PRUEBA DE HABILIDADES PRÁCTICAS CCNA

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ACTIVIDAD EVALUATIVA DEL DIPLOMADO DE PROFUNDIZACIÓN CCNA

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#### 2 RESUMEN

El término LAN (Red de área local) alude a una red -a veces llamada subredinstalada en una misma sala, oficina o edificio. Los nodos o puntos finales de una LAN se conectan a una topología de red compartida utilizando un protocolo determinado. Con la autorización adecuada, se puede acceder a los dispositivos de la LAN, esto es, estaciones de trabajo, impresoras, etc., desde cualquier otro dispositivo de la misma. Las aplicaciones software desarrolladas para las LAN (mensajería electrónica, procesamiento de texto, hojas electrónicas, etc.) también permiten ser compartidas por los usuarios.

Una red de área ancha o WAN (Red de área amplia) es una colección de LAN interconectadas. Las WAN pueden extenderse a ciudades, estados, países o continentes. Las redes que comprenden una WAN utilizan enrutadores para dirigir sus paquetes al destino apropiado. Los encaminadores son dispositivos hardware que enlazan diferentes redes para proporcionar el camino más eficiente para la transmisión de datos. Estos encaminadores están conectados por líneas de datos de alta velocidad, generalmente, líneas telefónicas de larga distancia, de manera que los datos se envían junto a las transmisiones telefónicas regulares.

Las redes LAN cubren una distancia geográfica relativamente pequeña y tienen altas velocidades de transmisión. Las WAN cubren grandes distancias geográficas, e ilimitadas en algún momento, y operan a velocidades de transmisión más bajas. Las LAN requieren un único proveedor de servicios Internet, o ISP (por sus siglas en inglés), como tu compañía telefónica o de cable, para proporcionar el punto de acceso o conexión. Las WAN por otra parte se basan en las infraestructuras de comunicación múltiples para llevar las señales a grandes distancias, a menudo saltando de una infraestructura a otra.

### 3 ABSTRACT

The term LAN (Local Area Network) refers to a network - sometimes called a subnet - installed in the same room, office or building. The nodes or endpoints of a LAN connect to a shared network topology using a specific protocol. With the proper authorization, you can access the devices on the LAN, that is, workstations, printers, etc., from any other device on it. Software applications developed for LANs (electronic messaging, word processing, electronic sheets, etc.) also allow them to be shared by users.

A wide area network or WAN (Wide Area Network) is a collection of interconnected LANs. WANs can be extended to cities, states, countries or continents. Networks that comprise WAN use routers to direct their packets to the appropriate destination. Routers are hardware devices that link different networks to provide the most efficient path for data transmission. These routers are connected by high-speed data lines, usually long-distance telephone lines, so that the data is sent alongside regular telephone transmissions.

LAN networks cover a relatively small geographical distance and have high transmission speeds. WANs cover large geographical distances, and unlimited at some time, and operate at lower transmission speeds. LANs require a single Internet service provider, or ISP, such as your telephone or cable company, to provide the access point or connection. WANs on the other hand rely on multiple communication infrastructures to carry signals over long distances, often jumping from one infrastructure to another.

### 4 INTRODUCCION

En el presente documento se desarrolló una prueba de habilidades practicas la cual consiste en el análisis de dos escenarios propuestos, donde se realizó una descripción detallada para cada escenario y la implementación de su topología física, las configuraciones de cada uno de los dispositivos y la verificación de la conectividad de cada uno de ellos se realizó por medio de la simulación haciendo uso del software Packet Tracer, el cual es un programa de simulación de redes que permite a los estudiantes experimentar con el comportamiento de la red y resolver dudas respecto a las mismas.

El fin de este trabajo es obtener la certificación CCNA Routing and Switching (Cisco Certified Network Associate Routing & Switching) está orientada a las habilidades prácticas en el diagnóstico y solución de problemas específicos de redes y, actualmente, es de las más importantes y respetadas por las empresas del mercado de las TI.

Además de demostrar las capacidades para configurar, operar y solucionar problemas de redes conmutadas y enrutadas, esta certificación ayuda a aquellos que la poseen a impulsar sus carreras profesionales, permitiéndoles optar a mejores puestos de trabajo especializados en la gestión de redes TI y, como consecuencia, obtener mayores salarios.

## 5 OBJETIVOS

### 5.1 GENERAL

Realizar las tareas asignadas en cada uno de los dos (2) escenarios propuestos

## 5.2 ESPECIFICOS

- Identificar el grado de desarrollo de competencias y habilidades que fueron adquiridas a lo largo del diplomado.
- Lograr realizar un registro de la configuración de cada uno de los dispositivos
- Describir detalladamente el paso a paso de cada una de las etapas realizadas durante el desarrollo de esta actividad
- Presentar un informe el cual debe cumplir con las normas ICONTEC 1486

# 6 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. Topología de red escenario 1

	PC-PT PC0	Server-PT Server0		
	2960-24TT Switch0			
PC-PT PC1	1841 Router1		PC-FT PC3	
PC-PT 2960-24TT PC2 Switch1	1841 Router0	1841 Router2	2960-24TT Switch2	PC-PT PC4

Desarrollo

Figura 2. Elementos a utilizar

Para poder instalar el módulo WIC-1T que es el que nos permite la comunidad WAN entre routers, debemos apagarlo e insertar el modulo en los SLOT 0 y 1.



Figura 3. Inserción módulo WIC-1T

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

### **ROUTER BOGOTA**

Router>enable Router#configure terminal Enter configuration commands, one per line. End with CNTL/Z. Router(config)#hostname BOGOTA BOGOTA(config)#no ip domain-lookup BOGOTA(config)#enable secret class BOGOTA(config)#line console 0 BOGOTA(config-line)#password cisco BOGOTA(config-line)#login BOGOTA(config-line)#line vty 0 4 BOGOTA(config-line)#password cisco BOGOTA(config-line)#login BOGOTA(config-line)#exit BOGOTA(config)#service password-encryption BOGOTA(config)#banner motd 'Los infractores se procesaran en la medida en que lo permita la ley' BOGOTA(config)#exit BOGOTA# %SYS-5-CONFIG\_I: Configured from console by console

### **ROUTER MEDELLIN**

Router>enable Router#configure terminal Enter configuration commands, one per line. End with CNTL/Z. Router(config)#hostname MEDELLIN MEDELLIN(config)#no ip domain-lookup MEDELLIN(config)#enable secret class MEDELLIN(config)#line console 0 MEDELLIN(config-line)#password cisco MEDELLIN(config-line)#login MEDELLIN(config-line)#line vty 0 4 MEDELLIN(config-line)#password cisco MEDELLIN(config-line)#login MEDELLIN(config-line)#exit MEDELLIN(config)#service password-encryption MEDELLIN(config)#banner motd 'Los infractores se procesaran en la medida en que lo permita la ley' MEDELLIN(config)#exit MEDELLIN# %SYS-5-CONFIG\_I: Configured from console by console

#### **ROUTER CALI**

Router>enable Router#configure terminal Enter configuration commands, one per line. End with CNTL/Z. Router(config)#hostname CALI CALI(config)#no ip domain-lookup CALI(config)#enable secret class CALI(config)#line console 0 CALI(config-line)#password cisco CALI(config-line)#login CALI(config-line)#line vty 0 4 CALI(config-line)#password cisco CALI(config-line)#login CALI(config-line)#exit CALI(config)#service password-encryption CALI(config)#banner motd 'Los infractores se procesaran en la medida en que lo permita la ley' CALI(config)#exit CALI# %SYS-5-CONFIG\_I: Configured from console by console

• Realizar la conexión fisica de los equipos con base en la topología de red



Figura 4. Conexión física

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

### 6.1 Parte 1: Asignación de direcciones IP

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

	BOGOTA		RESERVA
<b>IP</b> Inicial	192.168.1.1	IP inicial	192.168.1.97
Mask	27	Mask	27
	255.255.255.224		255.255.255.224
GW	192.168.1.1	GW	192.168.1.97
LAN	192.168.1.2 al 192.168.1.30	LAN	192.168.1.98 al 192.168.1.126
	MEDELLIN		RESERVA
IP Inicial	192.168.1.33	IP inicial	192.168.1.129
Mask	27	Mask	27
	255.255.255.224		255.255.255.224
GW	192.168.1.33	GW	192.168.1.129
LAN	192.168.1.34 al 192.168.1.62	LAN	192.168.1.130 al 192.168.1.158
	CALI		RESERVA
IP Inicial	192.168.1.65	IP inicial	192.168.1.161
Mask	27	Mask	27
	255.255.255.224		255.255.255.224
GW	192.168.1.65	GW	192.168.1.161
LAN	192.168.1.66 - 192.168.1.94	LAN	192.168.1.162 - 192.168.1.190

b. Asignar una dirección IP a la red.

IP asignada a la red: 192.168.1.100

### 6.2 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 lp en interfaz Serial 0/0	192.168.1.99	192.168.1.98	192.168.1.131
Dirección de lp en interfaz Serial 0/1		192.168.1.130	
Dirección de lp 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

	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	192.168.1.97	192.168.1.130	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	200	200	200
Afirmaciones de red	192.168.1.0	192.168.1.0	192.168.1.0

### MEDELLIN

	MEDELLIN			
Physical Config CLI	Attributes			
	IOS Command L	ine Interface		
down Serial0/1/0 down down	unassigned	YES unset	administratively	^
Vlan1 down down	unassigned	YES unset a	administratively	
%LINK-5-CHANGED: In	terface Serial0/0,	0, changed st	ate to up	
<pre>%LINEPROTO-5-UPDOWN state to up</pre>	: Line protocol or	n Interface Se:	rial0/0/0, changed	L
MEDELLIN#show ip in	terface brief			
Interface Protocol	IP-Address	OK? Method :	Status	
FastEthernet0/0 up	192.168.1.33	YES manual 1	up	
FastEthernet0/1 down down	unassigned	YES unset	administratively	
Serial0/0/0 up	192.168.1.99	YES manual 1	up	
Serial0/1/0 down down	unassigned	YES unset	administratively	
Vlan1 down down	unassigned	YES unset	administratively	
MEDELLIN#				¥
Ctrl+F6 to exit CLI focus			Copy Pas	te

Figura 5. Configuración básica Router Medellín

#### BOGOTA

CALI

	IOS Command Li	ne Interface	
down			
Serial0/1/0	192.168.1.130	YES manual 1	qu
up Vlan1	unageigned	VES unset	administratively
down down	anabbignea	120 dilbeo i	idminisore of very
BOGOTA#			
%LINK-5-CHANGED: In	nterface Serial0/0/	0, changed sta	ate to up
%LINEPROTO-5-UPDOWN	N: Line protocol on	Interface Se:	rial0/0/0, changed
state to up			
BOGOTA#show ip inte	erface brief		
Interface	IP-Address	OK? Method :	Status
Protocol			
FastEthernet0/0	192.168.1.1	YES manual 1	qı
FastEthernet0/0 up	192.168.1.1	YES manual 1	qt
FastEthernet0/0 up FastEthernet0/1	192.168.1.1 unassigned	YES manual w	up administratively
FastEthernet0/0 up FastEthernet0/1 down down Sorial0/0/0	192.168.1.1 unassigned	YES manual with YES unset	up administratively
FastEthernet0/0 up FastEthernet0/1 down down Serial0/0/0 up	192.168.1.1 unassigned 192.168.1.98	YES manual o YES unset o YES manual o	up administratively up
FastEthernet0/0 up FastEthernet0/1 down down Serial0/0/0 up Serial0/1/0	192.168.1.1 unassigned 192.168.1.98 192.168.1.130	YES manual o YES unset o YES manual o YES manual o	up administratively up up
FastEthernet0/0 up FastEthernet0/1 down down Serial0/0/0 up Serial0/1/0 up	192.168.1.1 unassigned 192.168.1.98 192.168.1.130	YES manual y YES unset of YES manual y YES manual y	up administratively up up
FastEthernet0/0 up FastEthernet0/1 down down Serial0/0/0 up Serial0/1/0 up Vlan1	192.168.1.1 unassigned 192.168.1.98 192.168.1.130 unassigned	YES manual n YES unset a YES manual n YES manual n YES unset a	up administratively up up administratively
FastEthernet0/0 up FastEthernet0/1 down down Serial0/0/0 up Serial0/1/0 up Vlan1 down down	192.168.1.1 unassigned 192.168.1.98 192.168.1.130 unassigned	YES manual o YES unset o YES manual o YES manual o YES unset o	up administratively up up administratively
FastEthernet0/0 up FastEthernet0/1 down down Serial0/1/0 up Serial0/1/0 up Vlan1 down down BCG0TA\$	192.168.1.1 unassigned 192.168.1.98 192.168.1.130 unassigned	YES manual n YES unset a YES manual n YES manual n YES unset a	ap administratively ap ap administratively
FastEthernet0/0 up FastEthernet0/1 down down Serial0/0/0 up Serial0/1/0 up Vlan1 down down BOGOTA#	192.168.1.1 unassigned 192.168.1.98 192.168.1.130 unassigned	YES manual n YES unset a YES manual n YES manual n YES unset a	ap administratively ap administratively

Figura 6. Configuración básica Router Bogotá



Figura 7. Configuración básica Router Cali

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.

MEDELLIN
Physical Config CLI Attributes
IOS Command Line Interface
MEDELLIN#
MEDELLIN#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS
inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route
Gateway of last resort is not set
192.168.1.0/27 is subnetted, 5 subnets
D 192.168.1.0 [90/20514560] via 192.168.1.98, 00:51:48,
Serial0/0/0
D 192.168.1.64 [90/21026560] wie 192.168.1.98 00.51.47
Seria10/0/0
C 192.168.1.96 is directly connected. Serial0/0/0
D 192.168.1.128 [90/21024000] via 192.168.1.98, 00:51:48,
Serial0/0/0
MEDELLIN‡
Ctrl+F6 to exit CLI focus Copy Paste
] lob

Figura 8. Enrutamiento Router Medellín

R BOGOTA	83		
Physical Config CLI Attributes			
IOS Command Line Interface			
BOGOTA# BOGOTA# BOGOTA# BOGOTA#show ip route Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2 E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area * - candidate default, U - per-user static route, o - ODR P - periodic downloaded static route Gateway of last resort is not set			
C 192.168.1.0 is directly connected, FastEthernet0/0 D 192.168.1.32 [90/20514560] via 192.168.1.99. 00:52:27.			
Serial0/0/0 D 192.168.1.64 [90/20514560] via 192.168.1.131, 00:52:26, Serial0/1/0 C 192.168.1.96 is directly connected, Serial0/0/0 C 192.168.1.128 is directly connected, Serial0/1/0			
BOGOTA‡			
Ctrl+F6 to exit CLI focus Copy Paste	]		
Пор			

Figura 9. Enrutamiento Router Bogotá

		CA	LI			83	
Physical	Config CLI	Attributes					
		IOS C	ommand Line Interface			_	
CALI#						^	
CALI#sh	CALI#show ip route						
Codes:	c - connected,	S - stat	10, I - IGRP, R - R	IP, M - mon	ыле, в -		
DGP	D - RTOPP FX	- RIGPD -	vternal 0 - OSPF	TA - OSPE i	nter area		
	N1 - OSPF NSSA	external	type 1, N2 - OSPF	NSSA extern	al type 2		
	E1 - OSPF exte	rnal type	1, E2 - OSPF exter	nal type 2,	E - EGP		
	i - IS-IS, L1	- IS-IS 1	evel-1, L2 - IS-IS	level-2, ia	- IS-IS		
inter a	rea						
	<ul> <li>candidate</li> </ul>	default,	U - per-user static	route, o -	ODR		
	P - periodic d	ownloaded	static route				
Gateway	of last resor	t is not	set				
19	2.168.1.0/27 i	s subnett	ed, 5 subnets				
D	192.168.1.0 [	90/205145	60] via 192.168.1.1	30, 00:52:5	3,		
Serial0	/0/0						
D	192.168.1.32	[90/21026	560] via 192.168.1.	130, 00:52:	53,		
Serial0	192 168 1 64	ie direct	ly connected FactE	thernet0/0			
D	192 168 1 96	190/21024	19 connected, fasts 0001 via 192 168 1	130 00-52-	53		
	/0/0		,	,	,		
с	192.168.1.128	is direc	tly connected, Seri	a10/0/0			
CALI#						$\sim$	
Ctrl+F6 to e	xit CLI focus			Сору	Paste		
_							
Тор							

Figura 10. Enrutamiento Router Cali

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

Para esto hacemos uso del comando show ip eigrp topology

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

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

P 192.168.1.0/27, 1 successors, FD is 28160 via Connected, FastEthernet0/0 P 192.168.1.32/27, 1 successors, FD is 20514560 via 192.168.1.99 (20514560/28160), Serial0/0/0 P 192.168.1.64/27, 1 successors, FD is 20514560 via 192.168.1.131 (20514560/28160), Serial0/1/0 P 192.168.1.96/27, 1 successors, FD is 20512000 via Connected, Serial0/0/0 P 192.168.1.128/27, 1 successors, FD is 20512000 via Connected, Serial0/1/0 BOGOTA#

9	BOGOTA	
Physical	Config CLI Attributes	
	IOS Command Line Interface	
с с	192.168.1.96 is directly connected, Serial0/0/0 192.168.1.128 is directly connected, Serial0/1/0	^
BOGOTA# BOGOTA# BOGOTA# BOGOTA# BOGOTA# IP-EIGR Codes:	show ip eigrp topology P Topology Table for AS 200/ID(192.168.1.130) P - Passive, A - Active, U - Update, Q - Query, R - F r - Reply status	leply,
₽ 192.1	68.1.0/27, 1 successors, FD is 28160 via Connected. FastEthernet0/0	
P 192.1	68.1.32/27, 1 successors, FD is 20514560 via 192.168.1.99 (20514560/28160). Serial0/0/0	
₽ 192.1	68.1.64/27, 1 successors, FD is 20514560 via 192.168.1.131 (20514560/28160), Serial0/1/0	
P 192.1	68.1.96/27, 1 successors, FD is 20512000 via Connected. Serial0/0/0	
₽ 192.1	68.1.128/27, 1 successors, FD is 20512000 via Connected, Serial0/1/0	
DOCOTA #	Figura 11 Balanceo de carga	v.

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

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

<b>Device ID</b>	Local Intrfce	Holdtme	Capability	Platform	Port ID
Switch	Fas 0/0	134	S	2960	Gig 0/1
MEDELLIN	Ser 0/0/0	134	R	C1841	Ser 0/0/0
CALI	Ser 0/1/0	142	R	C1841	Ser 0/0/0

		E	OGOTA		
Physical Cor	nfig <u>CLI</u> Attrib	utes			
			OS Command Line Ir	iterface	
IP-EIGRP To	y ip eigrp topol spology Table fo	ogy r AS 200/ID(	192.168.1.130)		
Codes: P - r -	Passive, A - Ac Reply status	tive, U - Up	date, Q - Quei	y, R - Repl	Ly,
P 192.168.1	1.0/27, 1 succes La Connected, Fa	sors, FD is stEthernet0/	28160 0		
P 192.168.1	32/27, 1 succe La 192.168.1.99	ssors, FD is (20514560/28	20514560 160). Serial0/	0/0	
P 192.168.1	1.64/27, 1 succe La 192.168.1.131	ssors, FD is (20514560/2	20514560 8160), Serial(	/1/0	
P 192.168.1 vi	1.96/27, 1 succe La Connected, Se	ssors, FD is rial0/0/0	20512000		
P 192.168.1 vi		essors, FD i rial0/1/0	s 20512000		
BOGOTA#					
BOGOTA#show	<pre>cdp neighbors</pre>				
Capability	Codes: R - Rout S - Swit	er, T - Tran ch, H - Host	s Bridge, B - , I - IGMP, r	- Repeater,	te Bridge , P - Phone
Device ID	Local Intrfce	Holdtme	Capability	Platform	Port ID
Switch	Fas 0/0	134	S	2960	Gig 0/1
MEDELLIN	Ser 0/0/0	134	R	C1841	Ser 0/0/0
BOGOTA#	Ser 0/1/0	142	R	01041	Ser 0/0/0

Figura 12. Dianóstico de vecinos

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

Redellin 🗆 🗆 🖾
Physical Config CLI Attributes
IOS Command Line Interface
<ul> <li>- candidate default, U - per-user static route, o - ODR</li> <li>P - periodic downloaded static route</li> </ul>
Gateway of last resort is not set
192.168.1.0/27 is subnetted, 5 subnets D 192.168.1.0 [90/20514560] via 192.168.1.98, 00:13:47, Serial0/0/0
C 192.168.1.32 is directly connected, FastEthernet0/0 D 192.168.1.64 [90/21026560] via 192.168.1.98, 00:13:47, Serial0/0/0
C 192.168.1.96 is directly connected, Serial0/0/0 D 192.168.1.128 [90/21024000] via 192.168.1.98, 00:13:47, Serial0/0/0
MEDELLIN# MEDELLIN#ping 192.168.1.98
Type escape sequence to abort. Sending 5, 100-byte ICMP Echos to 192.168.1.98, timeout is 2 seconds: !!!!! Success rate is 100 percent (5/5), round-trip min/avg/max = 1/14/67 ms
MEDELLIN#
Ctrl+F6 to exit CLI focus Copy Paste
П Тор

Figura 13. Ping Router MEDELLIN A Router BOGOTA

			BOG	ΟΤΑ		
Physical	Config	CLI	Attributes			
			IOS C	ommand Line Interfac	e	
state	to up					^
%DUAL- is up: Se in	5-NBRCHA new adj iciaran	NGE: IP acency accione	-EIGRP 20 s legales	0: Neighbor 192 en caso de us	.168.1.99 (Ser	ial0/0/0) o de este
dispos	itivo					
User A	ccess Ve	rificat	ion			
Passwo	rd:					
Passwo	rd:					
ROCOTA						
Passwo	rd:					
Passwo	rd:					
Passwo	rd:					
BOGOTA	‡ping 19	2.168.1	.131			
Type e Sendin	scape se g 5, 100 s.	quence -byte I	to abort. CMP Echos	to 192.168.1.1	.31, timeout is	2
11111						
Succes	s rate i	s 100 p	ercent (5	<li>/5), round-trip</li>	min/avg/max =	1/7/34 ms
BOGOTA	*					~
Ctrl+F6 to	exit CLI foc	us			Сору	Paste
Top						

Figura 14. Ping Router BOGOTA a Router CALI

		BOGOT	4		23
Dhysical (	Config CLL	Attributes			
riiyaicai (		Attributes			
		IOS Com	and Line Interface		
BOGOTA#				^	
BOGOTA#					
BOGOTA#p1	ng 192.168.	1.15			
Type esca	pe sequence	to abort.			
Sending 5	, 100-byte	ICMP Echos to	192.168.1.15,	, timeout is 2 seconds:	
11111					
Success r	ate is 100 p	percent (5/5)	, round-trip m	min/avg/max = 0/6/30 ms	
BOGOTA#					
BOGOTA#					
BOGOTA#					1
BOGOTA#					
BOGOTA#					
BOGOTA#					
BOGOTA#				~	
011 50 10 003	0116			Dente Dente	
Ctri+F6 to exit	CLI TOCUS			Copy Paste	
Top					

Figura 15. Ping Router BOGOTA a PC-0

ę		CA	LI		3
Phys	ical Config	CLI Attributes			
		IOS Co	mmand Line Interface		
CA CA CA CA CA CA CA CA CA CA CA CA CA C	DI# DI# DI# DI# DI# DI# DI# DI#	.1.68 nce to abort. te ICMP Echos 00 percent (5/	to 192.168.1.68, t; /5), round-trip min/	<pre>^ imeout is 2 seconds: /avg/max = 0/6/32 ms</pre>	
CA Ctrl+	51# F6 to exit CLI focus			Copy Paste	
🗌 Тор					

Figura 16. Ping Router CALI a PC-3



Figura 17. Ping PC-1 Router MEDELLIN

### 6.3 Parte 3: Configuración de Enrutamiento.

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

BOGOTA#conf t Enter configuration commands, one per line. End with CNTL/Z. BOGOTA(config)#router eigrp 200 BOGOTA(config-router)#network 192.168.1.0 BOGOTA(config-router)#do wr Building configuration... [OK]

MEDELLIN#conf t Enter configuration commands, one per line. End with CNTL/Z. MEDELLIN(config)#router eigrp 200 MEDELLIN(config-router)#network 192.168.1.0 MEDELLIN(config-router)#do wr Building configuration... [OK]

CALI#conf t Enter configuration commands, one per line. End with CNTL/Z. CALI(config)#router eigrp 200 CALI(config-router)#network 192.168.1.0 CALI(config-router)#do wr Building configuration... [OK] b. Verificar si existe vecindad con los routers configurados con EIGRP.

н	Address	Interface	Hold (sec)	Uptime	S (	RTT ms)	RTO	Q Cnt	Seq Num			
0	192.168.1.98	Se0/0/0	12	00:29:	44 4	0	1000	0	8			~
500	VIR <del>t</del>								-			
BOG	OTA‡show ip e	igrp neighbors										
IP-	EIGRP neighbo:	rs for process	200									
H	Address	Interface		Hold (sec)	Upti	ne	SRTI (ms)		RTO	Q Cnt	Seq Num	
0	192.168.1.13	1 Se0/1/0		10	00:2	8:33	40		1000	0	7	- 6
1	192.168.1.99	Se0/0/0		12	00:2	8:29	40		1000	0	7	
BOG	OTA#											
ī												
CA	LI#											
CA	LI#show ip eigr	p neighbors										
11	-EIGRP neighbor	s for process 2							~	-		
Н	Address	Interlace	HO. (s	ec) Id Upti	ıme	(ms)	. RI	0	Cnt 1	seq Num		
	192 168 1 130	Se0/0/0	11	00:3	30:28	40	10	00	0 '	7		

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

BOGOTA	23
Physical Config CLI Attributes	
IOS Command Line Interface	
	_
1 192.168.1.99 Se0/0/0 12 00:28:29 40 1000 0 7	L
BOGOTA#show ip route	L
Codes: C - connected. S - static. I - IGRP. R - RIP. M - mobile. B -	
BGP	
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area	
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2	
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP	
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS	
inter area	
* - candidate default, U - per-user static route, o - ODR	
P - periodic downloaded static route	
- 192.168.1.0/27 is subnetted, 5 subnets	
C 192.168.1.0 is directly connected, FastEthernet0/0	
D 192.168.1.32 [90/20514560] via 192.168.1.99, 00:32:27,	
Serial0/0/0	
D 192.168.1.64 [90/20514560] via 192.168.1.131, 00:32:30,	
Serial0/1/0	
C 192.168.1.96 is directly connected, Serial0/0/0	
C 192.168.1.128 is directly connected, Serial0/1/0	
D000734	
BOGOIA	ц.,
Ctrl+F6 to exit CLI focus Copy Paste	
Пор	

Figura 19. Comprobacion enrutamiento Router Bogotá

	MEDELLIN	
Physical Config	CLI Attributes	
	IOS Command Line	Interface
MEDELLIN#show i Codes: C - conr BGP D - EIGF N1 - OSF i - IS-1 inter area * - cand P - peri Gateway of last 192.168.1. D 192.168 Serial0/0/0 C 192.168 Serial0/0/0 C 192.168	<pre>p route ected, S - static, I - I P, EX - EIGRP external, F NSSA external type 1, F external type 1, E2 - S, L1 - IS-IS level-1, I idate default, U - per-u odic downloaded static r resort is not set 0/27 is subnetted, 5 sub .1.0 [90/20514560] via 1 .1.32 is directly connec .1.64 [90/21026560] via .1.96 is directly connec</pre>	<pre>A GGRP, R - RIP, M - mobile, B - O - OSPF, IA - OSPF inter area N2 - OSPF MSSA external type 2 OSPF external type 2, E - EGP 2 - IS-IS level-2, ia - IS-IS Her static route, o - ODR route mets .92.168.1.98, 00:34:25, ted, FastEthernet0/0 192.168.1.98, 00:34:25, ted, Serial0/0/0</pre>
D 192.168 Serial0/0/0	.1.128 [90/21024000] via	192.168.1.98, 00:34:25,
MEDELLIN# Ctrl+F6 to exit CLI focu	S	Copy Paste
Тор		

Figura 20. Comprobacion enrutamiento Router Medellín

Physical Config CL Attributes  IDS Command Line Interface  ID-EIGRP meighbors for process 200 H Address Interface Hold Uptime SRTT RTO Q Seq (sec) (ms) Cnt Num 0 192.168.1.130 Se0/0/0 11 00:30:28 40 1000 0 7 CALI# CALI#show ip route Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF Inter area NI - OSPF NSAS external type 1, N2 - OSPF InSAS external type 2 EI - OSPF external type 1, E2 - OSPF external type 2, E - EGP i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area + - candidate default, U - per-user static route, O - ODR P - periodic downloaded static route Gateway of last resort is not set 192.168.1.0/27 is subnetted, S subnets D 192.168.1.130 (90/21026104560) via 192.168.1.130, 00:34:50, Serial0/0/0 D 192.168.1.128 is directly connected, Serial0/0/0 C 192.168.1.128 is directly connected, Serial0/0/0 C 192.168.1.128 is directly connected, Serial0/0/0 C C C C D C C		CALI		
IDS Command Line Interface         IP-EIGRP meighbors for process 200         H Address       Interface         INTERFACE         INTERFACE         O 192.168.1.130 Se0/0/0         0 192.168.1.130 Se0/0/0         O 192.168.1.130 Se0/0/0         Cht Num         0 192.168.1.130 Se0/0/0         Cht Num         O 192.168.1.130 Se0/0/0         Cht Num         Cht Num         O 192.168.1.130 Se0/0/0         D - EIGRP, EX - EIGRP external, O - OSPF INTER area         NI - OSPF FXSR external type 2         EI - OSPF external type 1, E2 - OSPF external type 2, E - EOP         IS-15 Elvel-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         Cateway of last resort is not set         192.168.1.0/27 is subnetted, 5 subnets         D       192.168.1.0/20/20001 via 192.168.1.130, 00:34:50, Serial0/0/0         ChtHe6 to exit CLI focus    Copy Paste	Physical Config CLI Attributes			
ID-EIGRP neighbors for process 200         H Address       Interface       Hold Uptime       SRTT RTO Q Seq         (sec)       (ms)       Cnt Num         0       192.168.1.130       Se0/0/0       11       00:30:28       40       1000       0       7         CALI#         CALI#show ip route       Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF Inter area       NI       - OSPF RSS external type 1, V - OSPF NSS external type 2       EI - OSPF external type 1, E2 - OSPF external type 2, E - EGP       i - IS-IS, LI - 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       Cateway of last resort is not set         192.168.1.0/27 is subnetted, S subnets       D       192.168.1.0/27 is subnetted, S subnets       D       192.168.1.0/27 is subnetted, S subnets         D       192.168.1.0/27 is directly connected, FastEthermet0/0       D       192.168.1.128 is directly connected, Serial0/0/0       C         C       192.168.1.128 is directly connected, Serial0/0/0       C       192.168.1.128 is directly connected, Serial0/0/0       V         Cth+F6 to extt CLI focus       Copy       Paste		IOS Command Line Interface		
<pre>H Address Interface Hold Uptime SRIT RTO Q Seq (sec) (ms) Cnt Num 0 192.168.1.130 Se0/0/0 11 00:30:28 40 1000 0 7 CALI# CALI#Show ip route Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP D - EIGRP, EX - EIGRP external, O - OSPF inter area N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2 E1 - OSPF external type 1, N2 - OSPF external type 2, E - EGP i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, is - IS-IS inter area * - candidate default, U - per-user static route, o - ODR P - periodic downloaded static route Gateway of last resort is not set 192.168.1.0/27 is subnetted, 5 subnets D 192.168.1.027 is subnetted, 5 subnets D 192.168.1.027 is subnetted, 5 subnets D 192.168.1.64 is directly connected, TastEthermet0/0 D 192.168.1.28 (90/21024000) via 192.168.1.130, 00:34:50, Serial0/0/0 C 192.168.1.28 is directly connected, Serial0/0/0 C Call# v</pre>	IP-EIGRP neighbors for proces	s 200		^
<pre>(sec) (ms) Cht Num 0 192.168.1.130 Se0/0/0 11 00:30:28 40 1000 0 7 CALI# CALI# CALI# CALI# CALI# CALI#AND Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP D - EIGRP, EX - EIGRP external, 0 - OSPF, IA - OSPF inter area N1 - OSPF NSSA external type 1, E2 - OSPF external type 2 E1 - OSPF external type 1, E2 - OSPF external type 2 E1 - OSPF external type 1, L = IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area * - candidate default, U - per-user static route, o - ODR P - periodic downloaded static route Gateway of last resort is not set 192.168.1.0/27 is subnetted, 5 subnets D 192.168.1.0/27 is subnetted, 5 subnets D 192.168.1.0/27 is subnetted, S subnets D 192.168.1.0/27 is directly connected, FastEthernet0/0 D 192.168.1.64 is directly connected, FastEthernet0/0 C 192.168.1.128 is directly connected, Serial0/0/0 C 192.168.1.128 is directly connected, Serial0/0/0 C C 192.168.1.128 is directly connected, Serial0/0/0 C C 192.168.1.128 is directly connected, Serial0/0/0 C ALI# Cdir+F6 to ext CLI focus Copy Paste Composition Compo</pre>	H Address Interface	Hold Uptime SRTT	RTO Q Seq	
CALI# CALI# CALI# CALI#show ip route Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP D - EIGRP, EX - EIGRP external, O - OSPF NSA external type 2 EI - OSPF external type 1, B2 - OSPF external type 2, E - EGP i - IS-IS, LI - IS-IS level-1, L2 - IS-IS level-2, is - IS-IS inter area * - candidate default, U - per-user static route, o - ODR P - periodic downloaded static route Gateway of last resort is not set 192.168.1.0/27 is subnetted, 5 subnets D 192.168.1.0/27 is subnetted, 5 subnets D 192.168.1.0/27 is subnetted, 5 subnets D 192.168.1.0/27 is gloy/21026501 via 192.168.1.130, 00:34:53, Serial0/0/0 C 192.168.1.96 [90/21024000] via 192.168.1.130, 00:34:50, Serial0/0/0 C 192.168.1.28 is directly connected, FastEthernet0/0 D 192.168.1.28 is directly connected, Serial0/0/0 C 192.168.1.28 is directly connected, Serial0/0/0	0 192.168.1.130 Se0/0/0	(sec) (ms) 11 00:30:28 40	1000 0 7	
CALIF show ip route Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area NI - OSPF NSSA external type 1, NZ - OSPF NSSA external type 2 EI - OSPF external type 1, EZ - OSPF external type 2, E - EGP i - IS-IS, Ll - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area * - candidate default, U - per-user static route, o - ODR P - periodic downloaded static route Gateway of last resort is not set 192.168.1.0/27 is subnetted, S subnets D 192.168.1.0/27 is subnetted, S subnets D 192.168.1.0/27 is gloy/21026145601 via 192.168.1.130, 00:34:53, Serial0/0/0 D 192.168.1.64 is directly connected, FastEthernet0/0 D 192.168.1.128 is directly connected, Serial0/0/0 C 192.168.1.128 is directly connected, Serial0/0/0 C 192.168.1.128 is directly connected, Serial0/0/0 CALIF V Ctri+F6 to exit CLI focus	CALI#			
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2 E1 - OSPF external type 1, N2 - OSPF NSSA external type 2, I - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, L4 - IS-IS inter area * - candidate default, U - per-user static route, o - ODR P - periodic downloaded static route Gateway of last resort is not set 192.168.1.0/27 is submetted, 5 submets D 192.168.1.0/27 is submetted, 5 submets D 192.168.1.0 [90/20514560] via 192.168.1.130, 00:34:53, Serial0/0/0 D 192.168.1.64 is directly connected, FastEthermet0/0 D 192.168.1.128 is directly connected, Serial0/0/0 C 192.168.1.128 is directly connected, Serial0/0/0 C 192.168.1.128 is directly connected, Serial0/0/0 C cllf C Copy Paste	CALI#show ip route			
192.168.1.0/27 is subnetted, 5 subnets         D       192.168.1.0 [90/20514560] via 192.168.1.130, 00:34:50, Serial0/0/0         D       192.168.1.3 [90/2102650] via 192.168.1.130, 00:34:50, Serial0/0/0         C       192.168.1.96 [90/21024000] via 192.168.1.130, 00:34:50, Serial0/0/0         C       192.168.1.128 is directly connected, Serial0/0/0         CALLE       v         Ctri+F6 to exit CLI focus       Copy	D - ElGRP, EX - ElGRP NI - OSPF RSSA externa El - OSPF external typ i - IS-IS, LI - IS-IS * - candidate default, P - periodic downloade Gateway of last resort is not	<pre>external, 0 - OSP; IA - OSE 1 type 1, N2 - OSPF NSSA ext e 1, Z2 - OSPF external type level-1, L2 - IS-IS level-2, U - per-user static route, d static route set</pre>	/F inter area :ernal type 2 a 2, E - EGP . ia - IS-IS inter area o - ODR	
D     152.168.1.0 [90/20514560] via 152.168.1.130, 00:34:53, Serial0/0/0       D     152.168.1.32 [90/2102650] via 152.168.1.130, 00:34:50, Serial0/0/0       C     152.168.1.64 is directly connected, FastEthernet0/0       D     152.168.1.28 (50/21024000) via 152.168.1.130, 00:34:50, Serial0/0/0       C     152.168.1.28 is directly connected, Serial0/0/0       C     152.168.1.28 is directly connected, Serial0/0/0       CALL#     v	192.168.1.0/27 is subnet	ted, 5 subnets		
D 192.168.1.32 [90/21026560] via 192.168.1.130, 00:34:50, Serial0/0/0 C 192.168.1.64 is directly connected, FastEthernet0/0 D 192.168.1.96 [90/21024000] via 192.168.1.130, 00:34:50, Serial0/0/0 C 192.168.1.128 is directly connected, Serial0/0/0 CALI# v Ctrl+F6 to exit CLI focus Copy Paste	D 192.168.1.0 [90/20514	560] via 192.168.1.130, 00:3	34:53, Serial0/0/0	
C         192.166.1.64 is directly connected, FastEthernet0/0           D         192.166.1.64 (90/21024000) via 192.166.1.130, 00:34:50, Serial0/0/0           C         192.168.1.128 is directly connected, Serial0/0/0           CALI#         v           Ctrl+F6 to exit CLI focus         Copy	D 192.168.1.32 [90/2102	6560] via 192.168.1.130, 00:	34:50, Serial0/0/0	
C 192.168.1.96 (90/21024000) Via 192.168.1.130, 00:34:50, Seria10/0/0 CALI# v Chi+F6 to exit CLI focus Copy Paste	C 192.168.1.64 is direc	tly connected, FastEthernet	)/0	
CALI# Call# Copy Paste	C 192.168.1.128 is dire	ctly connected, Serial0/0/0	34:50, Serial0/0/0	
Ctrl+F6 to exit CLI focus Copy Paste	CALI#			~
7-	Ctrl+F6 to exit CLI focus		Copy Pas	te
7-				
	7 -			

Figura 21. Comprobacion enrutamiento Router 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.

P PC3 Physical Config Desktop Programming Attributes ommand Prompt х Packet Tracer PC Command Line 1.0 C:\>ping 192.168.1.40 Pinging 192.168.1.40 with 32 bytes of data: Reply from 192.168.1.40: bytes=32 time=17ms TTL=125 Reply from 192.168.1.40: bytes=32 time=16ms TTL=125 Reply from 192.168.1.40: bytes=32 time=15ms TTL=125 Reply from 192.168.1.40: bytes=32 time=16ms TTL=125 Ping statistics for 192.168.1.40: Packets: Sent = 4, Received = 4, Lost = 0 (0% loss), Approximate round trip times in milli-seconds: Minimum = 15ms, Maximum = 17ms, Average = 16ms C:\>

Figura 22. Ping PC-3 CALI a PC-1 MEDELLIN

2			PC3			
Physical	Config	Desktop	Programming	Attributes		
Command	Prompt					х
	y 192.10.					^
Reques	t timed o	ut.	butos=22 ti	mo-36mg T	TT-126	
Reply	from 192.	168.1.20	: bytes=32 ti	ime=17ms T	TL=126 TL=126	
Reply	from 192	168.1.20	bytes=32 ti	ime=15ms T	TL=126	
Ping 9 Pa Approx Mi	ckets: Se imate rou nimum = 1	ent = 4, H and trip t 15ms, Maxi	Received = 3, times in mill timum = 26ms,	Lost = 1 li-seconds Average =	(25% loss), : 19ms	
C:\>pi	ng 192.10	58.1.20				
Pingin	g 192.168	8.1.20 wit	th 32 bytes o	of data:		
Reply	from 192	168.1.20	bytes=32 ti	ime=39ms Ti	TL=126	
Reply	from 192	168.1.20	bytes=32 ti	ime=17ms T	TL=126	
Reply	from 192.	168.1.20:	: bytes=32 ti	ime=14ms T	TL=126	
Reply	192.	100.1.20	bytes-32 ti	.me-20ms 1.	11-120	
Ping s	tatistics	for 192.	.168.1.20:			
Pa	ckets: Se	ent = 4, 1	Received = $4$ ,	Lost = 0	(0% loss),	
Approx	imate rou	und trip t	imes in mill	li-seconds:	:	
Ma		4ms, Max:	Lmum = 39ms,	Average =	22ms	

Figura 23. Ping PC-3 CALI a Server-0



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

En este momento cualquier usuario de la red tiene acceso a todos sus dispositivos y estaciones de trabajo. El jefe de redes le solicita implementar seguridad en la red. Para esta labor se decide configurar listas de control de acceso (ACL) a los routers. Las condiciones para crear las ACL son las siguientes:

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

R	MEDELLIN	23
	Physical Config CLI Attributes	
	IOS Command Line Interface	
	^	1
	Los infractores se procesaran en la medida en que lo permita la ley User Access Verification Password:	
	<pre>MEDELLIN&gt;telnet 192.168.1.27 Trying 192.168.1.27 % Connection timed out; remote host not responding MEDELLIN&gt;telnet 192.168.1.98 Trying 192.168.1.96OpenLos infractores se procesaran en la medida en que lo permita la ley</pre>	
	User Access Verification Password:	

Figura 25. Telnet router MEDELLIN a router BOGOTA

CALI	
Physical Config CLI Attributes	
IOS Command Line Interface	
	^
Los infractores se procesaran en la medida en que lo permita	la lev
User Access Verification	
Password:	
CALI>Telnet 192.168.1.98 Trying 192.168.1.98OpenLos infractores se procesaran en D en que lo permita la ley	la medida
User Access Verification	- 11
Password:	~
Ctrl+F6 to exit CLI focus Copy	Paste
🗌 Тор	

Figura 26. Telnet router CALI a router BOGOTA

• 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.

ng Attributes	×
. port)	×
port)	^
port)	
E	
: FE80::201:43FF:FE91:1 : 192.168.1.40 : 255.255.255.224 : 192.168.1.33	D087
Server0	
Programming Attributes	
Programming Attributes	x
Programming Attributes	X
Programming Attributes	×
Programming Attributes er a maximum of 30 hops: 192.168.1.1	×
	: FE80::201:43FF:FE91:1 : 192.168.1.40 : 255.255.255.224 : 192.168.1.33 Server0

Figura 27. Tracert de Server-0 a PC-1 MEDELLIN



Figura 28. Tracert de Server-0 a PC-3 CALI

 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.

Compruebo el acceso de PC-1 MEDELLIN a PC-0 y Server-0 y se puede ver que está conectado, ahora procedo a hacer configuración de las listas de acceso en el router BOGOTA.



Figura 29. Ping PC-1 MEDELLIN a PC-0 y Server-0

#### Ahora ingresamos las listas de acceso

۲	BOGOTA	- 🗆 🗙
	Physical Config CLI Attributes	
	IOS Command Line Interface	
9	BOGOTA(config) #access-list 1 deny 192.168.1.33 0.0.0.200 BOGOTA(config) #access-list 1 deny any BOGOTA(config) #	^
æ	BOGOTA	- 🗆 ×
	Physical Config CLI Attributes	
	IOS Command Line Interface	
·	BOGOTA(config) # BOGOTA(config) #interface fastEthernet 0/0 BOGOTA(config-if) # BOGOTA(config-if) #ip access-group 1 out BOGOTA(config-if) #	^
	Figura 30. Lista de acceso Router Bogotá	

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

a. Se debe probar que la configuración de las listas de acceso fue exitosa. Al hacer ping de nuevo debe denegar la conexión.

PC1	
Physical Config Desktop Programming Attributes	
Command Prompt	х
Minimum = 14ms, Maximum = 18ms, Average = 16ms	^
C:\>ping 192.168.1.15	
Pinging 192.168.1.15 with 32 bytes of data:	
Reply from 192.168.1.98: Destination host unreachab Reply from 192.168.1.98: Destination host unreachab Reply from 192.168.1.98: Destination host unreachab Reply from 192.168.1.98: Destination host unreachab	ble. ble. ble. ble.
<pre>Ping statistics for 192.168.1.15: Packets: Sent = 4, Received = 0, Lost = 4 (1004)</pre>	loss),
C:\>ping 192.168.1.20	
Pinging 192.168.1.20 with 32 bytes of data:	
Reply from 192.168.1.98: Destination host unreached Reply from 192.168.1.98: Destination host unreached Reply from 192.168.1.98: Destination host unreached Reply from 192.168.1.98: Destination host unreached	ole. ole. ole. ole.
<pre>Ping statistics for 192.168.1.20: Packets: Sent = 4, Received = 0, Lost = 4 (1004)</pre>	loss),
C:\>	×
🗌 Тор	

Figura 31. Comprobación listas de acceso

b. Comprobar y	Completar	la	siguiente	tabla	de	condiciones	de	prueba	para
confirmar el óptim	no funcionar	nie	nto de la r	ed e.					

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

	ORIGEN	DESTINO	RESULTADO
	Router MEDELLIN	Router CALI	ABIERTO
	WS_1	Router BOGOTA	ABIERTO
	Servidor	Router CALI	ABIERTO
	Servidor	Router MEDELLIN	ABIERTO
	LAN del Router MEDELLIN	Router CALI	CERRADO
	LAN del Router CALI	Router CALI	ABIERTO
	LAN del Router MEDELLIN	Router MEDELLIN	ABIERTO
	LAN del Router CALI	Router MEDELLIN	CERRADO
	LAN del Router CALI	WS_1	HOST INALCANZABLE
PING	LAN del Router MEDELLIN	WS_1	HOST INALCANZABLE
	LAN del Router MEDELLIN	LAN del Router CALI	HOST INALCANZABLE
	LAN del Router CALI	Servidor	HOST INALCANZABLE
	LAN del Router MEDELLIN	Servidor	HOST INALCANZABLE
DING	Servidor	LAN del Router MEDELLIN	100% 5/5
FING	Servidor	LAN del Router CALI	100% 5/5
	Router CALI	LAN del Router MEDELLIN	100% 5/5
	Router MEDELLIN	LAN del Router CALI	100% 5/5

PC-PT

## 7 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.





24TT DINAMARCA

Server-PT

Server-PT WEB EXTERNO

## 7.1 Desarrollo

Los siguientes son los requerimientos necesarios:

1. Todos los routers deberán tener los siguiente:

#### 7.1.1 Configuración básica.

Router>enable Router#configure terminal Enter configuration commands, one per line. End with CNTL/Z. Router(config)#hostname BUCARAMANGA BUCARAMANGA(config)#no ip domain-lookup BUCARAMANGA(config)#enable secret class BUCARAMANGA(config)#line console 0 BUCARAMANGA(config-line)#password cisco BUCARAMANGA(config-line)#login BUCARAMANGA(config-line)#line vty 0 4 BUCARAMANGA(config-line)#password cisco BUCARAMANGA(config-line)#login BUCARAMANGA(config-line)#exit BUCARAMANGA(config)#banner motd 'Los infractores se procesaran en la medida en que lo permita la ley' BUCARAMANGA(config)#exit BUCARAMANGA# %SYS-5-CONFIG\_I: Configured from console by console BUCARAMANGA#conf t Enter configuration commands, one per line. End with CNTL/Z. BUCARAMANGA(config)#interface s BUCARAMANGA(config)#interface serial 0/1/0 BUCARAMANGA(config-if)#ip ad BUCARAMANGA(config-if)#ip address 172.31.2.33 255.255.252 BUCARAMANGA(config-if)#no shutdown BUCARAMANGA(config-if)# %LINK-5-CHANGED: Interface Serial0/1/0, changed state to up BUCARAMANGA(config-if)#do wr Building configuration... [OK] BUCARAMANGA(config-if)# %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up BUCARAMANGA(config)#interface FaSTEthernet 0/0 BUCARAMANGA(config-if)#ip address 172.31.0.10 255.255.255.192 BUCARAMANGA(config-if)#no shutdown BUCARAMANGA(config-if)# %LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

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

up Router>enable Router#configure terminal Enter configuration commands, one per line. End with CNTL/Z. Router(config)#hostname TUNJA TUNJA(config)#no ip domain-lookup TUNJA(config)#enable secret class TUNJA(config)#line console 0 TUNJA(config-line)#password cisco TUNJA(config-line)#login TUNJA(config-line)#line vty 0 4 TUNJA(config-line)#password cisco TUNJA(config-line)#login TUNJA(config-line)#exit TUNJA(config)#banner motd 'Los infractores se procesarán en la medida en que lo permita la ley' TUNJA(config)#exit TUNJA#configure terminal Enter configuration commands, one per line. End with CNTL/Z. TUNJA(config)#interface fastEthernet 0/0 TUNJA(config-if)#ip address 209.17.220.5 255.255.255.0 TUNJA(config-if)#no shutdown TUNJA(config-if)# %LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up TUNJA(config)#interface serial0/0/0 TUNJA(config-if)#ip address 172.31.2.34 255.255.255.252 TUNJA(config-if)#no shutdown %LINK-5-CHANGED: Interface Serial0/0/0, changed state to up %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up TUNJA(config)#interface serial 0/1/0 TUNJA(config-if)#ip address 172.31.2.37 255.255.255.252 TUNJA(config-if)#no shutdown %LINK-5-CHANGED: Interface Serial0/1/0, changed state to up %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up TUNJA#configure terminal Enter configuration commands, one per line. End with CNTL/Z. TUNJA(config)#interface fastEthernet 0/0 TUNJA(config-if)#ip address 209.17.220.5 255.255.255.0 TUNJA(config-if)#no shutdown TUNJA(config-if)# %LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

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

TUNJA(config-if)#exit TUNJA(config)#interface fastEthernet 0/1 TUNJA(config-if)#ip address 172.31.0.130 255.255.255.192 TUNJA(config-if)#no shutdown TUNJA(config-if)# %LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

Router>enable Router#configure terminal Enter configuration commands, one per line. End with CNTL/Z. Router(config)#hostname CUNDINAMARCA CUNDINAMARCA(config)#no ip domain-lookup CUNDINAMARCA(config)#enable secret class CUNDINAMARCA(config)#line console 0 CUNDINAMARCA(config-line)#password cisco CUNDINAMARCA(config-line)#login CUNDINAMARCA(config-line)#line vty 0 4 CUNDINAMARCA(config-line)#password cisco CUNDINAMARCA(config-line)#login CUNDINAMARCA(config-line)#exit CUNDINAMARCA(config)#banner motd 'Los infractores se procesaran en la medida en que lo permita la ley' CUNDINAMARCA(config)#exit CUNDINAMARCA# %SYS-5-CONFIG\_I: Configured from console by console CUNDINAMARCA#configure t CUNDINAMARCA#configure terminal Enter configuration commands, one per line. End with CNTL/Z. CUNDINAMARCA(config)#interface fas CUNDINAMARCA(config)#interface fastEthernet 0/0 CUNDINAMARCA(config-if)#ip address 172.31.0.5 255.255.255.192 CUNDINAMARCA(config-if)#no shut CUNDINAMARCA(config-if)#no shutdown CUNDINAMARCA(config-if)# %LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

### 7.1.2 Autenticación local con AAA.

BUCARAMANGA(config)#aaa new-model BUCARAMANGA(config)#username Admin1 secret ozkr636 BUCARAMANGA(config)#aaa authentication login default group tacacs+ local BUCARAMANGA(config)#tacacs-server host 192.168.2.2 BUCARAMANGA(config)#tacacs-server key tacacspa55 BUCARAMANGA(config)#exit

TUNJA(config)#aaa new-model TUNJA(config)#username Admin1 secret ozkr636 TUNJA(config)#aaa authentication login default group tacacs+ local TUNJA(config)#tacacs-server host 192.168.2.2 TUNJA(config)#tacacs-server key tacacspa55 TUNJA(config)#exit

CUNDINAMARCA(config)#aaa new-model CUNDINAMARCA(config)#username Admin1 secret ozkr636 CUNDINAMARCA(config)#aaa authentication login default group tacacs+ local CUNDINAMARCA(config)#tacacs-server host 192.168.2.2 CUNDINAMARCA(config)#tacacs-server key tacacspa55 CUNDINAMARCA(config)#exit Dd

#### 7.1.3 Cifrado de contraseñas.

BUCARAMANGA#conf t Enter configuration commands, one per line. End with CNTL/Z. BUCARAMANGA(config)#service password-encryption BUCARAMANGA(config)#end BUCARAMANGA#show running-config %SYS-5-CONFIG\_I: Configured from console by console

2	BUCARAMANGA	- 🗆 ×
Physical Config CL	Attributes	
	IOS Command Line Interface	
*SYS-5-CONFIG_1: C	onfigured from console by console	^
Puilding configura	tion	
Building Configura	c10n	
Current configurat:	ion : 1090 bytes	
1		
version 12.4		
no service timestar	mps log datetime msec	
no service timesta	mps debug datetime msec	
service password-e	ncryption	
1		
hostname BUCARAMAN	GA	
1		
1		
1		
enable secret 5 \$1	\$mERr\$9cTjUIEqNGurQ1FU.ZeC11	
1.		
i nev-medel		
ass new-model		
and authoritication	login default group tagaget logal	
and authentication	iogin derault group tacads# 100ai	
HOLE		~

Figura 33. Cifrado contraseñas Router Bucaramanga

TUNJA#conf t Enter configuration commands, one per line. End with CNTL/Z. TUNJA(config)#service password-encryption TUNJA(config)#end TUNJA#show running-config %SYS-5-CONFIG\_I: Configured from console by console

ę	TUNJA	-	×
Physical Config CLI	Attributes		
	IOS Command Line Interface		
*SYS-5-CONFIG_1: Confi	gured from console by console		^
Building configuration			
Current configuration	: 1084 bytes		
version 12.4			
no service timestamps	log datetime msec		
no service timestamps (	lebug datetime msec		
service password-encry	ption		
1			
hostname TUNJA			
1			
1			
: enable secret 5 flfmED:	A CITAL CONCURPTING AND A CITAL		
i secret s sismer.	C\$SCIJOIEdWGWIWIF0.20011		
1			
i i			
1			
aaa new-model			
1			
aaa authentication log:	in default group tacacs+ local		
More			¥

Figura 34. Cifrado contraseñas Router Tunja

CUNDINAMARCA#conf t Enter configuration commands, one per line. End with CNTL/Z. CUNDINAMARCA(config)#service password-encryption CUNDINAMARCA(config)#end CUNDINAMARCA#show running-config

3	CUNDINAMARCA	- • ×
Physical Config CLI	Attributes	
	IOS Command Line Interface	
Building configuratio	n	^
Current configuration	: 1091 bytes	
! version 12.4		
no service timestamps	log datetime msec	
no service timestamps	debug datetime msec	
service password-encr	yption	
1 bostname CUNDINAMARCA		
!		
1		
1		
enable secret 5 \$1\$mE	Rr\$9cTjUIEqNGurQiFU.ZeCi1	
1		
1		
1		
1		
aaa new-model		
!	gin default group tagaget logal	
aaa authentication io	yin derault group bacads+ ibeai	~

Figura 35. Cifrado contraseñas Router Cundinamarca

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

BUCARAMANGA>en Password: Password: BUCARAMANGA#conf t Enter configuration commands, one per line. End with CNTL/Z. BUCARAMANGA(config)#ip dhcp pool red\_buc BUCARAMANGA(dhcp-config)#net BUCARAMANGA(dhcp-config)#network 172.31.0.0 255.255.255.192 BUCARAMANGA(dhcp-config)#defa BUCARAMANGA(dhcp-config)#default-router 172.31.0.1 BUCARAMANGA(dhcp-config)# BUCARAMANGA(dhcp-config)#dn BUCARAMANGA(dhcp-config)#dns-server 8.8.8.8 BUCARAMANGA(dhcp-config)# BUCARAMANGA(dhcp-config)#exit BUCARAMANGA(config)#exit **BUCARAMANGA#** %SYS-5-CONFIG\_I: Configured from console by console BUCARAMANGA#sh

BUCARAMANGA#sn BUCARAMANGA#show ip dhcp pool

Pool redBuc :
Utilization mark (high/low) : 100 / 0
Subnet size (first/next) : 0 / 0
Total addresses : 16382
Leased addresses : 0
Excluded addresses : 0
Pending event : none
1 subnet is currently in the pool
Current index IP address range Leased/Excluded/Total
172.31.0.1 172.31.0.1 - 172.31.63.254 0 / 0 / 16382
Pool red buc :
Utilization mark (high/low) : 100 / 0
Utilization mark (high/low) : 100 / 0 Subnet size (first/next) : 0 / 0
Utilization mark (high/low): 100 / 0Subnet size (first/next): 0 / 0Total addresses: 62
Utilization mark (high/low): 100 / 0Subnet size (first/next): 0 / 0Total addresses: 62Leased addresses: 1

Pending event	: none	
1 subnet is current	ly in the pool	
Current index	IP address range	eased/Excluded/Total
172.31.0.1 1	72.31.0.1 - 172.31.0.62	1 /0 /62
BUCARAMANGA#		
	BUCARAMANGA	
	Physical Config CLI Attributes	
	And the second sec	
	IOS Command Line Interface	
	BUCARAMANGA#sh	^
	BUCARAMANGA#show ip dhep pool	
	Pool redBuc :	
	Utilization mark (high/low) : 100 / 0	
	Total addresses : 16382	
	Leased addresses : 0	
	Excluded addresses : 0	
	Pending event : none	
	1 subnet is currently in the pool	
	Current index IP address range	Leased/
	Excluded/Total	254 0 ( 0
	/ 16382	234 0 7 0
	Pool red_buc :	
	Utilization mark (high/low) : 100 / 0	
	Subnet size (first/next) : 0 / 0	
	Lessed addresses : 62	
	Excluded addresses : 0	
	Pending event : none	
	1 subnet is currently in the pool	
	Current index IP address range	Leased/
	Excluded/Total	
	1/2.31.0.1 1/2.31.0.1 - 172.31.0.6	52 I / 0
	BUCARAMANGA#	

Figura 36. DHCP Router Bucaramanga

	PC0 - 🗆		×	
Physical Config	Desktop Programming	Attributes		
OHCP	⊖ Static	DHCP request successful.		^
IP Address	172.31.0.2			
Subnet Mask	255.255.255.192			
Default Gateway	172.31.0.1			
DNS Server	8.8.8.8			

Figura 37. Solicitud DHCP exitosa en PC-0

CUNDINAMARCA>en Password: Password: CUNDINAMARCA#conf t Enter configuration commands, one per line. End with CNTL/Z. CUNDINAMARCA(config)#ip dhcp pool red\_cun CUNDINAMARCA(dhcp-config)#net CUNDINAMARCA(dhcp-config)#network 172.31.0.0 255.255.255.192 CUNDINAMARCA(dhcp-config)#de CUNDINAMARCA(dhcp-config)#default-router 172.31.0.1 CUNDINAMARCA(dhcp-config)#dns CUNDINAMARCA(dhcp-config)#dns-server 8.8.8.8 CUNDINAMARCA(dhcp-config)#exit CUNDINAMARCA(config)#exit CUNDINAMARCA# %SYS-5-CONFIG\_I: Configured from console by console CUNDINAMARCA#show % Incomplete command. CUNDINAMARCA#show ip dhcp pool Pool red cun : Utilization mark (high/low) : 100 / 0 Subnet size (first/next) :0/0 Total addresses : 62 Leased addresses : 0 Excluded addresses : 0 Pending event : none 1 subnet is currently in the pool Current index IP address range Leased/Excluded/Total 172 31 0 1 - 172 31 0 62 0 / 0 / 62 172.31.0.1

72.01.0.1	172	.01.0.02	0	, 0	/ 02
	CUNDIN	AMARCA			• 🔀
Physical Config CLI	Attributes				
	IOS C	ommand Line Interface			
CUNDINAMARCA (dncp-con	nrig) #derault-ro	uter 1/2.31.0.1			<u>^</u>
CUNDINAMARCA (dhep-cor	nfig)‡dns				
CUNDINAMARCA (dhep-cor	nfig)‡dns-server	8.8.8.8			
CUNDINAMARCA (dhep-cor	nfig)‡exit				
CUNDINAMARCA (config)	exit				
CUNDINAMARCA#					
%SYS-5-CONFIG_I: Cont	figured from cor	sole by console			
CUNDINAMARCA#show					
* incomplete command.					
CONDINAMARCA#Show 1p	ancp poor				
Pool red cun :					
Utilization mark (b)	iah/low) - 10	0 / 0			
Subnet size (first/	next) - 0	/ 0			
Total addresses	: 62				
Leased addresses	: 0				
Excluded addresses	: 0				
Pending event	: no	ne			
1 subnet is current	ly in the pool				
Current index	IP address rar	ige	Leased/E	xcluded/To	tal
172.31.0.1	172.31.0.1	- 172.31.0.62	0 /	0 / 62	
CUNDINAMARCA#conf t					~

Figura 38. DHCP Router Cundinamarca

	P	C4	- 🗆 ×
Physical Config	Desktop Programming	Attributes	
OHCP	O Static	DHCP request successful.	^
IP Address	172.31.0.2		
Subnet Mask	255.255.255.192		
Default Gateway	172.31.0.1		
DNS Server	8.8.8.8		

Figura 39. Solicitud DHCP exitosa PC-4

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

Username: Admin1

Password: TUNJA>en Password: Password: TUNJA#en TUNJA#configure terminal Enter configuration commands, one per line. End with CNTL/Z. TUNJA(config)#access-list 1 permit 172.31.0.0 255.255.192.0 TUNJA(config)#ip nat inside source list 1 interface serial 0/0/0 overload TUNJA(config)#interface fastEthernet 0/0 TUNJA(config-if)#ip nat inside TUNJA(config-if)#exit TUNJA(config)#interface serial 0/0/0 TUNJA(config-if)#ip nat outside TUNJA(config-if)#exit Username: Admin1 Password: CUNDINAMARCA>en

Password:

Password:

CUNDINAMARCA#configure terminal

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

CUNDINAMARCA(config)#access-list 1 permit 172.31.1.0 0.0.0.192

CUNDINAMARCA(config)#ip nat inside source list 1 interface fa 0/0 overload

CUNDINAMARCA(config)#interfac fastEthernet 0/0 CUNDINAMARCA(config-if)#ip nat inside CUNDINAMARCA(config-if)#exit CUNDINAMARCA(config)#interface serial 0/1/0 CUNDINAMARCA(config-if)#ip nat outside CUNDINAMARCA(config-if)#exit CUNDINAMARCA(config)#exit

### 7.2 Listas de control de acceso:

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

Username: admin1 Password: CUNDINAMARCA>en Password: Password: CUNDINAMARCA#conf t Enter configuration commands, one per line. End with CNTL/Z. CUNDINAMARCA(config)#access-list 111 deny icmp host 172.31.1.68 host 172.31.2.37 CUNDINAMARCA(config)#interface serial 0/1/0 CUNDINAMARCA(config)if)#ip access-group 111 out CUNDINAMARCA(config-if)#exit CUNDINAMARCA(config)#exit CUNDINAMARCA(config)#exit CUNDINAMARCA(config)#exit CUNDINAMARCA#

Username: admin1 Password: TUNJA>en Password: Password: TUNJA#conf terminal Enter configuration commands, one per line. End with CNTL/Z. TUNJA(config)#interface serial 0/1/0 TUNJA(config-if)#ip access-group 111 in TUNJA(config-if)#exit TUNJA(config)#exit TUNJA(config)#exit TUNJA# %SYS-5-CONFIG\_I: Configured from console by console • Los hosts de VLAN 10 en Cundinamarca si acceden a internet y no a la red interna de Tunja.

CUNDINAMARCA#conf t

Enter configuration commands, one per line. End with CNTL/Z. CUNDINAMARCA(config)#access-list 112 permit icmp host 172.31.2.12 host 172.31.2.37 CUNDINAMARCA(config)#interface serial 0/1/0

CUNDINAMARCA(config-if)#ip access-group 112 out

CUNDINAMARCA(config-if)#exit

CUNDINAMARCA(config)#exit

TUNJA#conf t

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

TUNJA(config)#interface serial 0/1/0

TUNJA(config-if)#ip access-group 112 in

TUNJA(config-if)#exit

TUNJA(config)#exit

TUNJA#

%SYS-5-CONFIG\_I: Configured from console by console

Se deben denegar las conexiones:

## Entre vlan 10 a vlan 20

CUNDINAMARCA#conf t

Enter configuration commands, one per line. End with CNTL/Z. CUNDINAMARCA(config)#access-list 113 deny icmp host 172.31.2.12 host 172.31.1.68 CUNDINAMARCA(config)#interface serial 0/1/0 CUNDINAMARCA(config-if)#ip access-group 113 in CUNDINAMARCA(config)#exit CUNDINAMARCA(config)#exit CUNDINAMARCA(config)#exit CUNDINAMARCA# %SYS-5-CONFIG\_I: Configured from console by console 00:47:14: %OSPF-5-ADJCHG: Process 1, Nbr 2.3.4.5 on Serial0/1/0 from FULL to DOWN, Neighbor Down: Dead timer expired 00:47:14: %OSPF-5-ADJCHG: Process 1, Nbr 2.3.4.5 on Serial0/1/0 from FULL to DOWN, Neighbor Down: Interface down or detached

# Entre vlan 10 a vlan 30

CUNDINAMARCA#conf t Enter configuration commands, one per line. End with CNTL/Z. CUNDINAMARCA(config)#access-list 114 deny icmp host 172.31.2.12 host 172.31.1.2 CUNDINAMARCA(config)#interface serial 0/1/0 CUNDINAMARCA(config-if)#ip access-group 114 in CUNDINAMARCA(config-if)#exit CUNDINAMARCA(config)#exit CUNDINAMARCA(config)#exit CUNDINAMARCA# %SYS-5-CONFIG\_I: Configured from console by console  Los hosts de VLAN 30 en Tunja solo acceden a servidores web y ftp de internet.

TUNJA#conf t Enter configuration commands, one per line. End with CNTL/Z. TUNJA(config)#access-list 115 permit icmp host 172.31.1.0 host 209.17.220.10 TUNJA(config)#interface fastethernet 0/0 TUNJA(config-if)#ip access-group 115 out TUNJA(config)#interface fastEthernet 0/1 TUNJA(config)#interface fastEthernet 0/1 TUNJA(config-if)#ip access-group 115 in TUNJA(config-if)#exit TUNJA(config)#exit TUNJA(config)#exit TUNJA(config)#exit TUNJA(config)#exit TUNJA(config)#exit

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

## Vlan 20 Tunja a vlan 20 Cund.

TUNJA#conf t Enter configuration commands, one per line. End with CNTL/Z. TUNJA(config)#access-list 116 permit icmp host 172.31.0.130 host 172.31.1.68 TUNJA(config)#interface fastEthernet 0/1 TUNJA(config-if)#ip access-group 116 in TUNJA(config-if)#exit TUNJA(config)#interface serial 0/1/0 TUNJA(config-if)#ip access-group 116 out TUNJA(config-if)#exit TUNJA(config-if)#exit TUNJA(config)#exit TUNJA(config)#exit TUNJA# %SYS-5-CONFIG\_I: Configured from console by console

#### CUNDINAMARCA#conf t

Enter configuration commands, one per line. End with CNTL/Z. CUNDINAMARCA(config)#interface serial 0/1/0 CUNDINAMARCA(config-if)#ip access-group 116 in CUNDINAMARCA(config-if)#exit CUNDINAMARCA(config)# 00:28:28: %OSPF-5-ADJCHG: Process 1, Nbr 2.3.4.5 on Serial0/1/0 from LOADING to FULL, Loading Done

#### Vlan 20 Tunja a vlan 10 Buc.

TUNJA#conf t Enter configuration commands, one per line. End with CNTL/Z. TUNJA(config)#access-list 117 permit icmp host 172.31.0.130 host 172.31.0.2 TUNJA(config)#interface fastEthernet 0/1 TUNJA(config-if)#ip access-group 117 in TUNJA(config-if)#exit TUNJA(config)#interface serial 0/0/0 TUNJA(config-if)#ip access-group 117 out TUNJA(config-if)#exit TUNJA(config-if)#exit TUNJA(config)#exit TUNJA# %SYS-5-CONFIG\_I: Configured from console by console

BUCARAMANGA#conf t Enter configuration commands, one per line. End with CNTL/Z. BUCARAMANGA(config)#interface serial 0/1/0 BUCARAMANGA(config-if)#ip access-group 117 in BUCARAMANGA(config-if)#exit BUCARAMANGA(config)#interface fastEthernet 0/0 BUCARAMANGA(config-if)#ip access-group 117 out BUCARAMANGA(config-if)#exit BUCARAMANGA(config)#exit BUCARAMANGA(config)#exit BUCARAMANGA(config)#exit BUCARAMANGA# %SYS-5-CONFIG\_I: Configured from console by console

R TUNJA	
Physical Config CLI Attributes	
IOS Command Line Interface	
Los infractores se procesaran en la medida en que lo permita	la ley
User Access Verification	
Username: admin1 Password:	
<pre>TUNJA&gt;en Password: Password: TUNJA&gt;how access-list Standard IP access list 1 10 permit 0.0.0.0 255.255.192.0 Extended IP access list 111 10 deny imp host 172.31.1.68 host 172.31.2.37 Extended IP access list 115 10 permit imp host 172.31.1.0 host 209.17.220.10 Extended IP access list 116 10 permit imp host 172.31.0.130 host 172.31.1.68 Extended IP access list 117 10 permit icmp host 172.31.0.130 host 172.31.0.2 TUNTA+</pre>	ž
Ctri+F6 to exit CLI focus Copy	Paste
🗌 Тор	

Figura 40. Access-list Tunja

CUNDINAMARCA	
Physical Config CLI Attributes	
IOS Command Line Interface	
	4
	~
Los infractores se procesaran en la medida en qu	le lo permita la ley
User Access Verification	
Username: admin1	
Password:	
CUNDINAMARCA>en	
Password:	
Password:	
CUNDINAMADCAtshow access-list	
Standard IP access list 1	
10 permit 172.31.1.0 0.0.0.192	
Extended IP access list 111	
10 deny icmp host 172.31.1.68 host 172.31.2.	. 37
Extended IP access list 112	
10 permit icmp host 172.31.2.12 host 172.31.	.2.37
Extended IP access list 113	
10 deny icmp host 172.31.2.12 host 172.31.1.	. 68
Extended IP access list 114	
10 deny 1cmp nost 1/2.31.2.12 nost 1/2.31.1.	. 4
CUNDINAMARCA#	~
Ctrl+F6 to exit CLI focus	Copy Paste
Top	

Figura 41. Access-list Cundinamarca

#### 7.3 Aspectos a tener en cuenta

• Habilitar VLAN en cada switch y permitir su enrutamiento.

#### 7.3.1 Switch Bucaramanga

Switch\_Buc#conf t Enter configuration commands, one per line. End with CNTL/Z. Switch\_Buc(config)#vlan 1 Switch\_Buc(config-vlan)#name vlan\_1 Switch\_Buc(config-vlan)#exit Switch\_Buc(config)#int vlan 1 Switch\_Buc(config-if)#ip address 172.31.2.2 255.255.255.248 Switch\_Buc(config-if)#no shutdown Switch\_Buc(config-if)#do wr %LINK-5-CHANGED: Interface Vlan1, changed state to up %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

Switch\_Buc#configure terminal Enter configuration commands, one per line. End with CNTL/Z. Switch\_Buc(config)#hostname Switch\_Buc Switch\_Buc(config)#vlan 10 Switch\_Buc(config-vlan)#name Vlan\_10 Switch\_Buc(config-vlan)#exit Switch\_Buc(config)#int Vlan 10 Switch\_Buc(config)#int Vlan 10 Switch\_Buc(config-if)#ip address 172.31.0.2 255.255.192 Switch\_Buc(config-if)#

#### %LINK-5-CHANGED: Interface Vlan10, changed state to up

witch\_Buc#configure terminal Enter configuration commands, one per line. End with CNTL/Z. Switch\_Buc(config)#vlan 30 Switch\_Buc(config-vlan)#name Vlan\_30 Switch\_Buc(config)#int vlan 30 Switch\_Buc(config)#int vlan 30 Switch\_Buc(config-if)#ip address 172.31.0.65 255.255.255.192 Switch\_Buc(config-if)#no shutdown Switch\_Buc(config-if)#do wr Building configuration... [OK] Switch\_Buc(config-if)# %LINK-5-CHANGED: Interface Vlan30, changed state to up

#### 7.3.2 Switch Tunja

Switch>en Switch#configure terminal Enter configuration commands, one per line. End with CNTL/Z. Switch(config)#hostname Switch\_Tun Switch\_Tun(config)#vlan 1 Switch\_Tun(config-vlan)#name Vlan\_1 Switch\_Tun(config-vlan)#exit Switch\_Tun(config)#int vlan 1 Switch\_Tun(config-if)#ip address 172.31.2.10 255.255.255.248 Switch\_Tun(config-if)#no shutdown Switch\_Tun(config-if)#do wr %LINK-5-CHANGED: Interface Vlan1, changed state to up %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

Switch\_Tun#configure terminal Enter configuration commands, one per line. End with CNTL/Z. Switch\_Tun(config)#vlan 20 Switch\_Tun(config-vlan)#name Vlan\_20 Switch\_Tun(config)#int vlan 20 Switch\_Tun(config)#int vlan 20 Switch\_Tun(config-if)#ip address 172.31.0.130 255.255.255.192 Switch\_Tun(config-if)#no shutdown Switch\_Tun(config-if)#do wr %LINK-5-CHANGED: Interface Vlan20, changed state to up

Switch\_Tun#configure terminal Enter configuration commands, one per line. End with CNTL/Z.

Switch\_Tun(config)#vlan 30 Switch\_Tun(config-vlan)#name Vlan\_30 Switch\_Tun(config-vlan)#exit Switch\_Tun(config)#int vlan 30 Switch\_Tun(config-if)#ip address 172.31.0.194 255.255.255.192 Switch\_Tun(config-if)#no shutdown Switch\_Tun(config-if)#do wr %LINK-5-CHANGED: Interface Vlan30, changed state to up

#### 7.3.3 Switch Cundinamarca

Switch>en Switch#configure terminal Enter configuration commands, one per line. End with CNTL/Z. Switch(config)#hostname Switch\_Cun Switch\_Cun(config)#vlan 1 Switch\_Cun(config-vlan)#name Vlan\_1 Switch\_Cun(config-vlan)#exit Switch\_Cun(config)#int vlan 1 Switch\_Cun(config-if)#ip address 172.31.2.12 255.255.255.248 Switch\_Cun(config-if)#no shutdown Switch\_Cun(config-if)#do wr %LINK-5-CHANGED: Interface Vlan1, changed state to up %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

Switch\_Cun#configure terminal Enter configuration commands, one per line. End with CNTL/Z. Switch\_Cun(config)#vlan 20 Switch\_Cun(config-vlan)#name Vlan\_20 Switch\_Cun(config-vlan)#exit Switch\_Cun(config)#int vlan 20 Switch\_Cun(config-if)#ip address 172.31.1.68 255.255.255.192 Switch\_Cun(config-if)#no shutdown Switch\_Cun(config-if)#do wr %LINK-5-CHANGED: Interface Vlan20, changed state to up

Switch\_Cun#configure terminal Enter configuration commands, one per line. End with CNTL/Z. Switch\_Cun(config)#vlan 30 Switch\_Cun(config-vlan)#name Vlan\_30 Switch\_Cun(config-vlan)#exit Switch\_Cun(config)#int vlan 30 Switch\_Cun(config-if)#ip address 172.31.1.2 255.255.255.192 Switch\_Cun(config-if)#no shutdown Switch\_Cun(config-if)#do wr %LINK-5-CHANGED: Interface Vlan30, changed state to up

Switch\_Cun#configure terminal Enter configuration commands, one per line. End with CNTL/Z. Switch\_Cun(config)#vlan 88 Switch\_Cun(config-vlan)#name Vlan\_88 Switch\_Cun(config-vlan)#exit Switch\_Cun(config)#int vlan 88 Switch\_Cun(config-if)#ip address 172.31.2.26 255.255.255.248 Switch\_Cun(config-if)#no shutdown Switch\_Cun(config-if)#do wr %LINK-5-CHANGED: Interface Vlan88, changed state to up

### 7.4 Enrutamiento OSPF con autenticación en cada router.

CUNDINAMARCA#configure terminal Enter configuration commands, one per line. End with CNTL/Z. CUNDINAMARCA(config)#router ospf 1 CUNDINAMARCA(config-router)#router-id 1.2.3.4 CUNDINAMARCA(config-router)#network 172.31.0.0 0.0.31.255 area 0 CUNDINAMARCA(config-router)#exit CUNDINAMARCA(config)#exit CUNDINAMARCA(config)#exit

TUNJA#configure terminal Enter configuration commands, one per line. End with CNTL/Z. TUNJA(config)#router ospf 1 TUNJA(config-router)#router-id 2.3.4.5 TUNJA(config-router)#network 172.31.0.0 0.0.31.255 area 0 TUNJA(config-router)#exit TUNJA(config)#exit TUNJA(config)#exit TUNJA# %SYS-5-CONFIG\_I: Configured from console by console 03:23:26: %OSPF-5-ADJCHG: Process 1, Nbr 172.31.2.38 on Serial0/1/0 from LOADING to FULL, Loading Done

BUCARAMANGA#configure terminal Enter configuration commands, one per line. End with CNTL/Z. BUCARAMANGA(config)#router ospf 1 BUCARAMANGA(config-router)#router-id 3.4.5.6 BUCARAMANGA(config-router)#network 172.31.0.0 0.0.31.255 area 0 BUCARAMANGA(config-router)#exit BUCARAMANGA(config)#exit BUCARAMANGA# %SYS-5-CONFIG\_I: Configured from console by console 03:25:00: %OSPF-5-ADJCHG: Process 1, Nbr 2.3.4.5 on Serial0/1/0 from LOADING to FULL, Loading Done

### 8 CONCLUSIONES

Considero que con la realización de este trabajo obtuve conocimientos claros acerca de las direcciones IP y cual su funcionamiento, lo cual me puede ayudar a decidir qué tipo o clase de direccionamiento IP debo utilizar de acuerdo a ciertas necesidades ya sea en el hogar, empresa pública o privada.

De esta práctica puedo concluir que, existen protocolos sencillos y fáciles de implementar, los cuales ayudan a establecer de manera estática las direcciones ip de las diferentes interfaces de los distintos dispositivos que conforman una red; haciendo énfasis en el router, donde se pueden usar protocolos para enrutar y comunicar a diferentes redes, tanto LAN como WAN. Pues este proceso de asignar direcciones es complejo de aplicar en redes de gran tamaño.

Además, se pudo observar que la transmisión de los datos, al utilizar enrutamiento estático es más confiable, este protocolo ayuda a que la confiabilidad en la red sea muy segura. Al implementar una ruta de respaldo o ruta sucesora, va a permitir que, si por algún motivo la conexión de los dispositivos es defectuosa, desconectada o violada en su acceso, la comunicación en la red se va a seguir transmitiendo por medio de esta ruta sucesora, sin que los datos sufran algunos cambios y llevándolos a sus destinos establecidos.

Finalmente, en cuanto al protocolo EIGRP se puede decir que es un protocolo sencillo que ayuda a muchos procesos dentro de la implementación de una red, ayuda a saber cuándo se presentaron daños, permite conocer dispositivos que son vecinos o están conectados adyacentemente, enruta de manera ordenada las direcciones de las interfaces.

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