed state to up

%LINK-5-CHANGED: Interface GigabitEthernet0/0.88, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.88, changed state to up

%LINK-5-CHANGED: Interface GigabitEthernet0/0.10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.10, changed state to up

CUNDINAMARCA(config-subif)#

Configuración DHCP Router TUNJA

```
TUNJA#config t
Enter configuration commands, one per line.  End with CNTL/Z.
TUNJA(config)#ip dhcp pool VLAN10
TUNJA(dhcp-config)#network 172.31.0.0 255.255.255.248
TUNJA(dhcp-config)#default-router 172.31.2.1
TUNJA(dhcp-config)#exit
TUNJA(config)#ip dhcp pool VLAN30
TUNJA(dhcp-config)#network 172.31.0.64 255.255.255.248
TUNJA(dhcp-config)#default-router 172.31.2.1
TUNJA(dhcp-config)#exit
TUNJA(config)#ip dhcp pool VLAN30_2
TUNJA(dhcp-config)#network 172.31.1.0 255.255.255.192
TUNJA(dhcp-config)#default-router 172.31.2.9
TUNJA(dhcp-config)#exit
TUNJA(config)#ip route 172.31.0.0 255.255.255.0 172.31.2.33
TUNJA(config)#ip route 172.31.0.64 255.255.255.248 172.31.2.33
TUNJA(config)#ip dhcp pool VLAN20
```

```
TUNJA(dhcp-config)#network 172.31.1.64 255.255.255.192
TUNJA(dhcp-config)#default-router 172.31.2.9
TUNJA(dhcp-config)#exit
TUNJA(config)#ip route 172.31.1.0 255.255.255.0 172.31.2.37
TUNJA(config)#ip route 172.31.1.64 255.255.255.248 172.31.2.37
TUNJA(config)#
```

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

Configuración OSFP Router BUCARAMANGA

```
BUCARAMANGA#config t
Enter configuration commands, one per line.  End with CNTL/Z.
BUCARAMANGA(config)#router ospf 1
BUCARAMANGA(config-router)#network 172.31.2.0 0.0.0.255 area 1
BUCARAMANGA(config-router)#network 172.31.2.32 0.0.0.255 area 1
BUCARAMANGA(config-router)#do wr
Building configuration...
[OK]
BUCARAMANGA(config-router)#
```

Configuración OSFP Router TUNJA

```
TUNJA#config t
Enter configuration commands, one per line.  End with CNTL/Z.
TUNJA(config)#router ospf 1
TUNJA(config-router)#network 172.31.2.32 0.0.0.255 area 1
TUNJA(config-router)#network 172.3.2.9 0.0.0.255 area 1
TUNJA(config-router)#network 172.31.2.26 0.0.0.255 area 1
TUNJA(config-router)#do wr
Building configuration...
[OK]
TUNJA(config-router)#
```

Configuración OSFP Router CUNDINAMARCA

```
CUNDINAMARCA#config t
Enter configuration commands, one per line.  End with CNTL/Z.
CUNDINAMARCA(config)#router ospf 1
CUNDINAMARCA(config-router)#network 172.31.2.36 0.0.0.255 area 1
CUNDINAMARCA(config-router)#network 172.31.2.8 0.0.0.255 area 1
```

```
CUNDINAMARCA(config-router)#do wr
Building configuration...
[OK]
CUNDINAMARCA(config-router)#
```

Configuración NAT Router TUNJA

```
TUNJA#config t
TUNJA(config)#access-list 1 permit 172.31.2.0 0.0.0.255
TUNJA(config)#access-list 1 permit 172.31.0.0 0.0.0.255
TUNJA(config)#access-list 1 permit 172.31.0.64 0.0.0.255
TUNJA(config)#access-list 1 permit 172.31.0.128 0.0.0.255
TUNJA(config)#access-list 1 permit 172.31.0.192 0.0.0.255
TUNJA(config)#access-list 1 permit 172.31.1.64 0.0.0.255
TUNJA(config)#access-list 1 permit 172.31.1.0 0.0.0.255
TUNJA(config)#access-list 1 permit 172.31.2.9 0.0.0.255
TUNJA(config)#access-list 1 permit 172.3.2.9 0.0.0.255
TUNJA(config)#ip nat inside source list 1 int g0/1 overload
TUNJA(config)#int s0/0/0
TUNJA(config-if)#ip nat inside
TUNJA(config-if)#exit
TUNJA(config)#int s0/0/1
TUNJA(config-if)#ip nat inside
TUNJA(config-if)#exit
TUNJA(config)#int g0/1
TUNJA(config-if)#ip nat outside
TUNJA(config-if)#exit
TUNJA(config)#router rip
TUNJA(config-router)#version 2
TUNJA(config-router)#network 172.31.2.0
TUNJA(config-router)#network 209.17.220.0
TUNJA(config-router)#exit
TUNJA(config)#ip route 172.31.1.0 255.255.255.192 172.31.2.37
TUNJA(config)#
TUNJA#
```

Configuración Enrutamiento NAT Router BUCARAMANGA

```
BUCARAMANGA#config t
BUCARAMANGA#(config)#ip route 209.17.220.0 255.255.255.0 172.31.2.34
BUCARAMANGA(config)#ip route 172.31.1.0 255.255.255.192 172.31.2.37
```

BUCARAMANGA(config)#ip route 172.31.1.64 255.255.255.192 172.31.2.37
BUCARAMANGA#(config)#

Configuración Enrutamiento NAT Router CUNDINAMARCA

CUNDINAMARCA#config t
CUNDINAMARCA(config)#ip route 209.17.220.0 255.255.255.0 172.31.2.38
CUNDINAMARCA(config)#ip route 172.31.0.64 255.255.255.192 172.31.2.33
CUNDINAMARCA(config)#ip route 172.31.0.0 255.255.255.192 172.31.2.33
CUNDINAMARCA(config)#

4. El enrutamiento deberá tener autenticación.

Enrutamiento PPP con autenticación PAP Router BUCARAMANGA

BUCARAMANGA#config t
BUCARAMANGA(config)#int s0/0/0
BUCARAMANGA(config-if)#encapsulation ppp
BUCARAMANGA(config-if)#ppp authentication pap
BUCARAMANGA(config-if)#ppp pap sent-username cisco password unad
BUCARAMANGA(config-if)#exit
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to down

00:01:39: %OSPF-5-ADJCHG: Process 1, Nbr 209.17.220.3 on Serial0/0/0 from FULL to DOWN, Neighbor Down: Interface down or detached

BUCARAMANGA(config)#

Enrutamiento PPP con autenticación PAP Router TUNJA

TUNJA#config t
TUNJA(config)#int s0/0/0
TUNJA(config-if)#encapsulation ppp
TUNJA(config-if)#ppp authentication pap
TUNJA(config-if)#ppp pap sent-username cisco password unad
TUNJA(config-if)#exit
TUNJA(config)#int s0/0/1
TUNJA(config-if)#encapsulation ppp
TUNJA(config-if)#ppp authentication pap
TUNJA(config-if)#ppp pap sent-username cisco password unad
TUNJA(config-if)#exit

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to down

00:02:49: %OSPF-5-ADJCHG: Process 1, Nbr 172.31.2.37 on Serial0/0/1 from FULL to DOWN, Neighbor Down: Interface down or detached

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

TUNJA(config)#

Enrutamiento PPP con autenticación PAP Router CUNDINAMARCA

CUNDINAMARCA#config t
Enter configuration commands, one per line. End with CNTL/Z.
CUNDINAMARCA(config)#int s0/0/1
CUNDINAMARCA(config-if)#encapsulation ppp
CUNDINAMARCA(config-if)#ppp authentication pap
CUNDINAMARCA(config-if)#ppp pap sent-username cisco password unad
CUNDINAMARCA(config-if)#exit
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up

CUNDINAMARCA(config)#
00:03:30: %OSPF-5-ADJCHG: Process 1, Nbr 209.17.220.3 on Serial0/0/1 from LOADING to FULL, Loading Done

CUNDINAMARCA(config)#

CONCLUSIONES

Con la realización de esta práctica, fue posible demostrar las habilidades adquiridas durante el desarrollo del curso de diplomado de profundización Cisco, se logra llevar a cabo de manera correcta la realización de configuraciones básicas con seguridad de dispositivos de red, al igual que configuraciones de enrutamiento OSPF, DHCP, ACL's, NAT y PAT (Overload), según sea requerido para cada necesidad establecida

Al concluir, se puede establecer el funcionamiento mínimo de una red de acuerdo a los lineamientos propuestos por la situación presentada, de igual forma, se logra evidenciar resultados personales en la adquisición de las destrezas necesarias para afrontar nuevos retos

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