TITULO DELTRABAJO Evaluación de habilidades practicas CCNA

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UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA UNAD ESCUELA DE CIENCIAS BASICAS, TECNOLOGIA E INGENIERIA (ECBTI) PROGRAMA DE INGENIERIA DE SISTEMAS PALMIRA 2019 EVALUACIOIN DE HABILIDADES PRACTICAS CCNA

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

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# CONTENIDO

Pá 1. INTRODUCCIÓN	ig. 10
2. OBJETIVOS	11
2.1 OBJETIVO GENERAL	11
2.2 OBJETIVOS ESPECÍFICOS	11
6 DESARROLLO DEL PROYECTO	12
Escenario 1	12
Parte 1: Asignación de direcciones IP	15
Parte 2: Configuración Básica	18
Parte 3: Configuración de Enrutamiento2	28
Parte 4: Configuración de las listas de Control de Acceso	33
Parte 5: Comprobación de la red instalada.	42
Escenario 2	48
1. Todos los routers deberán tener los siguiente:	49
<ol> <li>Todos El DHCP deberá proporcionar solo direcciones a los hosts de Bucaramang y Cundinamarca</li></ol>	ја 60
3. El web server deberá tener NAT estático y el resto de los equipos de la topología emplearan NAT de sobrecarga (PAT).	64
4. El enrutamiento deberá tener autenticación	65
CONCLUSIONES	67
BIBLIOGRAFÍA	68

# LISTA DE TABLAS

Pág.

Tabla 1. Definición Subredes	16
Tabla 2. Asignar dirección IP a la red BOGOTA-20 HOST	17
Tabla 3. Asignar dirección IP a la red MEDELLIN – 20 HOST	17
Tabla 4. Asignar dirección IP a la red CALI – 20 HOST	17
Tabla 5. Configuración básica de routers	18

# LISTA DE GRÁFICAS

Figura 1: Escenario 1	12
Figura 2: Topología de red	13
Figura 3 Conexión física de los equipos con base en la topología	15
Figura 4: Show ip route Router BOGOTA	21
Figura 5: Show ip route Router MEDELLIN Figura 6: Show in route Roter CALL	22
Figura 7: Balanceo de carga, BOGOTA	22
Figura 8: Balanceo de carga Router MEDELLIN	23
Figura 9: Balanceo de carga Router CALI	24
Figura 10: Diagnóstico de vecinos Router BOGOTA	24
Figura 11: Diagnóstico de vecinos Router MEDELLIN	25
Figura 12: Diagnóstico de vecinos Router CALI	25
Figura 13: PING SW1 BOGOTA Router →BOGOTA→MEDELLIN→CALI	26
Figura 14: PING MEDELLIN Router →MEDELLIN →BOGOTA	27
Figura 15: PING CUNDINAMARCA Router →CALI→BOGOTA	27
Figura 16: Vecindad Router BOGOTA	29
Figura 17: Vecindad Router MEDELLIN	30
Figura 18: Vecindad Router CALI	30
Figura 19: Rutas establecidas del Router BOGOTA	31
Figura 20: Rutas establecidas del Router MEDELLIN	32
Figura 21: Rutas establecidas del Router CALI	32
Figura 22: PING PC2-CALI → MEDELLIN→SERVIDOR BOGOTA	33
Figura 23: Telnet Router BOGOTA a MEDELLIN y CALI	34
Figura 24: Telnet Router MEDELLIN a BOGOTA y CALI	35
Figura 25: Telnet del Router CALI a MEDELLIN y BOGOTA	36
Figura 26: Acceso del servidor BOGOTA a equipos CALI	37
Figura 27: Acceso del servidor BOGOTA a equipos MEDELLIN	37
Figura 28: Acceso del WS 1 BOGOTA a equipos CALI	38
	30
Figura 30: PING PC1 MEDELLIN → SERVIDOR, SW1 BOGOTA	41
Figura 31: PING PC1 CALI $\rightarrow$ SERVIDOR BOGOTA $\rightarrow$ PC2 MEDELLIN	41
Figura 32: TELNET Router MEDELLIN → Router CALI	42
Figura 33: TELNET WS_1 → Router BOGOTA	43
Figura 34: TELNET SERVIDOR → Router CALI	43
Figura 35: TELNET SERVIDOR → Router MEDELLIN	43
Figura 36: TELNET LAN del Router MEDELLIN → Router CALI	44

Figura 37: TELNET LAN del Router CALI → Router CALI	44
Figura 38: TELNET LAN del Router MEDELLIN → Router MEDELLIN	44
Figura 39: TELNET LAN del Router CALI → Router MEDELLIN	45
Figura 40: PING LAN del Router CALI $\rightarrow$ WS_1	45
Figura 41: PING LAN del Router MEDELLIN → WS_1	45
Figura 42: PING LAN del Router MEDELLIN → LAN del Outer CALI	46
Figura 43: PING LAN del Router CALI → SERVIDOR	46
Figura 44: PING LAN del Router MEDELLIN → SERVIDOR	46
Figura 45: PING SERVIDOR $\rightarrow$ LAN del Router MEDELLIN	47
Figura 46: PING SERVIDOR $\rightarrow$ LAN del Router CALI	47
Figura 47: PING Router CALI $\rightarrow$ LAN del Router MEDELLIN	47
Figura 48: PING Router MEDELLIN → LAN del Router CALI	48
Figura 49: Escenario 2	48
Figura 50: Establezca un servidor TFTP	57
Figura 51: VERIFICACION DEL FUNCIONAMIENTO DE TFTP	59

### RESUMEN

En el presente trabajo desarrollado muestra 2 escenarios

Escenario 1 es una empresa donde posee sucursales distribuidas en la ciudad de Bogotá, Medellín y Cali donde se debe crear una red el cual se debe de configurar e intercambiar entre sí, donde se requiere direccionamiento IP de acuerdo al numero de host asignar parámetros básicos a cada router y swicht que se encuentren en la red crear subredes para establecer la conexión total de todos los hosts que deben de comunicarse realizar implementación de seguridad en la red al igual restringir el acceso y comunicación entre los host de acuerdo al administrador de la red al igual que realizar el proceso de validación del funcionamiento de los dispositivos de red.

Escenario 2 es una empresa que cuenta con una conexión de internet en una red Ethernet en donde se debe adaptar para que sea más fácil que los routers y las redes puedan conectarse a internet, pero con la condición de emplear direcciones de red LAN original donde debemos realizar configuraciones de routers, configuración de DHCP que van a proporcionar direcciones a los hosts de Bucaramanga y Cundinamarca, configurando servidores web crear enrutamientos y listas de control de acceso mediante VLAN al igual que VLSM

PALABRAS CLAVE: Routers, Switch, VLAN, VLMS, Enrutamiento, Red, DHCP, Sucursales, Comunicación, Internet, Ethernet, LAN y Direcciones

# ABSTRACT

In the present work developed shows 2 scenarios

Scenario 1 is a company where it has branches distributed in the city of Bogotá, Medellín and Cali where a network must be created which must be configured and exchanged with each other, where IP addressing is required according to the host number assign basic parameters to each router and swicht that are in the network create subnets to establish the total connection of all the hosts that must communicate perform security implementation in the network as well as restrict access and communication between the hosts according to the network administrator at as well as performing the process of validating the operation of the network devices.

Scenario 2 is a company that has an internet connection in an Ethernet network where it must be adapted to make it easier for routers and networks to connect to the internet, but with the condition of using original LAN network addresses where we must Perform router configurations, DHCP settings that will provide addresses to Bucaramanga and Cundinamarca hosts, configuring web servers create routing and access control lists via VLAN as well as VLSM

KEY WORDS: Routers, Switch, VLAN, VLMS, Routing, Network, DHCP, Branches, Communication, Internet, Ethernet, LAN and Addresses

# 1. INTRODUCCIÓN

El presente trabajo nos permite desarrollar 2 escenarios donde pondremos en practica todas las habilidades adquiridas en el transcurso de la enseñanza del diplomado Cisco donde ponemos en marcha los conocimientos en el desarrollo y diseño de redes por medio de la herramienta Packet Tracer.

Con el cual realizaremos configuraciones o parámetros básicas y de seguridad a router, switches para que así se puedan comunicar los equipos conectados a la red al igual que la comparación total de todos los dispositivos y su funcionamiento a cada unos de los escenarios planteados en la actividad donde se desarrolla en la modalidad práctica.

De manera que nosotros como estudiantes apliquemos los conocimientos en la solución de problemas LAN y WAN comenzando con los conocimientos básicos en cada uno de los elementos de una red como son los dispositivos tipos de redes cableado configuración y su óptimo funcionamiento.

# 2. OBJETIVOS

#### 2.1 OBJETIVO GENERAL

Crear 2 escenarios aplicando todos los conocimientos adquiridos en el trascurso del DIPLOMADO DE PROFUNDIZACIÓN CISCO (DISEÑO E IMPLEMENTACIÓN DE SOLUCIONES INTEGRADAS LAN / WAN) creando las diversas soluciones a los problemas planteados a cada uno de los escenarios mediante Packet tracer

# 2.2 OBJETIVOS ESPECÍFICOS

- ✓ Analizar el problema
- ✓ Realizar el diseño de cada escenario
- ✓ Utilizar la herramienta de Packet tracer
- ✓ Realizar conexiones y configuraciones Básicas a routers y switches
- ✓ Realizar proceso de asignación de IP al host
- ✓ Realizar procesos de configuración de DHCP
- ✓ Comprobar conexiones por medio de ping y telnet
- ✓ Comprobar el funcionamiento de cada escenario

# 6 DESARROLLO DEL PROYECTO

#### 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: Escenario 1



Figura 2: Topología de red

#### Desarrollo

Como trabajo inicial se debe realizar lo siguiente.

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

Router>en Router#conf t Enter configuration commands, one per line. End with CNTL/Z. Router(config)#hostname BOGOTA BOGOTA(config)#enable secret class BOGOTA(config)#banner motd # Enter TEXT message. End with the character '#'. Unauthorized access is strictly prohibited. # BOGOTA(config)#line con 0 BOGOTA(config-line)#password cisco BOGOTA(config-line)#login BOGOTA(config-line)#logging synchronous 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

# > Router MEDELLIN

Router>en Router#conf t Enter configuration commands, one per line. End with CNTL/Z. Router(config)#hostname MEDELLIN MEDELLIN(config)#enable secret class MEDELLIN(config)#banner motd # Enter TEXT message. End with the character '#'. Unauthorized access is strictly prohibited. # MEDELLIN(config)#line con 0 MEDELLIN(config-line)#password cisco MEDELLIN(config-line)#login MEDELLIN(config-line)#logging synchronous 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

# Router CALI

Router>en Router#conf t Enter configuration commands, one per line. End with CNTL/Z. Router(config)#hostname CALI CALI(config)#enable secret class CALI(config)#banner motd # Enter TEXT message. End with the character '#'. Unauthorized access is strictly prohibited. # CALI(config)#line con 0 CALI(config-line)#password cisco CALI(config-line)#login CALI(config-line)#logging synchronous 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

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



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

Parte 1: Asignación de direcciones IP.

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

- Dirección de red: 192.168.1.0/24 Mascara: 255.255.255.0 Binario: 111111111111111111111111100000000
- Segmentación: Se requiere segmentar en 8 partes la red

 $2^3 = 8$ Se encienden 3 bits que corresponde al numero usado para elevado en la formula anterior

Red

Host

Mascara: 255.255.255.224 Dirección de Red: 192.168.1.0/27

Determinamos los saltos de red

 $\frac{-\frac{256}{2224}}{32}$  Los saltos serán de 32

#### Cantidad de Host por subred

 $2^{m} - 2 = H$   $2^{5} - 2 = H$ 2x2x2x2x2 = 32 - 2 = 30 Host

#### • Definición Subredes

SUBRED 1 Network: 192.168.1.0/27 HostMin: 192.168.1.1 HostMax:192.168.1.30 Broadcast:192.168.1.31

#### <u>SUBRED 2</u>

Network: 192.168.1.32/27 HostMin: 192.168.1.33 HostMax:192.168.1.62 Broadcast:192.168.1.63

#### SUBRED 3

Network: 192.168.1.64/27 HostMin: 192.168.1.65 HostMax:192.168.1.94 Broadcast:192.168.1.95

#### SUBRED 4

Network: 192.168.1.96/27 HostMin: 192.168.1.97 HostMax:192.168.1.126 Broadcast:192.168.1.127

#### <u>SUBRED 5</u>

Network: 192.168.1.128/27 HostMin: 192.168.1.129 HostMax:192.168.1.158 Broadcast:192.168.1.159

#### SUBRED 6

Network: 192.168.1.160/27 HostMin: 192.168.1.161 HostMax:192.168.1.190 Broadcast:192.168.1.191

#### SUBRED 7

Network: 192.168.1.192/27 HostMin: 192.168.1.193 HostMax:192.168.1.222 Broadcast:192.168.1.223

#### <u>SUBRED 8</u>

Network: 192.168.1.224/27 HostMin: 192.168.1.225 HostMax:192.168.1.254 Broadcast:192.168.1.255

Tabla 1. Definición Subredes

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

BO	GOTA – 20 HOSTS	
1	Dirección de red	192.168.1.0
2	Dirección IP Gateway	192.168.1.1
3	IP PC1	192.168.1.2
4	SW1	192.168.1.19
5	IP Servidor	192.168.1.20
6	Máscara de Subred	255.255.255.0
	Tabla 2. Asignar dirección IP a la red BC	GOTA-20 HOST

MED	DELLIN – 20 HOSTS	
1	Dirección de red	192.168.1.32
2	Dirección IP Gateway	192.168.1.32
3	IP PC1	192.168.1.35
4	IP PC20	192.168.1.54
5	Mascara de Subred	255.255.255.0

Tabla 3. Asignar dirección IP a la red MEDELLIN - 20 HOST

CAL	I – 20 HOSTS	
1	Dirección de red	192.168.1.65
2	Dirección IP Gateway	192.168.1.64
3	IP PC1	192.168.1.66
4	IP PC20	192.168.1.86
5	Máscara de Subred	255.255.255.0

Tabla 4. Asignar dirección IP a la red CALI – 20 HOST

#### 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	192.168.1.98	192.168.1.97	192.168.1.130
Dirección de lp en interfaz Serial 0/1		192.168.1.129	
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

Tabla 5. Configuración básica de routers

# Configuración Básica Router BÓGOTA

# ✓ IP ROUTER BOGOTA G0/0 – SWITCH

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 Interface protocol on GigabitEthernet0/0, changed state to up BOGOTA(config-if)#exit

# ✓ IP ROUTER BOGOTA S0/3/0 – ROUTER MEDELLIN

BOGOTA>en BOGOTA#config t Enter configuration commands, one per line. End with CNTL/Z. BOGOTA(config)#int s0/3/0 BOGOTA(config-if)#ip address 192.168.1.97 255.255.255.240 BOGOTA(config-if)#no shut BOGOTA(config-if)#exit

# ✓ IP ROUTER BOGOTA S0/3/1 – ROUTER CALI

BOGOTA#en BOGOTA#config t Enter configuration commands, one per line. End with CNTL/Z. BOGOTA(config)#int s0/3/1 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(config)#exit

# > Configuración Básica Router MEDELLIN

# ✓ IP ROUTER MEDELLIN – G0/0 – SWITCH

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

 IP ROUTER MEDELLIN S0/3/0 – ROUTER BOGOTA MEDELLIN#en MEDELLIN#config t Enter configuration commands, one per line. End with CNTL/Z. MEDELLIN(config)#int s0/3/0 MEDELLIN(config-if)#ip address 192.168.1.98 255.255.255.240 MEDELLIN(config-if)#no shut 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 Básica Router CALI

# ✓ IP ROUTER CALI S0/3/0 – ROUTER BOGOTA

CALI>en CALI#config t Enter configuration commands, one per line. End with CNTL/Z. CALI(config)#int s0/3/0 CALI(config-if)#ip address 192.168.1.130 255.255.255.240 CALI(config-if)#no shut 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)#

# ✓ IP ROUTER CALI G0/0 – SWITCH

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. show ip route

> Router BOGOTA

		IOS Comm	and Line Interface				
	T.A.#	IOS COMIN	and Line Internace				
\$SYS-	-5-CONFIG_I: Conf	figured from	console by con	sole			'
BOGO	TA#show ip route						
Code:	s: L - local, C -	<ul> <li>connected,</li> </ul>	S - static, R ·	- RIP, M -	mobil	.e, B -	
	D - EIGRP, EX N1 - OSPF NSS E1 - OSPF exte i - IS-IS, L1	- EIGRP exte A external ty ernal type 1, - IS-IS leve	rnal, O - OSPF pe 1, N2 - OSPF E2 - OSPF exte 1-1, L2 - IS-IS	, IA - OSPH F NSSA exte ernal type S level-2,	inte rnal 2, E ia -	r area type 2 - EGP IS-IS	1
inte	r area						
	* - candidate P - periodic d	default, U - downloaded st	per-user stat: atic route	ic route, d	) - OD	R	
Gate	way of last reson	rt is not set					
	192.168.1.0/24 i	is variably s	ubnetted, 6 sul	bnets, 3 ma	sks		
T.	192.168.1.0/2	27 is directi 32 is directl	y connected, G v connected, G	igabitEther	net0/	0	
c	192.168.1.96/	28 is direct	ly connected,	Seria10/3/0	)		
L	192.168.1.97/	/32 is direct	ly connected,	Serial0/3/0	)		
C T	192.168.1.128	8/28 is direc	tly connected,	Serial0/3/	1		1
1	192.168.1.125	9/32 is dired	tly connected,	Serial0/3/	1		
BOGO	TA#						
				-			_

Figura 4: Show ip route Router BOGOTA

# Router MEDELLIN

MEDELLIN		-	-		×
Physical Config CLI Attributes					
IOS Command	Line Interface				
Password:					
Password:					
MEDELLIN>en					
Password:					
MEDELLIN#show ip route					
Codes: L - local, C - connected, S - BGP	static, R	- RIP, M - m	obile	, в -	
D - EIGRP, EX - EIGRP externa	1, 0 - OSPF	, IA - OSPF	inter	area	
N1 - OSPF NSSA external type	1, N2 - OSP	F NSSA exter	nal t	ype 2	
El - OSPF external type 1, E2	- OSPF ext	ernal type 2	, E -	EGP	
i - IS-IS, L1 - IS-IS level-1	., L2 - IS-I	S level-2, i	a - I	S-IS	
inter area			0.000		
P = periodic downloaded stati	g route	ic fouce, o	- ODR		
F periodic downloaded stati	c rouse				
Gateway of last resort is not set					
192.168.1.0/24 is variably subm	letted, 4 su	bnets, 2 mas	ks		
C 192.168.1.32/28 is directly	connected,	GigabitEther	net0/	0	
L 192.168.1.33/32 is directly	connected,	GigabitEther	net0/	0	
C 192.168.1.96/28 is directly	connected,	Serial0/3/0			
L 192.168.1.98/32 is directly	connected,	Serial0/3/0			
MEDELLIN#					¥
Ctrl+F6 to exit CLI focus		Сору		Paste	
Тор					

Figura 5: Show ip route Router MEDELLIN

# Router CALI

R CALI	_		$\times$
Physical Config CLI Attributes			
IOS Command Line Interface			
Password:			~
Password:			
CALI>en			
Password:			
CALI#show ip route			
Codes: L - local, C - connected, S - static, R - F BGP	(IP, M - mob)	це, в -	
D - EIGRP, EX - EIGRP external, O - OSPF, D	A - OSPF int	ter area	
N1 - OSPF NSSA external type 1, N2 - OSPF N	ISSA external	l type 2	
E1 - OSPF external type 1, E2 - OSPF extern	al type 2, I	E - EGP	
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS 1	.evel-2, ia -	- IS-IS	
inter area			
~ - candidate derault, 0 - per-user static D - periodic developeded static route	route, o - (	JDR	
F - periodic downroaded static foute			
Gateway of last resort is not set			
192.168.1.0/24 is variably subnetted, 4 subnet	ts, 2 masks		
C 192.168.1.64/28 is directly connected, Gig	abitEthernet	t0/0	
L 192.168.1.65/32 is directly connected, Gig	gabitEthernet	t0/0	
C 192.168.1.128/28 is directly connected, Se	ria10/3/0		
L 192.168.1.130/32 is directly connected, Se	rial0/3/0		
CALI#			¥
Ctrl+F6 to exit CLI focus	Сору	Paste	
Тор			

Figura 6: Show ip route Roter CALI

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

show ip route

#### > Balanceo de carga BOGOTA

hysical Config CLI	Attributes			
	IOS C	ommand Line Interface		
User Access Verificat	lon			 Ţ
Password:				
BOGOTA>en				
Password:				
BOGOTA#show ip route	192.168.1	.98		
Routing entry for 192	.168.1.96	/28		
Known via "connected"	, distanc	e 0, metric 0 (connect	ed, via:	
interface)				
Redistributing via	eigrp 1			
Routing Descriptor	Blocks:			
<ul> <li>directly connecte</li> </ul>	d, via se	rial0/3/0		
Route metric is	U, TTAII	ic snare count is i		
BOGOTA#show ip route	192.168.1	.130		
Routing entry for 192	.168.1.12	8/28		
Known via "connected"	, distanc	e 0, metric 0 (connect	ed, via:	
interface)				
Redistributing via	eigrp 1			÷
Kouting Descriptor	Blocks:			
airectly connecte	a, via Se	riaiu/3/1		
LOUTO MOTOR				

Figura 7: Balanceo de carga BOGOTA

> Balanceo de carga Router MEDELLIN

INICOLLEII	N					_	
Physical	Config	CLI	Attributes				
			IOS C	ommand Line Inter	face		
MEDELLI MEDELLI Routing Known v: interfac Redist Routin	N# entry f ia "conr ce) tributir ng Descr	ip rout for 192 hected" hg via riptor	e 192.168 168.1.96 , distanc eigrp 1 Blocks:	.1.97 /28 e O, metric	0 (connect	ed, via	~

Figura 8: Balanceo de carga Router MEDELLIN

## > Balanceo de carga Router CALI

CALI						-	
Physical	Config	CLI A	ttributes				
			IOS C	ommand Line Interfa	се		
CALI#sh	now ip ro	oute 192.	168.1.1	29			^
Known v	y entry i via "conn	nected",	distanc	e 0, metric 0	(connected	d, via	
interfa	ace)						
Redis	stributin	ng via ei	.grp 1				
Routi	ing Descr	iptor Bl	ocks:				
* dir	cectly co	onnected,	via Se	ria10/3/0			
P	Route met	ric is 0	, traff	ic share count	is l		
CALI#							
		Figura 9	: Balance	o de carga Router (	CALI		

**d.** Realizar un diagnóstico de vecinos uzando el comando cdp. show cdp neighbors

BOGOTA				—		
Physical Con	fig <u>CLI</u> Attribu	tes				
	1	OS Command Line	Interface			
Capability Bridge	Codes: R - Route	er, T - Trans	Bridge, B -	Source Rout	te	,
Phone	S - SWIC	cn, H - Host,	I - IGNP, F	- kepeater	, ₽ -	
Device ID ID	Local Intrfce	Holdtme	Capability	Platform	Port	
Switch 0/1	Gig 0/0	137	S	2950	Fas	
CALI 0/3/0 BOCOTA#	Ser 0/3/1	144	R	C2900	Ser	

> Diagnóstico de vecinos Router BOGOTA

Figura 10: Diagnóstico de vecinos Router BOGOTA

> Diagnóstico de vecinos Router MEDELLIN

MEDELLIN					—		×
Physical Co	onfig CLI	Attributes					
		IOS C	ommand Line I	nterface			
MEDELLIN#s Capability Bridge	how cdp ne Codes: R	ighbors - Router,	T - Trans	Bridge, B -	Source Route	• 	^
Phone Devrice ID	Togal T	ntrfoo P	aldtma	Comphility	Distform	Dort	
ID Switch	Cir O (O	norice n	leo	capability	acco	FOIL	
0/1 MEDELLIN#	GIG 0/0		152	5	2950	ras	

Figura 11: Diagnóstico de vecinos Router MEDELLIN

> Diagnóstico de vecinos Router CALI

CALI				_		Х
Physical Con	fig <u>CLI</u> Attribute	es				
	10	S Command Line	Interface			
CALI#show c Capability Bridge	dp neighbors Codes: R - Route S - Switc	r, T - Trans h H - Host	Bridge, B -	Source Rout	D -	^
Phone Device ID ID	Local Intrfce	Holdtme	Capability	Platform	Port	
Switch	Gig 0/0	139	S	2950	Fas	
BOGOTA 0/3/1 CALI#	Ser 0/3/0	139	R	C2900	Ser	

Figura 12: Diagnóstico de vecinos Router CALI

- e. Realizar una prueba de conectividad en cada tramo de la ruta usando Ping.
  - > PING WS 1-BOGOTA A ROUTER BOGOTA
  - > PING WS 1-BOGOTA A ROUTER MEDELLIN
  - > PING WS 1-BOGOTA A ROUTER CALI



Figura 13: PING BOGOTA

- PING PC1-MEDELLIN A ROUTER MEDELLIN
- > PING PC1-MEDELLIN A ROUTER BOGOTA



Figura 14: PING MEDELLIN

#### PING PC1-CALI A ROUTER CALI

#### > PING PC1-CALI A ROUTER BOGOTA



Figura 15: PING CUNDINAMARCA

#### Parte 3: Configuración de Enrutamiento.

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

# > EIGRP ROUTER BOGOTA

Unauthorized access is strictly prohibited. **User Access Verification** Password: BOGOTA>en Password: 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)#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 %DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 192.168.1.98 (Serial0/3/0) is up: new adjacency BOGOTA(config-router)#exit BOGOTA(config)#

# > EIGRP ROUTER MEDELLIN

Unauthorized access is strictly prohibited. User Access Verification Password: MEDELLIN>en Password: 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)#no auto-summary MEDELLIN(config-router)#exit MEDELLIN(config)#

# > EIGRP ROUTER CALI

Unauthorized access is strictly prohibited. User Access Verification Password: CALI>en Password: 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 %DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 192.168.1.129 (Serial0/3/0) is up: new adjacency CALI(config-router)#exit CALI(config)#

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

#### Vecindad Router BOGOTA

BOGOTA#show ip eigrp neighbors IP-EIGRP neighbors for process 1 H Address Interface Hold Uptime SRTT RTO Q Seq (sec) (ms) Cnt Num 0 192.168.1.130 Se0/3/1 10 02:03:54 40 1000 0 13 1 192.168.1.98 Se0/3/0 14 01:59:04 40 1000 0 8 BOGOTA#

5000	IA										-	
hysical	Conf	ig C	CLI	Attributes								
					IOS Con	nmand Line Inte	rface					
BOGOT	A#show	ip ei	grp	neighbors	IOS Cor	nmand Line Inte	rface					^
BOGOT IP-EI H A	A#show GRP nei ddress	ip ei .ghbor	grp : s fo I:	neighbors r process nterface	IOS Con	nmand Line Inte	SRTT	RTO	Q	Seg		^
BOGOT IP-EI H A	A‡show GRP nei ddress	ip ei .ghbor	grp : s fo I:	neighbors r process nterface	IOS Con	nmand Line Inte d Uptime 2)	SRTT (ms)	RTO	Q Cnt	Seq Num		^
BOGOT IP-EI H A 0 1	A#show GRP nei ddress 92.168.	ip ei .ghbor 1.130	grp s fo I S	neighbors r process nterface e0/3/1	IOS Con 1 Hold (sec 10	nmand Line Inte	SRTT (ms) 40	RT0 1000	Q Cnt 0	Seq Num 13		 ^

Figura 16: Vecindad Router BOGOTA

 Vecindad Router MEDELLIN MEDELLIN#show ip eigrp neighbors IP-EIGRP neighbors for process 1 H Address Interface Hold Uptime SRTT RTO Q Seq (sec) (ms) Cnt Num 0 192.168.1.97 Se0/3/0 13 02:08:07 40 1000 0 13 MEDELLIN#

MEDELL	.IN								_	×
Physical	Config C	LI Attributes								
MEDELL	IN#show ip e	eigro neighbors	IOS Comm	and Line Inter	face					*
IP-EIG	RP neighbors	s for process 1								
H Ad	dress	Interface	Hold (sec	Uptime )	SRTT (ms)	RTO	Q Cnt	Seq Num		
0 19	2.168.1.97	Se0/3/0	13	02:08:07	40	1000	0	13		
MEDELL	IN#									
•		Figura 17:	Vecinda	d Router ME	DELLIN					

#### Vecindad Router CALI

CALI#show ip eigrp neighbors IP-EIGRP neighbors for process 1 H Address Interface Hold Uptime SRTT RTO Q Seq (sec) (ms) Cnt Num 0 192.168.1.129 Se0/3/0 10 02:02:56 40 1000 0 12

#### CALI#

CAL	LI										_	$\times$
Physi	ical	Config	CLI	Attributes								
					IOS	Command Line	Interface	•				
CAL IP-	.I#sho EIGRI	ow ip e P neigh	igrp n bors f	eighbors or process	1							^
н	Addı	cess		Interface	Hold (sec)	Uptime	SRTT (ms)	RTO	Q Cnt	Seq Num		
0	192.	.168.1.	129	Se0/3/0	10	02:02:56	40	1000	0	12		
CAL	,I#											

Figura 18: Vecindad Router CALI

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

	— C	; נ
Physical Config <u>CLI</u> Attributes		
	IOS Command Line Interface	
BOGOTA#show ip route eigrp 192.168.1.0/24 is variabl D 192.168.1.32/28 [90/20 D 192.168.1.64/28 [90/21	y subnetted, 8 subnets, 3 masks 514560] via 192.168.1.98, 00:44:50, Serial0/3/0 72416] via 192.168.1.130, 00:44:51, Serial0/3/1	^
BOGOTA≴show ip route Codes: L - local, C - connecte D - EIGRP, EX - EIGRP e N1 - OSPF NSSA external E1 - OSPF external type i - IS-IS, L1 - IS-IS 1 * - candidate default, P - periodic downloaded	d, S - static, R - RIP, M - mobile, B - BGP xternal, O - OSPF, IA - OSPF inter area type 1, N2 - OSPF NSSA external type 2 1, E2 - OSPF external type 2, E - EGP evel-1, L2 - IS-IS level-2, ia - IS-IS inter area U - per-user static route, o - ODR static route	
Gateway of last resort is not	set	

# > Rutas establecidas del Router BOGOTA

Figura 19: Rutas establecidas del Router BOGOTA

> Rutas establecidas del Router MEDELLIN

Red Medi	ELLIN		-		×
Physic	al Config CLI Attributes				
	IOS Command	Line Interface			
MEDE D D D	LLIN#show ip route eigrp 192.168.1.0/24 is variably subnetted, 192.168.1.0/27 [90/2172416] via 192 192.168.1.64/28 [90/2684416] via 19 192.168.1.128/28 [90/2681856] via 1	7 subnets, 3 masks 2.168.1.97, 00:45:44, 50 2.168.1.97, 00:45:44, 50 92.168.1.97, 00:45:44,	erial0/3/0 Serial0/3/0 Serial0/3/0	)	^
MEDE Code	<pre>LLIN#show ip route s: L - local, C - connected, S - static D - EIGRP, EX - EIGRP external, 0 - N1 - OSPF NSSA external type 1, N2 - E1 - OSPF external type 1, E2 - OSPF i - IS-IS, L1 - IS-IS level-1, L2 - * - candidate default, U - per-user P - periodic downloaded static route</pre>	:, R - RIP, M - mobile, OSPF, IA - OSPF inter ( OSPF NSSA external type external type 2, E - 1 IS-IS level-2, ia - IS static route, o - ODR	B - BGP area pe 2 EGP -IS inter ar	ea	
Gate	way of last resort is not set				
ם ניס ם מיס ם	192.168.1.0/24 is variably subnetted, 192.168.1.0/27 [90/2172416] via 192 192.168.1.32/28 is directly connect 192.168.1.33/32 is directly connect 192.168.1.64/28 [90/2684416] via 15 192.168.1.96/28 is directly connect 192.168.1.98/32 is directly connect 192.168.1.128/28 [90/2681856] via 15	7 subnets, 3 masks 2.168.1.97, 00:45:47, So ed, GigabitEthernet0/0 22.168.1.97, 00:45:47, So ed, Serial0/3/0 ed, Serial0/3/0 .92.168.1.97, 00:45:47,	erial0/3/0 Serial0/3/0 Serial0/3/0	)	
MEDE	LLIN#				~

Figura 20: Rutas establecidas del Router MEDELLIN

> Rutas establecidas del Router CALI

riyaici			
	IOS Command Line Interface		
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, 00:47:2	9, Serial0/3/0	
D	192.168.1.32/28 [90/21026560] via 192.168.1.129, 00:47	:28, Serial0/3/0	
D	192.168.1.96/28 [90/21024000] Via 192.168.1.129, 00:47	:29, Serial0/3/0	
CALI	#show ip route		
Code	s: L - local, C - connected, S - static, R - RIP, M - mobil	le, B - BGP	
	D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF int	er area	
	N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external	type 2	
	El - 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 - O	DR	
	P - periodic downloaded static route		
Gate	way 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, 00:47:3	4, Serial0/3/0	
	192.168.1.32/28 [90/21026560] via 192.168.1.129, 00:47	:33, Serial0/3/0	
D			
D C	192.168.1.64/28 is directly connected, GigabitEthernet	0/0	
D C L	192.168.1.64/28 is directly connected, GigabitEthernet 192.168.1.65/32 is directly connected, GigabitEthernet	0/0 0/0	
D C L D	192.168.1.64/28 is directly connected, GigabitEthernet 192.168.1.65/32 is directly connected, GigabitEthernet 192.168.1.96/28 [90/21024000] via 192.168.1.129, 00:47	0/0 0/0 :34, Serial0/3/0	
D C L D C	192.168.1.64/28 is directly connected, GigabitEthernet 192.168.1.65/32 is directly connected, GigabitEthernet 192.168.1.96/28 [90/21024000] via 192.168.1.129, 00:47 192.168.1.128/28 is directly connected, Serial0/3/0	0/0 0/0 :34, Serial0/3/0	

Figura 21: Rutas establecidas del 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.

> PC2 – CALI --> PC1 – MEDELLIN

# > PC2 – CALI --> SERVER – BOGOTA



Figura 22: PING PC2-CALI →MEDELLIN→SERVIDOR 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.
- Establecer conexiones Telnet del Router BOGOTA a MEDELLIN y CALI

Regota	_	×
Physical Config CLI Attributes		
IOS Command Line Interface		
BOGOTA>en		^
Password: POCOTPAte-last 100 100 1 00		
Trying 192,168,1,98,Open		
Unauthorized access is strictly prohibited.		
Heer Access Verification		
USEL ACCESS VEHILLABION		
Password:		
MEDELLIN>en		
Password:		
MEDELLIN#exit		
[Connection to 192.168.1.98 closed by foreign host]		
BOGOTA#telnet 192.168.1.130		
Trying 192.168.1.130Open		
Unauthorized access is strictly prohibited.		
User Access Verification		
Password:		
CALI>en		
Password: CALItevit		
GADIPEATO		
[Connection to 192.168.1.130 closed by foreign host]		
BOGOTA#		$\checkmark$

Figura 23: Router BOGOTA a MEDELLIN y CALI

Establecer conexiones Telnet del Router MEDELLIN a BOGOTA y CALI

```
REDELLIN
                                                                                      \times
                                                                               _
  Physical Config CLI Attributes
                                  IOS Command Line Interface
  MEDELLIN#telnet 192.168.1.97
                                                                                     ٨
  Trying 192.168.1.97 ... Open
  Unauthorized access is strictly prohibited.
  User Access Verification
  Password:
  BOGOTA>en
  Password:
  BOGOTA#exit
  [Connection to 192.168.1.97 closed by foreign host]
  MEDELLIN#telnet 192.168.1.130
  Trying 192.168.1.130 ... Open
  Unauthorized access is strictly prohibited.
  User Access Verification
  Password:
  CALI>en
  Password:
  CALI#exit
  [Connection to 192.168.1.130 closed by foreign host]
  MEDELLIN#
```

Figura 24: Telnet Router MEDELLIN a BOGOTA y CALI

Establecer conexiones Telnet del Router CALI a MEDELLIN y BOGOTA

R CALI	_	×
Physical Config <u>CLI</u> Attributes		
IOS Command Line Interface		
CALI#telnet 192.168.1.129 Trying 192.168.1.129Open Unauthorized access is strictly prohibited.		^
User Access Verification		
Password: BOGOTA>en Password: BOGOTA#exit		
[Connection to 192.168.1.129 closed by foreign host] CALI#telnet 192.168.1.98 Trying 192.168.1.98Open Unauthorized access is strictly prohibited.		
User Access Verification		
Password: MEDELLIN>en Password: MEDELLIN#exit		
[Connection to 192.168.1.98 closed by foreign host] CALI#		~

Figura 25: Telnet del Router CALI a MEDELLIN y BOGOTA

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

#### > Acceso del servidor BOGOTA a equipos CALI



Figura 26: Acceso del servidor BOGOTA a equipos CALI

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#### > Acceso del servidor BOGOTA a equipos MEDELLIN

**R** .

R SEIVEL - DUGUIA	_	$\sim$
Physical Config Services Desktop Programming Attributes		
Command Prompt		x
C:\>ping 192.168.1.34 Pinging 192.168.1.34 with 32 bytes of data:		^
Request timed out. Danly from 192 168 1 34- hytec=32 time=11mc TTT=126		
Reply from 192.168.1.34: bytes=32 time=Ims TII=126 Reply from 192.168.1.34: bytes=32 time=2ms TII=126		
<pre>Ping statistics for 192.160.1.34: Packets: Sent = 4, Received = 3, Lost = 1 (25% loss), Approximate round trip times in milli-seconds: Minimum = low Maximum = line Approace - 4mc</pre>		
C:\>ping 192.160.1.35		
Pinging 192.168.1.35 with 32 bytes of data:		
Request timed out. Reply from 192.168.1.35: bytes=32 time=16ms TTL=126 Reply from 192.168.1.35: bytes=32 time=12ms TTL=126 Reply from 192.168.1.35: bytes=32 time=19ms TTL=126		
<pre>Ping statistics for 192.160.1.35: Packets: Sent = 4, Received = 3, Lost = 1 (25% loss), Packets: Sent = 4, Received = 10 (25% loss),</pre>		
Minimum = 12ms, Maximum = 19ms, Average = 15ms		~

Figura 27: Acceso del servidor BOGOTA a equipos MEDELLIN

# > Acceso del WS 1 BOGOTA a equipos CALI

WS 1 - BOGOTA	_	×
Physical Config Desktop Programming Attributes		
Command Prompt		х
Packet Tracer PC Command Line 1.0 C:\>ping 192.168.1.66 Pinging 192.168.1.66 with 32 bytes of data:		^
Reply from 192.168.1.1: Destination host unreachable. Reply from 192.168.1.1: Destination host unreachable. Reply from 192.168.1.1: Destination host unreachable. Reply from 192.168.1.1: Destination host unreachable. Ping statistics for 192.168.1.66:		
<pre>Packets: Sent = 4, Received = 0, Lost = 4 (100% loss), C:\&gt;ping 192.168.1.67</pre>		
Pinging 192.168.1.67 with 32 bytes of data:		
Reply from 192.168.1.1: Destination host unreachable. Reply from 192.168.1.1: Destination host unreachable. Reply from 192.168.1.1: Destination host unreachable. Reply from 192.168.1.1: Destination host unreachable.		
<pre>Ping statistics for 192.168.1.67: Packets: Sent = 4, Received = 0, Lost = 4 (100% loss), C:\&gt;</pre>		~

Figura 28: Acceso del WS 1 BOGOTA a equipos CALI

# > Acceso del WS 1 BOGOTA a equipos MEDELLIN

💘 WS 1 - BOGOTA	—	×
Physical Config Desktop Programming Attributes		
Command Prompt		х
C:\>ping 192.168.1.66		^
Pinging 192.168.1.66 with 32 bytes of data:		
Reply from 192.168.1.1: Destination host unreachable.		
Reply from 192.168.1.1: Destination host unreachable.		
Reply from 192.168.1.1: Destination host unreachable.		
<pre>Ping statistics for 192.168.1.66: Packets: Sent = 4, Received = 0, Lost = 4 (100% loss), C:\&gt;ping 192.168.1.67</pre>		
Pinging 192.168.1.67 with 32 bytes of data:		
Reply from 192.168.1.1: Destination host unreachable.		
Reply from 192.168.1.1: Destination host unreachable.		
Reply from 192.168.1.1: Destination host unreachable.		
Reply from 192.166.1.1: Destination nost unreachable.		
Ping statistics for 192.168.1.67:		
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),		
C:\>		~

Figura 29: Acceso del WS 1 BOGOTA a equipos MEDELLIN

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

# > Configuración ACL Router BOGOTA

Unauthorized access is strictly prohibited. **User Access Verification** Password: BOGOTA>en Password: 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 host 192.168.1.1 BOGOTA(config)#access-list 101 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.98 BOGOTA(config)#access-list 101 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.130 BOGOTA(config)#access-list 101 permit ip host 192.168.1.20 192.168.1.32 0.0.0.255 BOGOTA(config)#access-list 101 permit ip host 192.168.1.20 192.168.1.64 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 Router MEDELLIN

Unauthorized access is strictly prohibited. User Access Verification Password: MEDELLIN>en Password: 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 host 192.168.1.33 MEDELLIN(config)#access-list 100 permit ip 192.168.1.32 0.0.0.255 host 192.168.1.97 MEDELLIN(config)#access-list 100 permit ip 192.168.1.32 0.0.0.255 host 192.168.1.130 MEDELLIN(config)#access-list 100 permit ip 192.168.1.32 0.0.0.255 host 192.168.1.20 MEDELLIN(config)#access-list 100 deny ip any any MEDELLIN(config)#int g0/0 MEDELLIN(config)#int g0/0 MEDELLIN(config-if)#ip access-group 100 in MEDELLIN(config-if)#exit MEDELLIN(config)#

#### > Configuración ACL Router CALI

Unauthorized access is strictly prohibited. User Access Verification Password: CALI>en Password: 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 host 192.168.1.65 CALI(config)#access-list 102 permit ip 192.168.1.64 0.0.0.255 host 192.168.1.129 CALI(config)#access-list 102 permit ip 192.168.1.64 0.0.0.255 host 192.168.1.98 CALI(config)#access-list 102 permit ip 192.168.1.64 0.0.0.255 host 192.168.1.20 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)#

PING PC1 MEDELLIN ---> SERVER BOGOTA

#### PING PC1 MEDELLIN ---> SW1 BOGOTA



Figura 30: PING PC1 MEDELLIN →SERVIDOR, SW1 BOGOTA

#### PING PC1 CALI ---> SERVER BOGOTA

#### PING PC1 CALI --> PC2 MEDELLIN



Figura 31: PING PC1 CALI → SERVIDOR BOGOTA → PC2 MEDELLIN

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

a. Se debe probar que la configuración de las listas de acceso fue exitosa.b. Comprobar y Completar la siguiente tabla de condiciones de prueba para confirmar el óptimo funcionamiento de la red e.

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

Tabla 6. Condiciones de prueba

- TELNET
  - ✓ Router MEDELLIN → Router CALI

Redellin	-	×
Physical Config CLI Attributes		
IOS Command Line Interface		
MEDELLIN#telnet 192.168.1.130 Trying 152.168.1.130Open Unauthorized access is strictly prohibited.		^
User Access Verification		
Password:		
CALI>en Password:		
CALI#		

Figura 32: TELNET Router MEDELLIN → Router CALI

# ✓ WS\_1 → Router BOGOTA



Figura 33: TELNET WS\_1 → Router BOGOTA

#### ✓ SERVIDOR → Router CALI



Figura 34: TELNET SERVIDOR → Router CALI

#### ✓ SERVIDOR → Router MEDELLIN



Figura 35: TELNET SERVIDOR → Router MEDELLIN

- TELNET LAN
  - ✓ LAN del Router MEDELLIN → Router CALI



Figura 36: TELNET LAN del Router MEDELLIN → Router CALI

#### ✓ LAN del Router CALI → Router CALI



Figura 37: TELNET LAN del Router CALI → Router CALI

#### ✓ LAN del Router MEDELLIN $\rightarrow$ Router MEDELLIN



Figura 38: TELNET LAN del Router MEDELLIN → Router MEDELLIN

### ✓ LAN del Router CALI → Router MEDELLIN



Figura 39: TELNET LAN del Router CALI → Router MEDELLIN

- PING
  - ✓ LAN del Router CALI → WS\_1

🤻 PC1 - CALI	-	×
Physical Config Desktop Programming Attributes		
Command Prompt		х
C:\>ping 192.168.1.2		^
Pinging 192.168.1.2 with 32 bytes of data:		
Reply from 192.168.1.65: Destination host unreachable. Reply from 192.168.1.65: Destination host unreachable.		
Reply from 192.168.1.65: Destination host unreachable. Reply from 192.168.1.65: Destination host unreachable.		
<pre>Ping statistics for 192.168.1.2: Packets: Sent = 4, Received = 0, Lost = 4 (100% loss), C:\&gt;</pre>		

Figura 40: PING LAN del Router CALI → WS\_1

#### ✓ LAN del Router MEDELLIN → WS\_1

PC1 - MI	EDELLIN					-	×
Physical	Config	Desktop	Programming	Attributes			
Command	Prompt						х
C:\>pir	ng 192.16	8.1.2					^
Pinging	g 192.168	.1.2 with	32 bytes of	data:			
Reply f Reply f Reply f Reply f	from 192. from 192. from 192. from 192.	168.1.33: 168.1.33: 168.1.33: 168.1.33:	Destination Destination Destination Destination	host unr host unr host unr host unr	eachable. eachable. eachable. eachable.		
Ping st Pac C:\>	atistics ckets: Se	for 192. ent = 4, R	168.1.2: deceived = 0,	Lost = 4	(100% los	ās),	

Figura 41: PING LAN del Router MEDELLIN → WS\_1

#### ✓ LAN del Router MEDELLIN → LAN del Outer CALI



Figura 42: PING LAN del Router MEDELLIN → LAN del Outer CALI

• PING

#### ✓ LAN del Router CALI → SERVIDOR



Figura 43: PING LAN del Router CALI → SERVIDOR

✓ LAN del Router MEDELLIN  $\rightarrow$  SERVIDOR

🥐 PC1 - MEDELLIN	-	×
Physical Config Desktop Programming Attributes		
Command Prompt		х
C:\>ping 192.168.1.20		^
Pinging 192.168.1.20 with 32 bytes of data:		
Reply from 192.168.1.20: bytes=32 time=1ms 11L=126 Reply from 192.168.1.20: bytes=32 time=15ms TTL=126 Reply from 192.168 1 20: bytes=32 time=16ms TTL=126		
Reply from 192.168.1.20: bytes=32 time=14ms TTL=126		
<pre>Ping statistics for 192.168.1.20: Packets: Sent = 4, Received = 4, Lost = 0 (0% loss)</pre>	,	
Approximate round trip times in milli-seconds: Minimum = lms, Maximum = l6ms, Average = llms		
C:\>		

Figura 44: PING LAN del Router MEDELLIN → SERVIDOR

#### ✓ SERVIDOR → LAN del Router MEDELLIN



Figura 45: PING SERVIDOR → LAN del Router MEDELLIN

#### ✓ SERVIDOR → LAN del Router CALI

Ę	🖲 Server -	BOGOTA					_	×	
	Physical	Config	Services	Desktop	Programming	Attributes			
	Command	Prompt						х	
	C:\>pi	ng 192.1	68.1.66					^	
	Pingin	g 192.16	8.1.66 wit	h 32 byte	s of data:				
	Reply Reply Reply	from 192 from 192 from 192	.168.1.66: .168.1.66: .168.1.66:	bytes=32 bytes=32 bytes=32	time=1ms TT time=19ms T time=13ms T	L=126 TL=126 TL=126			
	Reply	from 192	.168.1.66:	bytes=32	time=15ms T	TL=126			
	Ping s Pa	tatistic: ckets: Se imate roy	s for 192. ent = 4, R und trip t	168.1.66: leceived =	4, Lost = 0	(0% loss)			
	Mi	nimum = 1	lms, Maxim	um = 19ms	, Average =	12ms			
	C:\>								

Figura 46: PING SERVIDOR → LAN del Router CALI

#### ✓ Router CALI → LAN del Router MEDELLIN

CALI								-		×
Physical	Config	CLI	Attributes							
			IOS C	Commar	nd Line In	terface				
CALI#p: Type e: Sending !!!!! Success	ing 192. scape sec g 5, 100 s rate is	168.1.3 quence -byte ] s 100 p	to abort. ICMP Echos percent (5	5 to 3	192.168 round-	8.1.34, -trip m	timeou in/avg/	nt is 2 (max = 5	seconds	:
CALI#										
	Figura	a 47: Pl	NG Router	r CAL	$I \rightarrow LA$	N del R	outer M	IEDELLI	N	

#### ✓ Router MEDELLIN → LAN del Router CALI

REDELLIN -	×
Physical Config CLI Attributes	
IOS Command Line Interface	
<pre>MEDELLIN#ping 192.168.1.66 Type escape sequence to abort. Sending 5, 100-byte ICMP Echos to 192.168.1.66, timeout is 2 seconds !!!!! Success rate is 100 percent (5/5), round-trip min/avg/max = 2/8/15 mm MEDELLIN#</pre>	
Figura 48: PING Router MEDELLIN → LAN del Router CALI	

# **Escenario 2**

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



Figura 49: Escenario 2

#### Desarrollo

Los siguientes son los requerimientos necesarios:

- 1. Todos los routers deberán tener los siguiente:
  - Configuración básica.
    - ✓ TUNJA

Router>en Router#conf t Enter configuration commands, one per line. End with CNTL/Z. Router(config)#hostname TUNJA TUNJA(config)#enable secret class TUNJA(config)#banner motd # Enter TEXT message. End with the character '#'. Unauthorized access is strictly prohibited. # TUNJA(config)#line con 0 TUNJA(config-line)#password cisco TUNJA(config-line)#login TUNJA(config-line)#logging synchronous TUNJA(config-line)#line vty 0 4 TUNJA(config-line)#password cisco TUNJA(config-line)#login TUNJA(config-line)#exit TUNJA(config)#service password-encryption TUNJA(config)# exit

TUNJA#

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

TUNJA#

# ✓ BUCARAMANGA

Router>en Router#conf t Enter configuration commands, one per line. End with CNTL/Z. Router(config)#hostname BUCARAMANGA BUCARAMANGA(config)#enable secret class BUCARAMANGA(config)#banner motd # Enter TEXT message. End with the character '#'. Unauthorized access is strictly prohibited. # BUCARAMANGA(config)#line con 0 BUCARAMANGA(config-line)#password cisco BUCARAMANGA(config-line)#login BUCARAMANGA(config-line)#logging synchronous BUCARAMANGA(config-line)#line vty 0 4 BUCARAMANGA(config-line)#password cisco BUCARAMANGA(config-line)#login BUCARAMANGA(config-line)#exit BUCARAMANGA(config)#service password-encryption BUCARAMANGA(config)#service password-encryption BUCARAMANGA(config)#exit BUCARAMANGA(config)#exit BUCARAMANGA[config]#exit BUCARAMANGA#

#### ✓ CUNDINAMARCA

Router>en Router#conf t Enter configuration commands, one per line. End with CNTL/Z. Router(config)#hostname CUNDINAMARCA CUNDINAMARCA(config)#enable secret class CUNDINAMARCA(config)#banner motd # Enter TEXT message. End with the character '#'. Unauthorized access is strictly prohibited. # CUNDINAMARCA(config)#line con 0 CUNDINAMARCA(config-line)#password cisco CUNDINAMARCA(config-line)#login CUNDINAMARCA(config-line)#logging synchronous CUNDINAMARCA(config-line)#line vty 0 4 CUNDINAMARCA(config-line)#password cisco CUNDINAMARCA(config-line)#login CUNDINAMARCA(config-line)#exit CUNDINAMARCA(config)#service password-encryption CUNDINAMARCA(config)#exit CUNDINAMARCA# %SYS-5-CONFIG I: Configured from console by console CUNDINAMARCA#

- Autenticación local con AAA.
  - ✓ 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 cisco

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 class

TUNJA(config-line)#login authentication vty

TUNJA(config-line)#end

TUNJA#

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

# ✓ 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 cisco 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 class BUCARAMANGA(config-line)#login authentication vty BUCARAMANGA(config-line)#end **BUCARAMANGA#** %SYS-5-CONFIG\_I: Configured from console by console **BUCARAMANGA#** 

# ✓ 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 cisco 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 class CUNDINAMARCA(config-line)#login authentication vty CUNDINAMARCA(config-line)#end CUNDINAMARCA(config-line)#end CUNDINAMARCA#

- Cifrado de contraseñas.
  - ✓ Se realizo en la configuración Básica de cada router
- Un máximo de internos para acceder al router.
  - ✓ TUNJA

TUNJA#config t

Enter configuration commands, one per line. End with CNTL/Z. TUNJA(config)#ip domain name DOMAIN.TUNJA

TUNJA(config)#crypto key generate rsa

The name for the keys will be: TUNJA.DOMAIN.TUNJA

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 4:59:16.734: %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)#

# ✓ BUCARAMANGA

BUCARAMANGA#config t Enter configuration commands, one per line. End with CNTL/Z. BUCARAMANGA(config)#ip domain name DOMAIN.BUCARAMANGA BUCARAMANGA(config)#crypto key generate rsa The name for the keys will be: BUCARAMANGA.DOMAIN.BUCARAMANGA 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 mav 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 3:37:1.177: %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)#

# ✓ CUNDINAMARCA

CUNDINAMARCA#config t

Enter configuration commands, one per line. End with CNTL/Z. CUNDINAMARCA(config)#ip domain name DOMAIN.CUNDINAMARCA CUNDINAMARCA(config)#crypto key generate rsa The name for the keys will be: CUNDINAMARCA.DOMAIN.CUNDINAMARCA 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 5:3:0.188: %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)#

• Máximo tiempo de acceso al detectar ataques.

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

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

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

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

# \* ASIGNARCION DE IP A CADA INTERFAZ 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 172.31.2.34 255.255.255.252 TUNJA(config-if)#no shut %LINK-5-CHANGED: Interface Serial0/0/0, changed state to down TUNJA(config-if)#exit 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)#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 TUNJA(config)#int g0/1 TUNJA(config-if)#ip address 209.17.220.1 255.255.255.0 TUNJA(config-if)#no shut TUNJA(config-if)#exit TUNJA(config)#copy running-config startup-config %LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up %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)#copy running-config startup-config Λ % Invalid input detected at '^' marker. TUNJA(config)#exit TUNJA#

%SYS-5-CONFIG\_I: Configured from console by console TUNJA#copy running-config startup-config Destination filename [startup-config]? Building configuration... [OK] TUNJA#

# ✓ 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 BUCARAMANGA(config-if)#exit 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 BUCARAMANGA(config)#exit BUCARAMANGA#copy running-config startup-config %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 %SYS-5-CONFIG I: Configured from console by console BUCARAMANGA#copy running-config startup-config Destination filename [startup-config]? Building configuration... [OK] **BUCARAMANGA#** %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up **BUCARAMANGA#** 

# ✓ 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 CUNDINAMARCA(config-if)#int g0/0 CUNDINAMARCA(config-if)#ip address 172.31.2.9 255.255.255.248 CUNDINAMARCA(config-if)#no shut CUNDINAMARCA(config-if)#exit CUNDINAMARCA(config)#exit CUNDINAMARCA#copy running-config startup-config %LINK-5-CHANGED: Interface Serial0/0/1, 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 %SYS-5-CONFIG\_I: Configured from console by console CUNDINAMARCA#copy running-config startup-config Destination filename [startup-config]? Building configuration... [OK] CUNDINAMARCA# %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up CUNDINAMARCA#

#### Establezca un servidor TFTP

Red Interno						_		×
Physical	Config	Services	Desktop	Programming	Attributes			
IP Configuration							х	^
IP Configuration								
О рнср		) s	tatic					
IP Address		172.	31.2.10					
Subnet Mask		255.	255.255.255.248					
Default Gateway		172.	172.31.2.9					
DNS Server		0.0.0	).0					

Figura 50: Establezca un servidor TFTP

# ✓ Configuración 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 - 1535 bytes] 1535 bytes copied in 3 secs (511 bytes/sec) 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)#

# ✓ Configuración 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)#exit TUNJA# %SYS-5-CONFIG I: Configured from console by console 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 - 1619 bytes] 1619 bytes copied in 0.002 secs (809500 bytes/sec) TUNJA#

# ✓ Configuración Router BUCARAMANGA

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

BUCARAMANGA(config)#ip route 172.31.2.36 255.255.255.254 172.31.2.34 BUCARAMANGA(config)#ip route 172.31.2.10 255.255.255.254 172.31.2.37 BUCARAMANGA(config)#exit **BUCARAMANGA#** %SYS-5-CONFIG\_I: Configured from console by console 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 - 1646 bytes] 1646 bytes copied in 0.01 secs (164600 bytes/sec) **BUCARAMANGA#** 

# VERIFICACION DEL FUNCIONAMIENTO DE TFTP CON EL PROCESO REALIZADO



Figura 51: VERIFICACION DEL FUNCIONAMIENTO DE TFTP

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

# Configuración de VLAN en swich ✓ BUCARAMANGA

SW\_BUCARAMANGA#EN SW\_BUCARAMANGA#config t Enter configuration commands, one per line. End with CNTL/Z. SW\_BUCARAMANGA(config)#int f0/1 SW\_BUCARAMANGA(config-if)#switchport mode trunk SW\_BUCARAMANGA(config)#int f0/2 SW\_BUCARAMANGA(config)#int f0/2 SW\_BUCARAMANGA(config-if)#switchport mode access SW\_BUCARAMANGA(config-if)#switchport access vlan 10 SW\_BUCARAMANGA(config)#int f0/3 SW\_BUCARAMANGA(config)#int f0/3 SW\_BUCARAMANGA(config-if)#switchport mode access SW\_BUCARAMANGA(config-if)#switchport mode access SW\_BUCARAMANGA(config)#int f0/3 SW\_BUCARAMANGA(config-if)#switchport access vlan 30 SW\_BUCARAMANGA(config-if)#switchport access vlan 30 SW\_BUCARAMANGA(config-if)#END SW\_BUCARAMANGA(config-if)#END

# ✓ CUNDINAMARCA

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

SW\_CUNDINAMARCA(config-if)#exit SW\_CUNDINAMARCA(config)#int f0/2 SW\_CUNDINAMARCA(config-if)#switchport mode access SW\_CUNDINAMARCA(config-if)#switchport access vlan 30 % Access VLAN does not exist. Creating vlan 30 SW\_CUNDINAMARCA(config-if)#exit SW\_CUNDINAMARCA(config)#int f0/3 SW\_CUNDINAMARCA(config)#int f0/3 SW\_CUNDINAMARCA(config-if)#switchport mode access SW\_CUNDINAMARCA(config-if)#switchport access vlan 20 %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 20 SW\_CUNDINAMARCA(config-if)#end SW\_CUNDINAMARCA#

# • Creación del HERPER ADDRESS EN LOS 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)#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 dot1g 30 BUCARAMANGA(config-subif)#ip address 172.31.0.65 255.255.255.248 %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-subif)#ip address 172.31.0.65 255.255.255.248 BUCARAMANGA(config-subif)#exit BUCARAMANGA(config)#

# ✓ 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 g0/0.20 CUNDINAMARCA(config-subif)#encapsulation dot1g 20 CUNDINAMARCA(config-subif)#ip address 172.31.1.65 255.255.255.192 CUNDINAMARCA(config-subif)#int g0/0.30 CUNDINAMARCA(config-subif)#encapsulation dot1g 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 dot1g 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

CUNDINAMARCA(config-subif)#ip address 172.31.2.25 255.255.255.248 CUNDINAMARCA(config-subif)#end CUNDINAMARCA# %SYS-5-CONFIG\_I: Configured from console by console

CUNDINAMARCA#

# • CREACION DEL DHCP

# ✓ 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)#exit TUNJA# %SYS-5-CONFIG I: Configured from console by console TUNJA#config t Enter configuration commands, one per line. End with CNTL/Z. 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).

✓ Router TUNJA

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

✓ Router BUCARAMANGA

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

# ✓ Router CUNDINAMARCA

CUNDINAMARCA#config t

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

# ✓ 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 172.31.2.26 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)#

# ✓ BUCARAMANGA

BUCARAMANGA(config)#config t 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)#exit

BUCARAMANGA(config)#

✓ 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]

#### Aspectos a tener en cuenta

- Habilitar VLAN en cada switch y permitir su enrutamiento.
- Enrutamiento OSPF con autenticación en cada router.
- Servicio DHCP en el router Tunja, mediante el helper address, para los routers Bucaramanga y Cundinamarca.
- Configuración de NAT estático y de sobrecarga.
- Establecer una lista de control de acceso de acuerdo con los criterios señalados.
- Habilitar las opciones en puerto consola y terminal virtual

# CONCLUSIONES

El aprendizaje desarrollado en el trabajo final del diplomado de Cisco no brinda muchos conocimientos respecto a las redes y telecomunicaciones donde nos prepara en el ámbito de que decisiones debemos de tomar al momento de diseñar y desarrollar una red como que configuraciones básicas y de seguridad debemos de tomar en los dispositivos que van hacer parte de la red

Al igual que en la realización de la practica nos fortaleció y en ella se demostró todo el conocimiento que se adquirió en el transcurso de diplomado de cisco como las diferentes configuraciones de NAT, PAT, DHCP, enrutamiento, ACL, OSPF entre otras que fueron necesarias en la realización del trabajo final.

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