PRUEBA DE HABILIDADES PRÁCTICAS CCNA

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UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA ESCUELA DE CIENCIAS BÁSICAS, TECNOLOGÍA E INGENIERÍA INGENIERÍA DE SISTEMAS

2019

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

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# UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA ESCUELA DE CIENCIAS BÁSICAS, TECNOLOGÍA E INGENIERÍA INGENIERÍA DE SISTEMAS

2019

# NOTA DE ACEPTACIÓN

Presidente del Jurado

Jurado

Jurado

## DEDICATORIA

Le dedico a mi familia que me ha apoyado y a las personas más cercanas que me han impulsado a para cumplir mis metas y poder ir cumpliendo los objetivos que tengo propuestos en lo académico y en lo personal enseñándome cuales son los valores que debo tener y mis responsabilidades.

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### RESUMEN

Durante el desarrollo del Diplomado de profundización CISCO se vinieron desarrollando diferentes tipos de laboratorios sobre casos puntuales que necesitaban solución y para ello se usaron herramientas como el software Packet Tracert y laboratorios en línea preparados por CISCO con equipos conectados a la red para realizar las simulaciones de configuración en equipos reales.

Se pretende entonces que el estudiante desarrolle las habilidades y el conocimiento para realizar el montaje de una red, configurando los diferentes dispositivos y equipos necesarios como routers, switches y equipos de cómputo; para la actividad final se necesita dar solución a dos escenarios propuestos, realizando las configuraciones pertinentes y haciendo uso del software de Packet Tracert para realizar la simulación del montaje de la red con sus diferentes equipos y configuraciones.

## ABSTRACT

During the development of the CISCO deepening Diploma, different types of laboratories were developed on specific cases that needed solution and for this purpose tools such as Packet Tracert software and online laboratories prepared by CISCO with equipment connected to the network were used to perform the simulations of configuration in real equipment.

It is then intended that the student develop the skills and knowledge to perform the assembly of a network, configuring the different devices and equipment necessary as routers, switches and computer equipment; For the final activity it is necessary to solve two proposed scenarios, making the relevant configurations and using the Packet Tracert software to perform the simulation of the network assembly with its different equipment and configurations.

# INTRODUCCIÓN

Para la culminación del diplomado de profundización CISCO se pretende desarrollar dos ejercicios con los conocimientos adquiridos durante los cursos vistos en las plataformas de CISCO, se requiere entonces aplicar diferentes configuraciones en routers, switches y PCs; se necesita también realizar la configuración de redes LAN/WAN y realizar todo esto en un software para la simulación como Packet Tracert.

## PRUEBA DE HABILIDADES PRÁCTICAS CCNA

#### **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.



Figura 1 – Topología Escenario 1



Figura 2 – Topología Escenario 1

### Desarrollo

Como trabajo inicial se debe realizar lo siguiente.

- Realizar las rutinas de diagnóstico y dejar los equipos listos para su configuración (asignar nombres de equipos, asignar claves de seguridad, etc).
- Realizar la conexión fisica de los equipos con base en la topología de red

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

## Configuración Routers

#### - Router Medellín

#en
#config t
#no ip domain-lookup
#enable secret cisco
#line con 0
#password class
#exit
#line vty 0 15
#password class
#login
#exit
#service password-encryption
#exit
#copy running-config startup-config

#### - Router Bogotá

#en
#config t
#no ip domain-lookup
#enable secret cisco
#line con 0
#password class
#exit
#line vty 0 15
#password class
#login
#exit
#service password-encryption

#exit
#copy running-config startup-config

### - Router Cali

- #en
- #config t
- #no ip domain-lookup
- #enable secret cisco
- #line con 0
- #password class
- #exit
- #line vty 0 15
- #password class
- #login
- #exit
- #service password-encryption
- #exit
- #copy running-config startup-config

## Parte 1: Asignación de direcciones IP:

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

N° sub red	Dirección subred	Broadcast	Netmask
1	192.168.1.0	192.168.1.31	255.255.255.224
2	192.168.1.32	192.168.1.63	255.255.255.224
3	192.168.1.64	192.168.1.95	255.255.255.224
4	192.168.1.96	192.168.1.127	255.255.255.224
5	192.168.1.128	192.168.1.159	255.255.255.224
6	192.168.1.160	192.168.1.191	255.255.255.224
7	192.168.1.192	192.168.1.223	255.255.255.224
8	192.168.1.224	192.168.1.255	255.255.255.224

#### Tabla 1 – Subneteo Red

- b. Asignar una dirección IP a la red.
  - 192.168.1.0

#### Parte 2: Configuración Básica.

- a. Completar la siguiente tabla con la configuración básica de los routers, teniendo en cuenta las subredes diseñadas.
- Realizar las rutinas de diagnóstico y dejar los equipos listos para su configuración (asignar nombres de equipos, asignar claves de seguridad, etc).

	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

Tabla 2 – Asignación IP

## Asignación IP Router Medellín

-

#en
#config t
#int fa0/0
#ip add 192.168.1.33 255.255.255.224
#no shut
#exit
#int s1/0
#ip add 192.168.199 255.255.255.224

#no shut #end

## - Asignación IP Router Cali

#en #config t #int fa0/0 #ip add 192.168.1.65 255.255.255.224 #no shut #exit #int s1/0 #ip add 192.168.131 255.255.255.224 #no shut #end

#### - Asignación IP Router Bogota

#en
#config t
#int fa2/0
#ip add 192.168.1.1 255.255.255.224
#no shut
#exit
#int s0/0
#ip add 192.168.1.98 255.255.255.224
#no shut
#exit
#int s1/0
#ip add 192.168.1.130 255.255.255.224
#no shut
#end

 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

🥐 Medellín	🐙 Bogota	💽 Cali — 🗆
Physical Config CLI	Physical Config CLI	Physical Config CLI
IOS Command Line Interface	IOS Command Line Interface	IOS Command Line Interface
<pre>%LIME-F-CHANGED: Interface Serial//O, changed state to up %LIME2070-F-UT20000; Lima protocol on Interface Serial//O, cf Souter: here is a state of the series of the</pre>	<pre>PTFCONFIG.1: Configured free conscie by console LLIPFCONFIG.1: Configured free conscience by console UNECONFIG.1: Configured free conscience by con- tainerCONFIG.1: Interface Serial/O, changed state to up LLIPECONFIGURE Interface Serial/O, changed state to up LLIPE-CONFIGURE Interface Serial/O, changed state D = 100000 KC = 10000 Hereinia, changed state L = 100000 KC = 100000 Hereinia, changed state L = 100000 Hereinia, changed state L = 1000000 Hereinia, changed state L = 100000 Hereinia, changed state L = 100000000 Hereinia, changed state L = 100000000000000000000000000000000000</pre>	<pre>Dimensionley-config Fracture-config Particulation (Hammas (Fracture-config)) Particulation (Hammas (Fracture-config)) Dimension Dimensio Dime</pre>

Figura 3 – Tabla de enrutamiento

c. Verificar el balanceo de carga que presentan los routers

#show ip route

n Medellín	🗨 Bogota	📀 Cali — 🗆 🗙
Physical Config CLI	Physical Config CLI	Physical Config CLI
IOS Command Line Interface	IOS Command Line Interface	IOS Command Line Interface
Router-show ip routs Codes: C - soundstead, S - shokin, J - 1079, B - 1079, M - solid Codes: C - soundstead, S - shokin, J - 1079, J - 1079, J - 1079 N - 0797 HEERA external type 1, JZ - 0797 MEA external II - 0797 HEERA (J - 1979, I, JZ - 0797 MEA external II - 0797 HEERA (J - 1979, I, JZ - 0797 MEA external II - 10797 HEERA (J - 1974), JZ - 13-13 Howled, I - - candidate default, U - per-user static routs Gateway of Last resort is not set 132, 163, 1.077 is submettead, S nubmette (152, 163, 1.077 is submettead, S nubmette 132, 163, 1.077 is submettead, S nubmette (152, 163, 1.077 is submettead, S nubmette 132, 163, 1.077 is submettead, S nubmettead, S nubmette 132, 163, 1.077 is submettead, S nubmettead, S nubmettead 132, 163, 1.077 is submettead, S nubmettead, S nubmettead 132, 163, 1.077 is submettead, S nubmettead, S nubmettead 132, 163, 1.077 is submettead, S nubmettead 132, 163, 1.077 is submettead, S nubmettead 132, 163, 1.077 is submettead 132, 163, 1.077 is submettead 132, 163, 1.077 is submettead 132, 163, 1.077 is submettead 132, 163, 1.077 is submettead 133, 1.077 is submettead 134, 1.077 is submettead 135, 1.077 is submettead 134, 1.077 is submettead 135, 1.077 is submettead 135, 1.077 is submettead 135, 1.077 is submettead 136, 1.0	<pre>i - 15-15, 11 - 13-15   avail, 12 - 15-15   avail, 12 - 15-15</pre>	<pre>stillHEFPOTO-6-UPDOWN: Line protocol on Interface Serial//0, changed state to up DouterShow up route Codes: C - connected, S = static, I - 102P, R - BIP, H - mobile, B - BOP D - 1102P, KV - 1102P external, 0 - 03P7, IA - 03P7 inter area B - 03P7 Science result, 1 - 102P, R - BIP, H - mobile, B - BOP D - 1102P, KV - 1102P external, 0 - 03P7, IA - 03P7 inter area B - 03P7 Science result, 1 - 1 - 03P external vyet: n - 1 - 102 I - 15-15, Li - 15-13 level-1, Li - 15-15 level-2, Li - 15-15 limer area P - pariodic domoloaded static route Cateway of last record is not cet 192.168.1.0/27 is rubmetted, 2 nubmets [ 192.168.1.0/27 is rubmetted, 2 nubmets [ 2 nutersited visited area [ 2 nutersited visited area [ 2 nutersited visited area [ 2 nutersited visited area [ 2 nutersited area [</pre>
		4

Figura 4 – Balanceo de enrutamiento

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

## #sh cdp neighbors

🥐 Medellin —	💐 Bogota —	🕐 Cali — 🗆 🗙
Physical Config CLI	Physical Config CLI	Physical Config CLI
Physical Config CLI IOS Command Line Interface PARAMETERS IN CONTRACT AND	Physical Config CLI IOS Command Line Interface Provide Common Common Common Common Common (Common Common Common Common Common Common (Common Comm	Physical Config CLI IOS Command Line Interface N- ver sort services type 1, 82 - 007 sectors type 1, 1 - 107 1 - 007 sectors type 1, 82 - 007 sectors type 1, 1 - 107 + - conditions default, 0 - per-user restar routs, 0 - 008 P - periodic default, 0 - per-user restar routs, 0 - 008 P - periodic default, 0 - per-user restar routs, 0 - 008 P - periodic default, 0 - per-user restar routs, 0 - 008 P - periodic default, 0 - per-user restar routs, 0 - 008 P - periodic default, 0 - per-user restar routs, 0 - 008 P - periodic default, 0 - per-user restar routs, 0 - 008 P - periodic default, 0 - 008 P - periodi
Сору	Сору	Copy Paste

Figura 5 – Diagnostico de Vecinos.

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

>ping 192.168.1.99 >ping 192.168.1.131



Figura 6 – Verificación de ping

#### Parte 3: Configuración de Enrutamiento.

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

#### - Enrutamiento router Medellín

#en

#config t #router eigrp 200 #network 192.168.1.32 0.0.0.31 #network 192.168.1.96 0.0.0.31 #no auto-summary

## - Enrutamiento router Cali

#en

#config t

#router eigrp 200

#network 192.168.1.64 0.0.0.31

#network 192.168.1.128 0.0.0.31

#no auto-summary

## - Enrutamiento router Medellín

#en #config t #router eigrp 200 #network 192.168.1.96 0.0.0.31 #network 192.168.1.128 0.0.0.31 #network 192.168.1.0 0.0.0.31

#no auto-summary

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

#sh ip eigrp neighbors

🐙 Medellín	🐙 Bogets	🧟 Cali – 🗆 🗙
Physical Config CLI	Physical Config CLI	Physical Config CLI
IOS Command Line Interface	IOS Command Line Interface	IOS Command Line Interface
<pre>provide stars 200 Rootsfroute stars 200</pre>	<pre>mutantry mutantry stolutdmatchizeri stolut-fmatchizeri boult-fmatchizeri boult-fmatchizeri boult-fmatchizeri boult-fmatchizeri contegrand upoult-fmatchizer; TP-HIGP 200: Heighar 192.148.1.39 (Serial/A) resy contegrand upoult-fmatchizer; TP-HIGP 200: Heighar 192.148.1.31 (Serial/A) resy contegrand upoult-fmatchizer; Subset contegrandes (Serial Bouter (Seriagrandes) (Seriagrandes) (Serial Bouter (Seriagrandes) (Seriag</pre>	The second state         The second state         The second state         The second state           Decess (configured states)         DO 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,

Figura 7 – Vecindad de routers

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

#sh ip route



Figura 8 – Tablas de enrutamiento

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.



Ping a host red de Medellín.

Figura 9 – ping host Medellín



## Ping a host servidor Bogot

Figura 10 – Ping host Bogotá

## 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.
  - Configuración Telnet Medellin #en
     #config t
     #line vty 0 4
     #password class
     #login
     #exit
    - Configuración Telnet Bogota #en #config t #line vty 0 4 #password class #login #exit

-

 Configuración Telnet Cali #en
 #config t
 #line vty 0 4
 #password class
 #login
 #exit b.El equipo WS1 y el servidor se encuentran en la subred de administración. Solo el servidor de la subred de administración debe tener acceso a cualquier otro dispositivo en cualquier parte de la red.

# - Configuración Router Medellín y Cali

#access-list 110 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.2
#access-list 110 permit icmp any any echo-reply
#access-list 110 deny ip any any
#int fastO/O
#ip access-group 110 in

## - Configuración Router Bogota

#access-list 110 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.2
#access-list 110 deny ip any any
#int fastO/O
#ip access-group 110 out



Figura 11 – Ping pc Medellín



Figura 12 -Ping pc Cali

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



Figura 13 – ping Cali a Servidor

Physical	Config	Desktop	Programming	Attributes	
riiyaidai	Connig	Desktop	Programming	Auribotes	
Command	Prompt				
Packet	Tracer	PC Command	Line 1.0		
C:\>pi:	ng 192.1	68.1.3			
Dinging	g 192.16	8.1.3 with	32 bytes of	data:	
Reply	from 192	168.1.65:	Destination	host unrea	chable.
Deply	from 192	168 1 65	Destination	host unrea	chable.
Reply	from 192	.168.1.65:	Destination	host unrea	chable.
Ding at	tatiatia	for 192	160 1 2.		
Page	ckets: S	ent = 4, R	eceived = 0,	Lost = 4	100% loss),
<b>C</b> -1-1-1-1		co o oz			
C:(spi	ng 192.1	68.1.37			
Pinging	g 192.16	8.1.37 wit	h 32 bytes o	f data:	
Peply	from 192	168 1 65-	Destination	host unrea	chable
Reply	from 192	168.1.65:	Destination	host unrea	chable.
Reply	from 192	168.1.65:	Destination	host unrea	chable.
Reply	from 192	.168.1.65:	Destination	host unrea	chable.
D4		102	1 60 1 07-		
Pang Ba	ckets: S	ent = 4. R	eceived = 0.	Lost = 4	100% loss)
C:\>					

Figura 14 – ping Cali a Medellín

Parte 5: Comprobación de la red instalada.

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

-Router Medellín

#show access-list
Extended IP access list 110
10 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.2
20 permit icmp any any echo-reply
30 deny ip any any

-Router Bogota

#show access-listExtended IP access list 11010 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.220 deny ip any any

-Router Cali

#show access-list
Extended IP access list 110
10 permit ip 192.168.1.0 0.0.0.255 host 192.168.1.2
20 permit icmp any any echo-reply
30 deny ip any any

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	Permitido
	WS_1	Router BOGOTA	Permitido
	Servidor	Router CALI	Permitido
	Servidor	Router MEDELLIN	Permitido
TELNET	LAN del Router MEDELLIN	Router CALI	Denegado
	LAN del Router CALI	Router CALI	Denegado
	LAN del Router MEDELLIN	Router MEDELLIN	Denegado
	LAN del Router CALI	Router MEDELLIN	Denegado
PING	LAN del Router CALI	WS_1	Denegado
	LAN del Router MEDELLIN	WS_1	Denegado
	LAN del Router MEDELLIN	LAN del Router CALI	Denegado
PING	LAN del Router CALI	Servidor	Permitido
	LAN del Router MEDELLIN	Servidor	Permitido
	Servidor	LAN del Router MEDELLIN	Permitido
	Servidor	LAN del Router CALI	Permitido
	Router CALI	LAN del Router MEDELLIN	Permitido
	Router MEDELLIN	LAN del Router CALI	Permitidos

Tabla 3 – Comprobaciones escenario 1

## **Escenario 2**

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



#### Desarrollo

Los siguientes son los requerimientos necesarios:

• Todos los routers deberán tener los siguiente:

• Configuración básica.

## Configuración Router Bucaramanga

#conf term

-

#hostname bucaramanga

#no ip domain-lookup

#banner motd "Solo personal autorizado"

#enable secret consola

#line console 0

#password cisco

#login

#logging synchronous

#line vty 0 15

#password cisco

#login

#logging synchronous

#int f0/0.1

#encapsulation dot1q 1

#ip address 172.31.2.1 255.255.255.248

#int f0/0.10

#encapsulation dot1q 10

#ip address 172.31.0.1 255.255.255.192

#int f0/0.30

#encapsulation dot1q 30

#ip address 172.31.0.65 255.255.255.192 #int f0/0 #no shutdown

#int s0/0/0

#ip address 172.31.2.34 255.255.255.252 #no shutdown

#router ospf 1

#network 172.31.0.0 0.0.0.63 area 0
#network 172.31.0.64 0.0.0.63 area 0
#network 172.31.2.0 0.0.0.7 area 0
#network 172.31.2.32 0.0.0.3 area 0

#end

- Configuración Router Tunja

>en

#conf term
#hostname tunja
#no ip domain-lookup
#banner motd "Solo personal autorizado"
#enable secret cisco
#line console 0
#password consola
#login
#login

#line vty 0 15
#password cisco
#login
#logging synchronous
#int f0/0.1
#encapsulation dot1q 1
#ip address 172.3.2.9 255.255.255.248
#int f0/0.20
#encapsulation dot1q 20
#ip address 172.31.0.129 255.255.255.192
#int f0/0.30
#encapsulation dot1q 30
#ip address 172.31.0.193 255.255.255.192
#int f0/0
#no shutdown

#int s0/0/0

#ip address 172.31.2.33 255.255.255.252

#no shutdown

#int s0/0/1

#ip address 172.31.2.37 255.255.255.252

#no shutdown

#int f0/1

#ip address 209.165.220.1 255.255.255.0

#no shutdown

#router ospf 1

#network 172.3.2.8 0.0.0.7 area 0

#network 172.31.0.128 0.0.0.63 area 0
#network 172.31.0.192 0.0.0.63 area 0
#network 172.31.2.32 0.0.0.3 area 0
#network 172.31.2.36 0.0.0.3 area 0
#end

#### - Configuración Router Cundinamarca

>en

#conf term #hostname cundinamarca #no ip domain-lookup #banner motd "Solo personal autorizado" #enable secret consola #line console 0 #password cisco123 #login #logging synchronous #line vty 0 15 #password consola #login #logging synchronous #int f0/0.1 #encapsulation dot1q 1 #ip address 172.31.2.9 255.255.255.248 #int f0/0.20 #encapsulation dot1q 20 #ip address 172.31.1.65 255.255.255.192 #int f0/0.30

#encapsulation dot1q 30

#ip address 172.31.1.1 255.255.255.192

#int f0/0.88

#encapsulation dot1q 88

#ip address 172.31.2.25 255.255.255.248

#int f0/0

#no shutdown

#int s0/0/0

#ip address 172.31.2.38 255.255.255.252

#no shutdown

#router ospf 1

#network 172.31.1.0 0.0.0.63 area 0

#network 172.31.1.64 0.0.0.63 area 0

#network 172.31.2.8 0.0.0.7 area 0

#network 172.31.2.24 0.0.0.7 area 0

#network 172.31.2.36 0.0.0.3 area 0

#end

- Configuración Switch Bucaramanga

>en

#conf term

#hostname S1

#vlan 1

#vlan 10

#vlan 30

#int f0/20

#switchport mode access
#switchport access vlan 10
#int f0/24
#switchport mode access
#switchport access vlan 30
#int f0/1
#switchport mode trunk
#int vlan 1
#ip address 172.31.2.3 255.255.255.248
#no shutdown
#ip default-gateway 172.31.2.1

- Configuración Switch Tunja

>en

#conf term
#hostname SWTUNJA
#vlan 1
#vlan 20
#vlan 30
#int f0/20
#switchport mode access
#switchport access vlan 20
#int f0/24
#switchport mode access
#switchport access vlan 30
#int f0/1
#switchport mode trunk

#int vlan 1#ip address 172.3.2.11 255.255.255.248#no shutdown#ip default-gateway 172.3.2.9

## - Configuración Switch Cundinamarca

>en

#conf term

#hostname SWCUNDINAMARCA

#vlan 1

#vlan 20

#vlan 30

#vlan 88

#exit

#int f0/20

#switchport mode access

#switchport access vlan 20

#int f0/24

#switchport mode access

#switchport access vlan 30

#int f0/10

#switchport mode access

#switchport access vlan 88

#int f0/1

#switchport mode trunk

#int vlan 1

#ip address 172.31.2.11 255.255.255.248 #no shutdown #ip default-gateway 172.31.2.9

#### - Autenticación AAA Bucaramanga

#username admin secret cisco
#aaa new-model
#aaa authentication login AUTH local
#line console 0
#login authentication AUTH
#line vty 0 15
#login authentication AUTH
#service password-encryption

#### - Autenticación AAA Tunja

#username admin secret cisco
#aaa new-model
#aaa authentication login AUTH local
#line console 0
#login authentication AUTH
#line vty 0 15
#login authentication AUTH
#service password-encryption

#### - Autenticación AAA Cundinamarca

#username admin secret cisco
#aaa new-model
#aaa authentication login AUTH local
#line console 0
#login authentication AUTH
#line vty 0 15
#login authentication AUTH
#service password-encryption

#### - Intentos de acceso al router

#### Bucaramanga

#login block-for 5 attempts 4 within 60Tunja#login block-for 5 attempts 4 within 60

## Cundinamarca

#login block-for 5 attempts 4 within 60

#### - Máximo tiempo de acceso al detectar ataques.

## Bucaramanga

#login block-for 5 attempts 4 within 60

### Tunja

#login block-for 5 attempts 4 within 60

## Cundinamarca

#login block-for 5 attempts 4 within 60

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

ERVIDOR INTERNO			
Physical Config Se	rvices Desktop	Programming Attributes	
O DHCP		Static	
PAddress		172.31.2.28	
Subnet Mask		255.255.255.248	
Default Gateway		172.31.2.25	
DNS Server		172.31.2.28	
IPv6 Configuration			
	C Autr	o Confin	
Dric Address	O Auto	State	
Pv6 Address	U Aut		1
Pv6 Address Link Local Address		FE80::260:47FF:FEED:5961	
Pv6 Address Link Local Address Pv6 Gateway	0.444	FE80::260:47FF:FEED:5961	
Pv6 Address Link Local Address IPv6 Gateway IPv6 DNS Server	U Aut	FE80::280:47FF-FEED:5961	
Pv6 Address Link Local Address Pv6 Gateway Pv6 DNS Server 802.1X		FE80-280-47FF FEED 5961	1 
Pv6 Address Link Local Address Pv6 Gateway Pv6 DNS Server 802.1X Use 802.1X Security		FE80-260.47FF FEED 5961	
Vice Prof. Address     Link Local Address     Prof. Gateway     Prof. DNS Server     802.1X     Use 802.1X Security     Authentication	MDS	FE0:-380-47FF FEED 5961	X
VitP     Pv6 Address     Link Local Address     Pv6 Gateway     Pv6 DNS Server     802.1X     Security     Authentication     Username	MD5	FE0:-280.47FF FEED 5961	) / []
ProF Address     Link Local Address     ProF Gateway     ProF DNS Server     802.1X     Gatewall     Userame     Userame	(MD5	FE80::260:47FF FEED:5961	×

Figura 15 - Servidor Interno

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

#### - Router Tunja

#ip dhcp excluded-address 172.31.0.1

#ip dhcp excluded-address 172.31.0.65

#ip dhcp excluded-address 172.31.1.65

#ip dhcp excluded-address 172.31.1.1

#ip dhcp pool V10B

#network 172.31.0.0 255.255.255.192

#default-router 172.31.0.1

#dns-server 172.31.2.28

#ip dhcp pool V30B
#network 172.31.0.64 255.255.255.192
#default-router 172.31.0.65
#dns-server 172.31.2.28
#ip dhcp pool V20C
#network 172.31.1.64 255.255.255.192
#default-router 172.31.1.65
#dns-server 172.31.2.28
#ip dhcp pool V30C
#network 172.31.1.0 255.255.255.192
#default-router 172.31.1.1

#### - Router Bucaramanga

#int f0/0.10
#ip helper-address 172.31.2.33
#int f0/0.30
#ip helper-address 172.31.2.33
#end

### - Router Cundinamarca

#int f0/0.20
#ip helper-address 172.31.2.37
#int f0/0.30
#ip helper-address 172.31.2.37

Pc Bucaramanga

hysical Config	Desktop Program	ning Attributes	
OHCP		Static	
IP Address		169.254.1.130	
Subnet Mask		255.255.0.0	
Default Gateway		0.0.0.0	
DNS Server		0.0.0.0	
IPv6 Configuration			
-			
OHCP	A	uto Config (I) Static	
DHCP IPv6 Address	© A	uto Config   Static	1
<ul> <li>DHCP</li> <li>IPv6 Address</li> <li>Link Local Address</li> </ul>	A ()	VIto Config   Static  FE80::2E0:8FFF.FE55:182	I
<ul> <li>DHCP</li> <li>IPv6 Address</li> <li>Link Local Address</li> <li>IPv6 Gateway</li> </ul>	A ()	VIO Config    Static  FE80-2E0.8FFF.FE55:182	1
DHCP     IPv6 Address     Link Local Address     IPv6 Gateway     IPv6 DNS Server	© #	Vito Config    Static  FE80::2E0:0FFF:FE55:182	
DHCP     IPv6 Address     Link Local Address     IPv6 Gateway     IPv6 DNS Server     802.1X	© #	FE80::2E0:8FFF:FE55:182	
DHCP     IPv6 Address     Link Local Address     IPv6 Gateway     IPv6 DNS Server     802.1X     Use 802.1X Secur	⊙ A	FEB0::260:8FFF:FES5:182	
DHCP     IPv6 Address     Link Local Address     IPv6 Gateway     IPv6 DNS Server     802.1X     Use 802.1X Secur     Authentication	€ A	VID Confg   Static  FE80::2E0:8FFF:PE55:182	
DHCP     IPv6 Address     Link Local Address     IPv6 Gateway     IPv6 DNS Server     802.1X     Use 802.1X Secur     Authentication     Username	ity MD5	Vio Config   Static  FEB0::2E0.0FFF.FE55.182	

# Figura 16 – Configuración Pc Bucaramanga

	esktop Programming	Attributes	
DHCP		Static	
PAddress		169.254.196.182	
Subnet Mask		255.255.0.0	
Default Gateway		0.0.0.0	
DNS Server		0.0.0.0	
IPv6 Configuration			
O DHCP	Auto Co	onfig	
IPv6 Address		1	
Link Local Address		FE80::260:2FFF:FE31:C4B6	
Link Local Address IPv6 Gateway		FE80:260:2FFF:FE31:C486	
Link Local Address IPv6 Gateway IPv6 DNS Server		FE80-260-2FFF-FE31-C486	
Link Local Address IPv6 Gateway IPv6 DNS Server 802.1X		FE80-260-2FFF-FE31-C486	
Link Local Address IPv6 Gateway IPv6 DNS Server 802.1X		FE80-260.2FFF.FE31.C486	
Link Local Address IPv6 Gateway IPv6 DNS Server 802.1X Use 802.1X Security Authentication	MDS	FE80-260-2FFF FE31-C406	-
Link Local Address Pv6 Gateway Pv6 DNS Server a02.1X Use 802.1X Security Authentication Username	(MD5	FE80.260.2FFF FE31.C4B8	

#end

-

# - Pc Tunja

inyoloan ooning	Desktop Programming	Attributes		
OHCP		Static		
IP Address		172.31.0.130		
Subnet Mask		255.255.255.192		
Default Gateway		172.31.0.129		
DNS Server		172.31.2.28		
DHCP IPv6 Address Link Local Address	Auto C	FE80::2E0:A3FF:FEA1:C25B	/ /	
IPv6 Gateway IPv6 DNS Server				
802.1X	ity			
802.1X Use 802.1X Secu Authentication	MD5			
802.1X Use 802.1X Secu Authentication Username	MD5			

Figura 18 – configuración Pc Tunja

hysical Config	Desktop Programming	Attributes	
O DHCP		Static	
IP Address		172.31.0.194	
Subnet Mask		255.255.255.192	
Default Gateway		172.31.0.193	
DNS Server		172.31.2.28	
IPv6 Configuration			
O DHCP	Auto Co	onfig	
IPv6 Address		1	
Link Local Address		FE80::2D0:BAFF:FECB:4C9A	
IPv6 Gateway			
IPv6 Gateway IPv6 DNS Server			
IPv6 Gateway IPv6 DNS Server 802.1X			
IPv6 Gateway IPv6 DNS Server 802.1X	ty		
IPv6 Gateway IPv6 DNS Server 802.1X Use 802.1X Secur Authentication	ty MD5		<b>v</b>
IPv6 Gateway IPv6 DNS Server 802.1X Use 802.1X Secur Authentication Username	lty MD5		•

Figura 19 – Configuración Pc Tunja

# - Pc Cundinamarca

hysical Config De	esktop Programming	Attributes	
DHCP		Static	
IP Address		172.31.1.66	
Subnet Mask		255.255.255.192	
Default Gateway		172.31.1.65	
DNS Server		172.31.2.28	
IPv6 Configuration			
C DHCP	Auto Cor	infig	
0			
IPv6 Address		1	
IPv6 Address Link Local Address		/ FE80::201:42FF:FE16:70E1	
IPv6 Address Link Local Address IPv6 Gateway		/ FE80:201.42FF.FE16.70E1	
IPv6 Address Link Local Address IPv6 Gateway IPv6 DNS Server		/ FE80:201.42FF.FE16.70E1	
IPv6 Address Link Local Address IPv6 Gateway IPv6 DNS Server 802.1X		FE80:201:42FF;FE16:70E1	
IPv6 Address Link Local Address IPv6 Gateway IPv6 DNS Server 802.1X		/ FE80:201.42FF:FE18:70E1	
Pv6 Address Link Local Address Pv6 Gateway Pv6 DNS Server 802.1X Use 802.1X Security Authentication	MD5	/ FE80::201.42FF.FE16:70E1	
Pv6 Address Link Local Address Pv6 DNS Server 802.1X Use 802.1X Security Authentication Username	[MDS	/ FE80:201.42FF.FE16:70E1	



Physical Config D	esktop Programming	Attributes	
DHCP		Static	
IP Address		169.254.123.162	
Subnet Mask		255.255.0.0	
Default Gateway		0.0.0.0	
DNS Server		0.0.0.0	
IDu6 Configuration			
in to configuration			
O DHCP	Auto Co	onfig loo Static	
DHCP     IPv6 Address	🔿 Auto Co	onfig     Static	
DHCP      IPv6 Address  Link Local Address	🔘 Auto Co	onfig	
DHCP      DHCP      IPv6 Address      Link Local Address      IPv6 Gateway	🔘 Auto Co	onfig	
DHCP     DHCP     IPv6 Address     Link Local Address     IPv6 Gateway     IPv6 DNS Server	🔘 Auto Co	nfig  Static / FE80-20184FF FE57.7BA2	
DHCP     DHCP     IPv6 Address     Link Local Address     IPv6 Gateway     IPv6 DNS Server     802.1X	🔘 Auto Co	nfig  Static  FE80-20184FF.FE57.7BA2	
O DHCP     Pv6 Address     Link Local Address     Pv6 Gateway     IPv6 DNS Server     802.1X     Use 802.1X Security	💿 Auto Co	nfng   Static  / FE80:201:84FF.FE57.7BA2	
DHCP     DHCP     Iv6 Address     Link Local Address     Iv6 Gateway     Iv6 DNS Server     802.1X     Use 802.1X Security     Authentication	Auto Co MD5	I FEB0:20184FF;FE57.7BA2	
Other     Other     Other     Other     Other     Other     VeGatevay     PvGGatevay     PvGDNSServer     802.1X     Other     Use 802.1X Security     Authentication     Username	© Auto Co MD5	onfg   Static  /  FE80-201:64FF;FE57.7BA2	×



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

#### - Tunja

#ip nat inside source static 172.31.2.28 209.165.220.4 #access-list 1 permit 172.0.0.0 0.255.255.255 #ip nat inside source list 1 interface f0/1 overload #int f0/1 #ip nat outside #int f0/0.1 #ip nat inside #int f0/0.20 #ip nat inside #int f0/0.30 #ip nat inside #int s0/0/0 #ip nat inside #int s0/0/1 #ip nat inside #exit #ip route 0.0.0.0 0.0.0.0 209.165.220.3 #router ospf 1 #default-information originate

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

Gateway of last resort is 209.165.220.3 to network 0.0.0.0

172.3.0.0/29 is subnetted, 1 subnets

C 172.3.2.8 is directly connected, FastEthernet0/0.1

172.31.0.0/16 is variably subnetted, 11 subnets, 3 masks

O 172.31.0.0/26 [110/65] via 172.31.2.34, 00:24:49, Serial0/0/0

O 172.31.0.64/26 [110/65] via 172.31.2.34, 00:24:49, Serial0/0/0

C 172.31.0.128/26 is directly connected, FastEthernet0/0.20

C 172.31.0.192/26 is directly connected, FastEthernet0/0.30

O 172.31.1.0/26 [110/65] via 172.31.2.38, 00:23:33, Serial0/0/1

O 172.31.1.64/26 [110/65] via 172.31.2.38, 00:23:33, Serial0/0/1

O 172.31.2.0/29 [110/65] via 172.31.2.34, 00:24:49, Serial0/0/0

O 172.31.2.8/29 [110/65] via 172.31.2.38, 00:23:33, Serial0/0/1

O 172.31.2.24/29 [110/65] via 172.31.2.38, 00:23:33, Serial0/0/1

C 172.31.2.32/30 is directly connected, Serial0/0/0

C 172.31.2.36/30 is directly connected, Serial0/0/1

C 209.165.220.0/24 is directly connected, FastEthernet0/1

S\* 0.0.0.0/0 [1/0] via 209.165.220.3

#### Bucaramanga

#show ip route

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area

\* - candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is 172.31.2.33 to network 0.0.0.0

172.3.0.0/29 is subnetted, 1 subnets

O 172.3.2.8 [110/65] via 172.31.2.33, 00:25:08, Serial0/0/0

172.31.0.0/16 is variably subnetted, 11 subnets, 3 masks

C 172.31.0.0/26 is directly connected, FastEthernet0/0.10

C 172.31.0.64/26 is directly connected, FastEthernet0/0.30

O 172.31.0.128/26 [110/65] via 172.31.2.33, 00:25:08, Serial0/0/0

O 172.31.0.192/26 [110/65] via 172.31.2.33, 00:25:08, Serial0/0/0

O 172.31.1.0/26 [110/129] via 172.31.2.33, 00:23:42, Serial0/0/0

O 172.31.1.64/26 [110/129] via 172.31.2.33, 00:23:42, Serial0/0/0

C 172.31.2.0/29 is directly connected, FastEthernet0/0.1

O 172.31.2.8/29 [110/129] via 172.31.2.33, 00:23:42, Serial0/0/0

O 172.31.2.24/29 [110/129] via 172.31.2.33, 00:23:42, Serial0/0/0

C 172.31.2.32/30 is directly connected, Serial0/0/0

O 172.31.2.36/30 [110/128] via 172.31.2.33, 00:24:02, Serial0/0/0

O\*E2 0.0.0.0/0 [110/1] via 172.31.2.33, 00:02:01, Serial0/0/0

#### Cundinamarca

#show ip route

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area

\* - candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is 172.31.2.37 to network 0.0.0.0

172.3.0.0/29 is subnetted, 1 subnets

O 172.3.2.8 [110/65] via 172.31.2.37, 00:24:15, Serial0/0/0

172.31.0.0/16 is variably subnetted, 11 subnets, 3 masks

O 172.31.0.0/26 [110/129] via 172.31.2.37, 00:24:15, Serial0/0/0

O 172.31.0.64/26 [110/129] via 172.31.2.37, 00:24:15, Serial0/0/0

O 172.31.0.128/26 [110/65] via 172.31.2.37, 00:24:15, Serial0/0/0

O 172.31.0.192/26 [110/65] via 172.31.2.37, 00:24:15, Serial0/0/0

C 172.31.1.0/26 is directly connected, FastEthernet0/0.30

C 172.31.1.64/26 is directly connected, FastEthernet0/0.20

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

C 172.31.2.8/29 is directly connected, FastEthernet0/0.1

C 172.31.2.24/29 is directly connected, FastEthernet0/0.88

O 172.31.2.32/30 [110/128] via 172.31.2.37, 00:24:15, Serial0/0/0

C 172.31.2.36/30 is directly connected, Serial0/0/0

O\*E2 0.0.0.0/0 [110/1] via 172.31.2.37, 00:02:24, Serial0/0/0

#### Tunja

-

#show ip nat translation

Pro Inside global Inside local Outside local Outside global icmp 209.165.220.1:1 172.31.1.2:1 209.165.220.3:1 209.165.220.3:1 icmp 209.165.220.1:2 172.31.1.2:2 209.165.220.3:2 209.165.220.3:2 icmp 209.165.220.1:3 172.31.1.2:3 209.165.220.3:3 209.165.220.3:3 icmp 209.165.220.1:4 172.31.1.2:4 209.165.220.3:4 209.165.220.3:4 ---- 209.165.220.4 172.31.2:8 --- ---

## El enrutamiento deberá tener autenticación.

## Bucaramanga

#conf t

#int s0/0/0#ip ospf authentication message-digest#ip ospf message-digest-key 1 md5 cisco123

## - Cundinamarca

#int s0/0/0

#ip ospf authentication message-digest#ip ospf message-digest-key 1 md5 cisco123

## Tunja

#conf t

#int s0/0/0

#ip ospf authentication message-digest

#ip ospf message-digest-key 1 md5 cisco123

#int s0/0/1

#ip ospf authentication message-digest

#ip ospf message-digest-key 1 md5 cisco123

#### Listas de control de acceso:

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

#### - CUNDINAMARCA

#access-list 111 deny ip 172.31.1.64 0.0.0.63 209.165.220.0 0.0.0.255

#access-list 111 permit ip any any

#int f0/0.20

#ip access-group 111 in

₽C4	- • ×
Physical Config Desktop Programming Attributes	
Command Prompt	Х
	^
Packet Tracer PC Command Line 1.0 C:\>ping 172.31.0.130	
Pinging 1/2.31.0.130 with 32 bytes of data:	
Request timed out.	
Reply from 172.31.0.130: bytes=32 time=1ms TTL=126 Reply from 172.31.0.130: bytes=32 time=1ms TTL=126	
Reply from 172.31.0.130: bytes=32 time=1ms TTL=126	
Ping statistics for 172.31.0.130:	
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss), Approximate round trip times in milli-seconds:	
Minimum = 1ms, Maximum = 1ms, Average = 1ms	
C:\>ping 209.165.220.3	
Pinging 209.165.220.3 with 32 bytes of data:	
Reply from 172.31.1.65: Destination host unreachable.	
Reply from 172.31.1.65: Destination host unreachable.	
Reply from 172.31.1.65: Destination host unreachable.	
Ping statistics for 209.165.220.3:	
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),	
C:\>	~

Figura 22 – Ping

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

#### - Cundinamarca

#access-list 112 permit ip 172.31.1.0 0.0.0.63 209.165.220.0 0.0.0.255

#access-list 112 deny ip any any

#int f0/0.30

#ip access-group 112 in



Figura 23 – Ping

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

#### Tunja

-

#access-list 111 permit tcp 172.31.0.192 0.0.0.63 209.165.220.0 0.0.0.255 eq 80 #access-list 111 permit tcp 172.31.0.192 0.0.0.63 209.165.220.0 0.0.0.255 eq 21 #access-list 111 permit tcp 172.31.0.192 0.0.0.63 209.165.220.0 0.0.0.255 eq 20 #int f0/0.30

#ip access-group 111 in



Figura 24 – Ping



Figura 25 – Pagina Server

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

#### - TUNJA

#access-list 112 permit ip 172.31.0.128 0.0.0.63 172.31.1.64 0.0.0.63 #access-list 112 permit ip 172.31.0.128 0.0.0.63 172.31.0.0 0.0.0.63 #int f0/0.20 #ip access-group 112 in

PC2	- Ο Σ
Physical Config Desktop Programming Attributes	
Command Promot	X
	<u>^</u>
Reply from 172.31.1.66: bytes=32 time=3ms TTL=126	
Reply from 172.31.1.66: bytes=32 time=1ms TTL=126	
Reply from 172.31.1.66: bytes=32 time=2ms TTL=126	
Reply from 172.31.1.66: bytes=32 time=1ms TTL=126	
Ping statistics for 172 31 1 66.	
Packets: Sent = 4 Received = 4 Lost = 0 (0% loss)	
Approximate round trip times in milli-seconds:	
Minimum = 1ms, Maximum = 3ms, Average = 1ms	
C:\>ping 172.31.0.2	
Pinging 172 31 0 2 with 32 bytes of data:	
ringing 1/2.01.0.2 with 02 bytes of data.	
Request timed out.	
Reply from 172.31.0.2: bytes=32 time=1ms TTL=126	
Reply from 172.31.0.2: bytes=32 time=1ms TTL=126	
Reply from 172.31.0.2: bytes=32 time=4ms TTL=126	
Ping statistics for 172 31 0 2	
Packets: Sent = 4. Received = 3. Lost = 1 (25% loss)	
Approximate round trip times in milli-seconds:	
Minimum = 1ms, Maximum = 4ms, Average = 2ms	
C:\>	~

Figura 26 - Ping

PC2	X
Physical Config Desktop Programming Attributes	
Command Prompt	Х
	^
C:\>ping 172.31.0.66	
Pinging 172.31.0.66 with 32 bytes of data:	
Deply from 172 21 0 120. Destination heat upper shable	
Reply from 172.31.0.129: Destination host unreachable.	
Reply from 172.31.0.129: Destination host unreachable.	
Reply from 172.31.0.129: Destination host unreachable.	
Ping statistics for 172.31.0.66:	
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),	
C. \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
c. (/ping 1/2.31.2.20	
Pinging 172.31.2.28 with 32 bytes of data:	
Reply from 172 31 0 129. Destination host unreachable	
Reply from 172.31.0.129: Destination host unreachable.	
Reply from 172.31.0.129: Destination host unreachable.	
Reply from 172.31.0.129: Destination host unreachable.	
Ping statistics for 172.31.2.28:	
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),	
	~
Птор	

Figura 27 - Ping

Los hosts de VLAN 30 de Bucaramanga acceden a internet y a cualquier equipo de VLAN 10.

- Bucaramanga

#access-list 111 permit ip 172.31.0.64 0.0.0.63 209.165.220.0 0.0.0.255 #int f0/0.30

#ip access-group 111 in

(₹ PC1	3
Physical Config Desktop Programming Attributes	
Command Prompt X	
Packets: Sent = 4, Received = 0, Lost = 4 (100% 1038),	
C:\>ping 209.165.220.3	
Pinging 209.165.220.3 with 32 bytes of data:	
Reply from 209.165.220.3: bytes=32 time=1ms TTL=126 Reply from 209.165.220.3: bytes=32 time=4ms TTL=126 Reply from 209.165.220.3: bytes=32 time=1ms TTL=126 Reply from 209.165.220.3: bytes=32 time=1ms TTL=126	
<pre>Ping statistics for 209.165.220.3: Packets: Sent = 4, Received = 4, Lost = 0 (0% loss), Approximate round trip times in milli-seconds: Minimum = 1ms, Maximum = 4ms, Average = 1ms</pre>	
C:\> ~	

Figura 28 - Ping

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

#### Bucaramanga

#access-list 112 permit ip 172.31.0.0 0.0.0.63 172.31.1.64 0.0.0.63 #access-list 112 permit ip 172.31.0.0 0.0.0.63 172.31.0.128 0.0.0.63 #int f0/0.10

#ip access-group 112 in

\_



Figura 29 - ping



Figura 30 - Ping

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

#### - Bucaramanga

#access-list 113 deny ip 172.31.2.0 0.0.0.7 172.31.0.0 0.0.0.63 #access-list 113 deny ip 172.31.0.64 0.0.0.63 172.31.0.0 0.0.0.63 #access-list 113 permit ip any any #int f0/0.10 #ip access-group 113 out

#### Tunja

-

#access-list 113 deny ip 172.3.2.8 0.0.0.7 172.31.0.128 0.0.0.63 #access-list 113 deny ip 172.3.0.192 0.0.0.63 172.31.0.128 0.0.0.63 #access-list 113 permit ip any any #int f0/0.20 #ip access-group 113 out

#### Cundinamarca

#access-list 113 deny ip 172.31.2.8 0.0.0.7 172.31.1.64 0.0.0.63 #access-list 113 deny ip 172.31.1.0 0.0.0.63 172.31.1.64 0.0.0.63 #access-list 113 deny ip 172.31.2.24 0.0.0.7 172.31.1.64 0.0.0.63 #access-list 113 permit ip any any

#int f0/0.20

#ip access-group 113 out



Figura 31 – Ping



Figura 32 - Ping



Figura 33 - Ping

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

## - Bucaramanga

#access-list 3 permit 172.31.2.0 0.0.0.7 #access-list 3 permit 172.3.2.8 0.0.0.7 #access-list 3 permit 172.31.2.8 0.0.0.7 #line vty 0 15 #access-class 3 in

#### Tunja

-

#access-list 3 permit 172.31.2.0 0.0.0.7 #access-list 3 permit 172.3.2.8 0.0.0.7 #access-list 3 permit 172.31.2.8 0.0.0.7 #line vty 0 15 #access-class 3 in

## - Cundinamarca

#access-list 3 permit 172.31.2.0 0.0.0.7 #access-list 3 permit 172.3.2.8 0.0.0.7 #access-list 3 permit 172.31.2.8 0.0.0.7 #line vty 0 15 #access-class 3 in

## CONCLUSIONES

Con el desarrollo de los escenarios propuestos se pudo colocar en práctica el conocimiento adquirido durante el diplomado de profundización CISCO, permitiendo al estudiante identificar sus habilidades que durante este fue adquiriendo para identificar las soluciones óptimas y adecuadas para la resolución de problemas reales.

El uso de una configuración adecuada y los equipos que se usen para el montaje de una red puede facilitar la comunicación de varias partes permitiendo que allá una estabilidad en las comunicaciones y así esto puede asegurar la integridad y la seguridad de los datos.

#### **BIBLIOGRAFIA**

CISCO. (2014). Enrutamiento Dinámico. Principios de Enrutamiento y Conmutación. Recuperado de https://static-courseassets.s3.amazonaws.com/RSE50ES/module7/index.html#7.0.1.1

CISCO. (2014). OSPF de una sola área. Principios de Enrutamiento y Conmutación. Recuperado de https://static-courseassets.s3.amazonaws.com/RSE50ES/module8/index.html#8.0.1.1

CISCO. (2014). Listas de control de acceso. Principios de Enrutamiento y Conmutación. Recuperado de https://static-courseassets.s3.amazonaws.com/RSE50ES/module9/index.html#9.0.1.1

CISCO. (2014). DHCP. Principios de Enrutamiento y Conmutación. Recuperado de https://static-course-assets.s3.amazonaws.com/RSE50ES/module10/index.html#10.0.1.1

CISCO. (2014). Traducción de direcciones IP para IPv4. Principios de Enrutamiento y Conmutación. Recuperado de https://static-course-assets.s3.amazonaws.com/RSE50ES/module11/index.html#11.0.1.1

Macfarlane, J. (2014). Network Routing Basics : Understanding IP Routing in Cisco Systems. Recuperado de http://bibliotecavirtual.unad.edu.co:2048/login?url=http://search.ebscohost.com/logi n.aspx?direct=true&db=e000xww&AN=158227&lang=es&site=ehost-live

Lucas, M. (2009). Cisco Routers for the Desperate : Router and Switch Management, the Easy Way. San Francisco: No Starch Press. Recuperado de https://1drv.ms/b/s!AmIJYei-NT1Im3L74BZ3bpMiXRx0

Odom, W. (2013). CISCO Press (Ed). CCNA ICND1 Official Exam Certification Guide. Recuperado de

http://ptgmedia.pearsoncmg.com/images/9781587205804/samplepages/97815872 05804.pdf

Odom, W. (2013). CISCO Press (Ed). CCNA ICND2 Official Exam Certification Guide. Recuperado de http://mr-telecomunicaciones.com/wpcontent/uploads/2018/09/wendellodom.pdf

Lammle, T. (2010). CISCO Press (Ed). Cisco Certified Network Associate Study Guide. Recuperado de https://1drv.ms/b/s!AmIJYei-NT1Im3GQVfFFrjnEGFFU

CISCO. (2014). Introducción a redes conmutadas. Principios de Enrutamiento y Conmutación. Recuperado de https://static-course-assets.s3.amazonaws.com/RSE50ES/module1/index.html#1.0.1.1

CISCO. (2014). Configuración y conceptos básicos de Switching. Principios de Enrutamiento y Conmutación. Recuperado de https://static-course-assets.s3.amazonaws.com/RSE50ES/module2/index.html#2.0.1.1

CISCO. (2014). VLANs. Principios de Enrutamiento y Conmutación. Recuperado de https://static-courseassets.s3.amazonaws.com/RSE50ES/module3/index.html#3.0.1.1

CISCO. (2014). Conceptos de Routing. Principios de Enrutamiento y Conmutación. Recuperado de https://static-courseassets.s3.amazonaws.com/RSE50ES/module4/index.html#4.0.1.1

CISCO. (2014). Enrutamiento entre VLANs. Principios de Enrutamiento y Conmutación. Recuperado de https://static-courseassets.s3.amazonaws.com/RSE50ES/module5/index.html#5.0.1.1

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