PRUEBA DE HABILIDADES PRACTICAS CCNA

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INTRODUCCION

El siguiente documento presenta lo que ha denominado la evaluación de habilidades practicas la universidad y la plataforma CISCO, y nos presenta 2 ejercicios de aplicación a los cuales debemos hacerles configuraciones que hemos aprendido a lo largo del curso.

Dentro de los ejercicios encontramos ejercicios de inicialización de equipos y configuración para implementación de redes, estas destrezas han sido adquiridas por nosotros los estudiantes por medio de múltiples ejercicios, tanto prácticos como de conocimiento teórico.

En los ejercicios desarrollados vamos a realizar elección de equipos, conexiones de diferentes tipos de cables, configuraciones básicas como direccionamiento, configuraciones DHCP, NAT, PAT, OSPF, implementación de ACL, aplicaciones de seguridad, también encontramos el uso de muchos mecanismos de diagnóstico y ayudas de configuración como PING, show ip route, show ip nat translations, do show ip route connected, tracer route, entre otros.

Prueba de habilidades practicas

Escenario 1

Una empresa posee sucursales distribuidas en las ciudades de Bogotá y Medellín, 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

Este escenario plantea el uso de RIP como protocolo de enrutamiento, considerando que se tendran rutas por defecto redistribuidas; asimismo, habilitar el encapsulamiento PPP y su autenticación.

Los routers Bogota2 y medellin2 proporcionan el servicio DHCP a su propia red LAN y a los routers 3 de cada ciudad.

Debe configurar PPP en los enlaces hacia el ISP, con autenticación.

Debe habilitar NAT de sobrecarga en los routers Bogota1 y medellin1.

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.



Parte 1: Configuración del enrutamiento

a. Configurar el enrutamiento en la red usando el protocolo RIP versión 2, declare la red principal, desactive la sumarización automática.

Desarrollo:

Empezamos configurando en cada terminal el direccionamiento con todas las rutas necesarias; activando y desactivando lo solicitado, por lo cual vamos a dejar registro del codigo usado y pantallazos de comprobacion.

ISP

Conf t Int s0/0/0 Ip address 209.17.220.1 255.255.255.252 Clock rate 4000000 No shutdown Int s0/0/1 Ip address 209.17.220.5 255.255.255.252 Clock rate 4000000 No shutdown

MEDELLIN 1

Conf t Int s0/0/0 Ip address 209.17.220.2 255.255.255.252 Clock rate 4000000 No shutdown

Int s0/0/1

Ip address 172.29.6.1 255.255.255.252 Clock rate 4000000 No shutdown Int s0/1/0 Ip address 172.29.6.9 255.255.255.252 Clock rate 4000000 No shutdown

MEDELLIN 2

Int s0/0/0 Ip address 172.29.6.2 255.255.255.252 Clock rate 4000000 No shutdown Int s0/0/1 Ip address 172.29.6.5 255.255.255.252 Clock rate 4000000 No shutdown Int g0/0 ip address 172.29.4.1 255.255.255.128 no shutdown

MEDELLIN 3

Enable Conf t Int s0/0/0 Ip address 172.29.6.10 255.255.255.252 Clock rate 4000000 No shutdown Int s0/0/1 Ip address 172.29.6.14 255.255.255.252 Clock rate 4000000 No shutdown Int s0/1/0 Ip address 172.29.6.6 255.255.255.252 Clock rate 4000000 No shutdown Int g0/0 Ip address 172.29.4.129 255.255.255.128 No shutdown

BOGOTA 1

enable conf t Int s0/0/0 Ip address 209.17.220.6 255.255.255.252 Clock rate 4000000 No shutdown Int s0/0/1 Ip address 172.29.3.9 255.255.255.252 Clock rate 4000000 No shutdown Int s0/1/0 Ip address 172.29.3.1 255.255.255.252 Clock rate 4000000 No shutdown Int s0/1/1 Ip address 172.29.3.5 255.255.255.252 Clock rate 4000000 No shutdown

BOGOTA 2

Configure terminal Int s0/0/0 Ip address 172.29.3.10 255.255.255.252 No shutdown Int s0/0/1 Ip address 172.29.3.13 255.255.255.252 Clock rate 4000000 No shutdown Int g0/0 Ip address 172.29.1.1 255.255.255.0 No shutdown

BOGOTA 3

En Conf t Int s0/0/0 Ip address 172.29.3.2 255.255.255.252 No shutdown Int s0/0/1 Ip address 172.29.3.6 255.255.255.252 Clock rate 4000000 No shutdown Int s0/1/0 Ip address 172.29.3.14 255.255.255.252 Clock rate 4000000 No shutdown Int g0/0 Ip address 172.29.0.1 255.255.255.0

No shutdown

Ahora configuramos RIP en ambas zonas, debe ser en forma independiente y se solicita que sea la version 2.

MEDELLIN 1

En Conf t Router rip Version 2 No auto-summary Do show ip route connected

🖲 MED	ELLIN1						—		×
Physic	al Config	CLI	Attributes						
			IOS Co	mmand Line Inter	rface				
%LII	NK-5-CHANGE	D: Int	erface Se	rial0/1/0,	changed s	state	to up		^
%LII chai	NEPROTO-5-U nged state	DDOWN:	Line pro	tocol on In	terface S	Serial	.0/1/0,		
%LII	NK-5-CHANGE	D: Int	erface Se	rial0/1/1,	changed s	state	to up		
%LII chai	NEPROTO-5-U nged state	to up	Line pro	tocol on In	terface S	Serial	.0/1/1,		
MEDI	ELLIN1>EN	_							
Ente	er configur	ation	commands,	one per li	ne. End	with	CNTL/Z	-	
MEDI	ELLIN1 (conf	ig)#R0	DUTER RIP						
MEDI	ELLIN1 (conf	ig-rou	ter) #VERS	ION 2					
MEDI	SLLINI (conf	ig-rou	ter) #NO A	UTO-SUMMARY	CONVECT	TED.			
C	172 29 4	0/30	is direct	ly connector	d Seriel	0/0/1			
č	172 29 6	8/30	is direct	ly connected	d. Serial	0/1/0			
č	172.29.6.	12/30	is direc	tly connect	ed. Seria	10/1/	1		
С	209.17.22	0.0/30) is dire	ctly connect	ted, Seri	a10/0	/0		
MEDI	T.T.TN1 (conf	ig-ro	ter)#						\sim

Network 172.29.6.0 Network 172.29.6.8 Network 172.29.6.12 Passive-interface s0/0/0

MEDELLIN 2

En Conf t Router rip Version 2 No auto-summary Do show ip route connected

MEDELLI	N 2					_		×
Physical	Config	CLI	Attributes					
			IOS Cor	nmand Line Inter	face			
								^
%LINK-	5-CHANGE	D: Int	erface Se	:ial0/0/1, d	hanged st	ate to up		
a T THERE		DDOWN.	T :					
change	d state	to up	Line pro	cocol on int	errace se	ria10/0/1,		
MEDELL	TNOSEN							
MEDELL	IN2#CONF	т						
Enter	configur	ation	commands,	one per lin	e. End w	ith CNTL/Z	-	
MEDELL	IN2 (conf	ig)#RC	UTER RIP					
MEDELL	IN2 (conf	ig-rou	ter) #VERS	ION 2				
MEDELL	IN2 (conf	ig-rou	ter) #NO A	JTO-SUMMARY		_		
MEDELL	IN2 (conf	ig-rou	ter) #DO S	HOW IP ROUTE	CONNECTE	D	-	
	72.29.4.	0/25	is direct.	y connected	, Gigabit	stnernet0/	0	
	14.49.0. 72.29.6	4/20	is direct.	Ly connected	, serialo	/0/0		
	12.29.0.	4/30	is direct.	ry connected	, Serialo	/0/1		
MEDELL	IN2 (conf	ig-rou	ter)#					\sim

Network 172.29.4.0 Network 172.29.6.0 Network 172.29.6.4 Passive-interface g0/0

MEDELLIN 3

En Conf t Router rip Version 2 No auto-summary Do show ip route connected Network 172.29.4.12 Network 172.29.6.8 Network 172.29.6.4 Network 172.29.4.128 Passive-interface g0/0

```
REDELLIN 3
```

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```
Physical Config CLI
                           Attributes
                                IOS Command Line Interface
 GigabitEthernet0/0, changed state to up
 %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0,
 changed state to up
 %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0,
 changed state to up
 $LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1,
 changed state to up
 MEDELLIN3>en
 MEDELLIN3#conf t
 Enter configuration commands, one per line. End with CNTL/2.
 MEDELLIN3 (config) #router rip
 MEDELLIN3(config-router) #version 2
MEDELLIN3(config-router) #no auto-summary
MEDELLIN3(config-router) #do show ip route connected
     172.29.4.128/25 is directly connected, GigabitEthernet0/0
  C
  C
       172.29.6.4/30 is directly connected, Serial0/1/0
172.29.6.8/30 is directly connected, Serial0/0/0
172.29.6.12/30 is directly connected, Serial0/0/1
  С
  С
 MEDELLIN3 (config-router) #
```

BOGOTA 1

En Conf t Router rip Version 2 No auto-summary Do show ip route connected

ROGOTA1	—		\times
Physical Config CLI Attributes			
IOS Command Line Interface			
<pre>%LINEPROTO-5-UPDOWN: Line protocol on Interface Se changed state to up</pre>	erial0/1/	ο,	^
<pre>%LINEPROTO-5-UPDOWN: Line protocol on Interface Se changed state to up</pre>	erial0/0/	1,	
<pre>%LINEPROTO-5-UPDOWN: Line protocol on Interface Se changed state to up</pre>	erial0/0/	ο,	
BOGOTAl> BOGOTAl>en BOGOTAljen BOGOTAlgconft Enter configuration commands, one per line. End y BOGOTAl(config-router) #version 2 BOGOTAl(config-router) #version 2 BOGOTAl(config-router) #no auto-summary BOGOTAl(config-router) #do show ip route connected C 172.29.3.0/30 is directly connected, Serial(C 172.29.3.4/30 is directly connected, Serial(C 172.29.3.8/30 is directly connected, Serial(C 209.17.220.4/30 is directly connected, Serial(BOGOTAl(config-router)#	vith CNTL 0/1/0 0/1/1 0/0/1 al0/0/0	/z.	۲
Ctrl+F6 to exit CLI focus	Сору	Paste	

Network 172.29.3.0

Network 172.29.3.4 Network 172.29.3.8 Passive-interface s0/0/0

BOGOTA 2

En Conf t Router rip Version 2 No auto-summary Do show ip route connected

Physical Config	CLI	Attributes							
		IOS Co	mmand Line I	Interface					
%LINK-5-CHANGE	D: Inte	rface Se	ria10/0/1	l, chang	ged st	ate t	o up		
AT THE DROTO - 5 - 11	IDDOWN.		*****	Tatavé					
GigabitEtherne	t0/0, c	hanged s	tate to u	ap	ice				
			_	_	_				
%LINEPROTO-5-0 changed state	to up	Line pro	tocol on	Interfa	ace Se	rial	0/0/1,		
%LINEPROTO-5-U	PDOWN:	Line pro	tocol on	Interfa	ace Se	rialO	0/0/0,		
<pre>%LINEPROTO-5-U changed state</pre>	to up	Line pro	tocol on	Interfa	ace Se	rialO	0/0/0,		
%LINEPROTO-5-U changed state BOGOTA2>en	IPDOWN: : to up	Line pro	tocol on	Interfa	ace Se	rialO	0/0/0,		
<pre>%LINEPROTO-5-U changed state BOGOTA2>en BOGOTA2#conf t</pre>	DOWN: :	Line pro	tocol on	Interfa	ace Se	rialO	0/0/0,		
<pre>%LINEPROTO-5-U changed state BOGOTA2>en BOGOTA2#conf t Enter configur</pre>	TPDOWN: to up	Line pro ommands,	tocol on one per	Interfalline.	ace Se End w	rial0)/0/0, NTL/Z	-	
<pre>%LINEPROTO-5-U changed state BOGOTA2>en BOGOTA2#conf t Enter configur BOGOTA2 (config</pre>	PDOWN: to up to up ation control of the second seco	Line pro ommands, r rip	one per	Interfa	ace Se End w	vith C)/0/0, NTL/Z	-	
<pre>%LINEPROTO-5-U changed state BOGOTA2>en BOGOTA2#conf t Enter configur BOGOTA2 (config BOGOTA2 (config</pre>	TPDOWN: to up ation c) #route router	Line pro ommands, r rip)‡versio	one per n 2	Interfa	ace Se End W	rial0)/0/0, NTL/Z	-	
<pre>%LINEPROTO-5-U changed state BOGOTA2>en BOGOTA2#conf t Enter configur BOGOTA2 (config BOGOTA2 (config BOGOTA2 (config</pre>	TPDOWN: to up ation c) #route -router -router	ommands, r rip)#versio)#no aut	one per n 2 o-summary	Interfa line.	ace Se End W	vith C)/0/0, MTL/Z	-	
<pre>%LINEPROTO-5-U changed state BOGOTA2>en BOGOTA2#conf t Enter configur BOGOTA2 (config BOGOTA2 (config BOGOTA2 (config BOGOTA2 (config</pre>	<pre>pDOWN: to up ation c } #route -router -router -router</pre>	ommands, r rip)#versio)#do sho	tocol on one per n 2 o-summary w ip rout	Interfa line. Y te conne	End w	vith C)/0/0, MTL/Z	-	
<pre>%LINEPROTO-5-U changed state BOGOTA2>en BOGOTA2#conf t Enter configur BOGOTA2 (config BOGOTA2 (config BOGOTA2 (config C 172.29.1.</pre>	TPDOWN: to up ation c) froute -router -router -router 0/24 i	<pre>commands, r rip) #versio) # no aut) # do sho s direct</pre>	one per n 2 o-summary w ip rout ly connect	Interfa line. y te conne cted, Gi	End w ected igabit	rial0 with C	NTL/2	-	
<pre>%LINEPROTO-5-U changed state BOGOTA2>en BOGOTA2#conf t Enter configur BOGOTA2 (config BOGOTA2 (config BOGOTA2 (config C 172.29.1. C 172.29.3.</pre>	repown: to up (reation c reation c r	Line pro ommands, r rip)#versio)#no aut)#do sho s direct s direct	one per n 2 o-summary w ip rout ly connect	Interfa line. y cted, Gi cted, Se	End w ected igabit	erial vith C Ether 0/0/0	NTL/2		

Network 172.29.3.8 Network 172.29.3.12 Passive-interface g0/0

BOGOTA 3

En Conf t Router rip Version 2 No auto-summary Do show ip route connected

```
 BOGOTA 3
                                                                                     \times
 Physical Config CLI
                             Attributes
                                   IOS Command Line Interface
   GigabitEthernet0/0, changed state to up
   %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0,
   changed state to up
   %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1,
   changed state to up
   %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0,
   changed state to up
   BOGOTA3>en
   BOGOTA3#conf t
   Enter configuration commands, one per line. End with CNTL/2.
   BOGOTA3(config) #router rip
   BOGOTA3(config-router) #version 2
   BOGOTA3(config-router)#no auto-summary
BOGOTA3(config-router)#do show ip route connected
         172.29.0.0/24 is directly connected, GigabitEthernet0/0
172.29.3.0/30 is directly connected, Serial0/0/0
172.29.3.4/30 is directly connected, Serial0/0/1
172.29.3.12/30 is directly connected, Serial0/1/0
    C
    C
    С
    С
  BOGOTA3 (config-router) #
```

Network 172.29.3.0 Network 172.29.0.0 Network 172.29.3.4 Network 172.29.3.12 Passive-interface g0/0

Ahora hacemos verificacion de las redes conesctedas que usamos por medio del codigo *show ip route* en los router MEDELLIN 1 Y BOGOTA 1; tambien podemos encontrar la red principal por medio del codigo *show running-config.*

```
HEDELLINIShow ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSDF NSSA external type 1, N2 - OSDF NSSA external type 2
E1 - OSDF external type 1, E2 - OSDF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
         - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route
Gateway of last resort is not set
     172.29.0.0/16 is variably subnetted, 9 subnets, 3 masks
        172.29.4.0/25 [120/1] via 172.29.6.2, 00:00:11, Serial0/0/1
R
R
        172.29.4.128/25 [120/1] via 172.29.6.14, 00:00:10, Serial0/1/1
                          [120/1] via 172.29.6.10, 00:00:10, Serial0/1/0
c
        172.29.6.0/30 is directly connected, Serial0/0/1
        172.29.6.1/32 is directly connected, Serial0/0/1
L
R
        172.29.6.4/30 [120/1] via 172.29.6.2, 00:00:11, Seria10/0/1
                        [120/1] via 172.29.6.14, 00:00:10, Serial0/1/1
                        [120/1] via 172.29.6.10, 00:00:10, Serial0/1/0
c
        172.29.6.8/30 is directly connected, Serial0/1/0
         172.29.€.9/32 is directly connected, Serial0/1/0
L
C
         172.29.6.12/30 is directly connected, Serial0/1/1
L
        172.29.6.13/32 is directly connected, Serial0/1/1
     209.17.220.0/24 is variably subnetted, 2 subnets, 2 masks
c
        209.17.220.0/30 is directly connected, Serial0/0/0
        209.17.220.2/32 is directly connected, Serial0/0/0
```

MEDELLIN1

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```
Physical Config CLI Attributes
                         IOS Command Line Interface
 interface Serial0/1/0
 ip address 172.29.6.9 255.255.255.252
 clock rate 4000000
 T
 interface Serial0/1/1
 ip address 172.29.6.13 255.255.255.252
 clock rate 4000000
 1
 interface Vlanl
 no ip address
 shutdown
 router rip
 version 2
 passive-interface Serial0/0/0
 network 172.29.0.0
 no auto-summary
 T
 ip classless
 ip flow-export version 9
```

```
BOGOTAl>en
BOGOTAl#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
      D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
      N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
      E1 - OSDF external type 1, E2 - OSDF external type 2, E - EGD
      1 - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, 1a - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
      P - periodic downloaded static route
Gateway of last resort is not set
     172.29.0.0/16 is variably subnetted, 9 subnets, 3 masks
R
        172.29.0.0/24 [120/1] via 172.29.3.2, 00:00:21, Serial0/1/0
                      [120/1] via 172.29.3.6, 00:00:21, Serial0/1/1
       172.29.1.0/24 [120/1] via 172.29.3.10, 00:00:22, Serial0/0/1
R
C
       172.29.3.0/30 is directly connected, Serial0/1/0
       172.29.3.1/32 is directly connected, Serial0/1/0
L
c
        172.29.3.4/30 is directly connected, Serial0/1/1
L
        172.29.3.5/32 is directly connected, Serial0/1/1
C
       172.29.3.8/30 is directly connected, Serial0/0/1
       172.29.3.9/32 is directly connected, Serial0/0/1
L
R
       172.29.3.12/30 [120/1] via 172.29.3.10, 00:00:22, Seria10/0/1
                       [120/1] via 172.29.3.2, 00:00:21, Serial0/1/0
                       [120/1] via 172.29.3.6, 00:00:21, Serial0/1/1
     209.17.220.0/24 is variably subnetted, 2 subnets, 2 masks
C,
       209.17.220.4/30 is directly connected, Serial0/0/0
L
        209.17.220.6/32 is directly connected, Serial0/0/0
```

```
P BOGOTA1
                                                                  Ma
 Physical Config CLI Attributes
                           IOS Command Line Interface
    clock rate 4000000
   interface Serial0/1/0
   ip address 172.29.3.1 255.255.255.252
    clock rate 4000000
   interface Serial0/1/1
   ip address 172.29.3.5 255.255.255.252
   clock rate 4000000
   interface Vlanl
   no ip address
   shutdown
   router rip
   version 2
   passive-interface Serial0/0/0
   network 172.29.0.0
   no auto-summary
  ip classless
   ip flow-export version 9
```

b. Los routers Bogota1 y Medellín deberán añadir a su configuración de enrutamiento una ruta por defecto hacia el ISP y, a su vez, redistribuirla dentro de las publicaciones de RIP.

Añadimos las configuraciones solicitadas.

MEDELLIN 1

```
En
Conf t
Ip route 0.0.0.0 0.0.0.0 209.17.220.1
Router rip
Default-information originate
Show ip-route
(buscamos dentro de las direcciones la que nos da salida a red la identifica un *)
```

```
Gateway of last resort is 209.17.220.1 to network 0.0.0.0
          172.29.0.0/16 is variably subnetted, 9 subnets, 3 masks
172.29.4.0/25 [120/1] via 172.29.6.2, 00:00:10, Serial0/0/1
172.29.4.128/25 [120/1] via 172.29.6.10, 00:00:15, Serial0/1/0
[120/1] via 172.29.6.14, 00:00:15, Serial0/1/1
Þ
R
                172.29.6.0/30 is directly connected, Serial0/0/1
172.29.6.1/32 is directly connected, Serial0/0/1
С
L
               172.29.6.4/30 [120/1] via 172.29.6.10, 00:00:15, Serial0/1/0
[120/1] via 172.29.6.14, 00:00:15, Serial0/1/1
[120/1] via 172.29.6.14, 00:00:15, Serial0/1/1
[120/1] via 172.29.6.2, 00:00:10, Serial0/0/1
172.29.6.8/30 is directly connected, Serial0/1/0
172.29.6.9/32 is directly connected, Serial0/1/0
R
c
L
                172.29.6.12/30 is directly connected, Serial0/1/1
172.29.6.13/32 is directly connected, Serial0/1/1
С
L
         209.17.220.0/24 is variably subnetted, 3 subnets, 2 masks
209.17.220.0/30 is directly connected, Serial0/0/0
С
                209.17.220.1/32 is directly connected, Serial0/0/0
С
L
                209.17.220.2/32 is directly connected, Serial0/0/0
S*
         0.0.0.0/0 [1/0] via 209.17.220.1
MEDELLIN1#
```

BOGOTA 1

En Conf t Ip route 0.0.0.0 0.0.0.0 209.17.220.5 Router rip Default-information originate Show ip-route (buscamos dentro de las direcciones la que nos da salida a red la identifica un *)

Gateway of last resort is 172.29.3.1 to network 0.0.0.0
172.29.0.0/16 is variably subnetted, 10 subnets, 3 masks
C 172.29.0.0/24 is directly connected, GigabitEthernet0/0
L 172.29.0.1/32 is directly connected, GigabitEthernet0/0
R 172.29.1.0/24 [120/1] via 172.29.3.13, 00:00:24,
Serial0/1/0
C 172.29.3.0/30 is directly connected, Serial0/0/0
L 172.29.3.2/32 is directly connected, Serial0/0/0
C 172.29.3.4/30 is directly connected, Serial0/0/1
L 172.29.3.6/32 is directly connected, Serial0/0/1
R 172.29.3.8/30 [120/1] via 172.29.3.13, 00:00:24,
Serial0/1/0
[120/1] via 172.29.3.1, 00:00:22,
Serial0/0/0
[120/1] via 172.29.3.5, 00:00:22,
Serial0/0/1
C 172.29.3.12/30 is directly connected, Serial0/1/0
L 172.29.3.14/32 is directly connected, Serial0/1/0
R* 0.0.0.0/0 [120/1] via 172.29.3.1, 00:00:22, Serial0/0/0
[120/1] via 172.29.3.5, 00:00:22, Serial0/0/1

C.El router ISP deberá tener una ruta estática dirigida hacia cada red interna de Bogotá y Medellín para el caso se sumarizan las subredes de cada uno a /22.

MEDELLIN			128	64	32	16	8	4	2	1	128	64	32	16	8	4	2	1
172.29.4.0	172	29	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
172.29.4.128	172	29	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0
172.29.6.0	172	29	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
172.29.6.12	172	29	0	0	0	0	0	1	1	0	0	0	0	0	1	1	0	0
172.29.6.8	172	29	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0
172.29.6.4	172	29	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0
172.29.4.0/22	172	29	0	0	0	0	0	- 4	0	0	0	0	0	0	0	0	0	0
BOGOTA			128	64	32	16	8	- 4	2	1	128	64	32	16	8	- 4	2	1
172.29.1.0	172	29	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
172.29.3.0	172	29	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
172.29.0.0	172	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
172.29.3.8	172	29	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
172.29.3.4	172	29	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0
172.29.3.12	172	29	0	0	0	0	0	0	1	1	0	0	0	0	1	1	0	0
172.29.4.0/22	172	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sumarizamos en excel y procedemos a configurar las rutas en ISP

ISP en Conf t Ip route 172.29.4.0 255.255.255.0 209.17.220.2 Ip route 172.29.0.0 255.255.255.0 209.17.220.6

Parte 2: Tabla de Enrutamiento.

a. Verificar la tabla de enrutamiento en cada uno de los routers para comprobar las redes y sus rutas.

Hacemos verificacion por medio de envio de paquetes para verificar redes y rutas.



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

El balanceo de cargas lo podemos notar en las conexiones dobles donde se balancea el envio de informacion y lo podemos ver en las rutas delos router con mas de una conexión. Tomamos como ejemplo MEDELLIN 1 donde en la ruta 172.29.6.4/30 encontramos e rutas de transito de informacion.

MEDELLIN 1 enable show ip route

```
MEDELLIN1#SHOW IP ROUTE
Codes: L = local, C = connected, S = static, R = RIP, M = mobile, B = BGP
D = EIGRD, EX = EIGRD external, O = OSPF, IA = OSPF inter area
N1 = OSPF NSSA external type 1, N2 = OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
        * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route
Gateway of last resort is not set
     172.29.0.0/16 is variably subnetted, 9 subnets, 3 masks
        172.29.4.0/25 [120/1] via 172.29.6.2, 00:00:01, Seria10/0/1
2
         172.29.4.128/25 [120/1] via 172.29.6.10, 00:00:02, Serial0/1/0
R
                          [120/1] via 172.29.6.14, 00:00:02, Serial0/1/1
С
        172.29.6.0/30 is directly connected, Serial0/0/1
        172.29.6.1/32 is directly connected, Serial0/0/1
L
R
        172.29.6.4/30 [120/1] via 172.29.6.2, 00:00:01, Serial0/0/1
                         [120/1] via 172.29.6.10, 00:00:02, Serial0/1/0
                         [120/1] via 172.29.6.14, 00:00:02, Serial0/1/1
```

c. Obsérvese en los routers Bogotá1 y Medellín1 cierta similitud por su ubicación, por tener dos enlaces de conexión hacia otro router y por la ruta por defecto que manejan.

BOGOTA 1 Y MEDELLIN1 son redes similares, en numero de conexiones, se conectan a igual numero de routers y se conectan con ISP.

d. Los routers Medellín2 y Bogotá2 también presentan redes conectadas directamente y recibidas mediante RIP.

MEDELLIN 2 – BOGOTA 2

Enable Show ip route

	172.29.0.0/16 is variably subnetted, 9 subnets, 3 masks
R	172.29.0.0/24 [120/1] via 172.29.3.14, 00:00:16, Serial0/0/1
C	172.29.1.0/24 is directly connected, GigabitEthernet0/0
L	172.29.1.1/32 is directly connected, GigabitEthernet0/0
R	172.29.3.0/30 [120/1] via 172.29.3.9, 00:00:23, Serial0/0/0
	[120/1] via 172.29.3.14, 00:00:16, Serial0/0/1
R	172.29.3.4/30 [120/1] via 172.29.3.9, 00:00:23, Seria10/0/0
	[120/1] via 172.29.3.14, 00:00:16, Serial0/0/1
C	172.29.3.8/30 is directly connected, Serial0/0/0
L	172.29.3.10/32 is directly connected, Serial0/0/0
C	172.29.3.12/30 is directly connected, Serial0/0/1
L	172.29.3.13/32 is directly connected, Serial0/0/1

BOGOTA2#

172.29.0.0/16 is variably subnetted, 9 subnets, 3 masks C 172.29.4.0/25 is directly connected, GigabitEthernet0/0 L 172.29.4.1/32 is directly connected, GigabitEthernet0/0 R 172.29.4.128/25 [120/1] via 172.29.6.6, 00:00:07, Serial0/0/1 C 172.29.6.0/30 is directly connected, Serial0/0/0 L 172.29.6.2/32 is directly connected, Serial0/0/0 C 172.29.6.4/30 is directly connected, Serial0/0/1 L 172.29.6.5/32 is directly connected, Serial0/0/1 R 172.29.6.8/30 [120/1] via 172.29.6.1, 00:00:27, Serial0/0/0 [120/1] via 172.29.6.6, 00:00:07, Serial0/0/1 172.29.6.12/30 [120/1] via 172.29.6.1, 00:00:27, Serial0/0/0 R [120/1] via 172.29.6.6, 00:00:07, Serial0/0/1

MEDELLIN2#

e. Las tablas de los routers restantes deben permitir visualizar rutas redundantes para el caso de la ruta por defecto.

El balanceo de cargas tambien se representa con los conexiones redundantes, esto lo podemos observar en MEDELLIN 3 Y BOGOTA 3, por medio del codigo show ip route.

MEDELLIN 3 – BOGOTA 3

Enable Show ip route

Medellin 3

MEDELLIN3#SHOW IP ROUTE Codes: L = local, C = connected, S = static, R = RIP, N = mobile, B = BGP D = EIGRD, EX = EIGRD external, O = OSPF, IA = OSPF inter area N1 = OSPF NSSA external type 1, N2 = OSPF NSSA external type 2 E1 = OSPF external type 1, E2 = OSPF external type 2, E = EGP i = IS=IS, L1 = IS=IS level=1, L2 = IS=IS level=2, ia = IS=IS inter area * = candidate default, U = per-user static route, o = ODR P = periodic downloaded static route

Gateway of last resort is not set

172.29.0.0/16 is variably subnetted, 10 subnets, 3 masks R 172.29.4.0/25 [120/1] via 172.29.6.5, 00:00:10, Serial0/1/0 C 172.29.4.129/25 is directly connected, GigabitEthernet0/0 L 172.29.4.129/32 is directly connected, GigabitEthernet0/0 R 172.29.6.0/30 [120/1] via 172.29.6.5, 00:00:01, Serial0/1/0 [120/1] via 172.29.6.13, 00:00:01, Serial0/0/1

Bogota 3

	172.29.0.0/16 is variably subnetted, 10 subnets, 3 masks
C	172.29.0.0/24 is directly connected, GigabitEthernet0/0
L	172.29.0.1/32 is directly connected, GigabitEthernet0/0
R	172.29.1.0/24 [120/1] via 172.29.3.13, 00:00:06, Serial0/1/0
C	172.29.3.0/30 is directly connected, Serial0/0/0
L	172.29.3.2/32 is directly connected, Serial0/0/0
C	172.29.3.4/30 is directly connected, Serial0/0/1
L	172.29.3.6/32 is directly connected, Serial0/0/1
R	172.29.3.8/30 [120/1] via 172.29.3.1, 00:00:14, Serial0/0/0
	[120/1] via 172.29.3.5, 00:00:14, Serial0/0/1
	<pre>[120/1] via 172.29.3.13, 00:00:0€, Serial0/1/0</pre>
C	172.29.3.12/30 is directly connected, Serial0/1/0

f.El router ISP solo debe indicar sus rutas estáticas adicionales a las directamente conectadas.

Cuando configuramos RIP en ambas zonas, pudimos visualizar las interfaces pasivas de los router, aquí mostramos cada una de ellas.

Passive-interface s0/0/0 MEDELLIN1 Passive-interface g0/0 MEDELLIN2 Passive-interface g0/0 MEDELLIN3 Passive-interface s0/0/0 BOGOTA1 Passive-interface g0/0 BOGOTA2 Passive-interface g0/0 BOGOTA3

Parte 3: Deshabilitar la propagación del protocolo RIP.

a. Para no propagar las publicaciones por interfaces que no lo requieran se debe deshabilitar la propagación del protocolo RIP, en la siguiente tabla se indican las interfaces de cada router que no necesitan desactivación.

ROUTER	INTERFAZ	
Bogota1	SERIAL0/0/1; SERIAL0/1/1	SERIAL0/1/0;
Bogota2	SERIAL0/0/0; SERIA	L0/0/1
Bogota3	SERIAL0/0/0; SERIAL0/1/0	SERIAL0/0/1;
Medellín1	SERIAL0/0/0; SERIAL0/1/1	SERIAL0/0/1;
Medellín2	SERIAL0/0/0; SERIA	L0/0/1
Medellín3	SERIAL0/0/0; SERIAL0/1/0	SERIAL0/0/1;
ISP	No lo requiere	

En la parte 1 cuando configuramos los routers y RIP se configuraron estas interfaces y todo lo demás se deshabilito porque no era necesario.

Parte 4: Verificación del protocolo RIP.

a. Verificar y documentar las opciones de enrutamiento configuradas en los routers, como el **passive interface** para la conexión hacia el ISP, la versión de RIP y las interfaces que participan de la publicación entre otros datos.

passive interface: Una interface pasiva lo que hace es que no envía ningún tipo de paquete, ni hellos ni cualquier otro tipos de paquetes. Es decir que por esa interfaces no podremos tener neighbors o vecinos pero si anunciara las redes de dichas interfaces.

Rip version 2: Soporta subredes, CIDR y VLSM. Soporta autenticación utilizando uno de los siguientes mecanismos: no autentificación, autentificación mediante contraseña, autentificación mediante contraseña codificada

b. Verificar y documentar la base de datos de RIP de cada router, donde se informa de manera detallada de todas las rutas hacia cada red.

MEDELLIN1 —	>
Physical Config CLI Attributes	
IOS Command Line Interface	
<pre>%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up</pre>	^
<pre>%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up</pre>	
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to up	
<pre>%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed state to up</pre>	
MEDELLIN1>EN	
MEDELLIN1#CONF T Enter configuration commands, one per line. End with CNTL/Z.	
MEDELLIN1 (config) #ROUTER RIP	
MEDELLIN1 (config-router) #VERSION 2	
MEDELLINI (config-router) #NO AUTO-SUMMARY	
C 172.29.6.0/30 is directly connected. Serial0/0/1	
C 172.29.6.8/30 is directly connected, Serial0/1/0	
C 172.29.6.12/30 is directly connected, Serial0/1/1	
C 209.17.220.0/30 is directly connected, Serial0/0/0	
MEDELLIN1 (config-router) #	~

hysical (Config	CLI	Att	ributes									
				IOS Cor	nman	d Line I	nterfa	ce					
													~
%LINK-5-	CHANGEI	: Int	erfa	ce Se	rial	.0/0/1	, cha	anged	lsta	te 1	to up		
%LINK-5-	CHANGEI): Int	erfa	ice Se	rial	.0/0/1	, cha	anged	l sta	te 1	to up		
%LINK-5- %LINEPRO	CHANGEI	D: Int	erfa Lir	ice Se ne pro	rial tocc	.0/0/J	, cha Inte:	anged rface	l sta Ser	te t	to up 0/0/1,		
%LINK-5- %LINEPRO changed	CHANGEI IO-S-UI state t	D: Int PDOWN: to up	erfa : Lir	ice Se ne pro	rial	0/0/1 01 on	, cha Inte	anged rface	l sta Ser	te t	to up 0/0/1,		
%LINK-5- %LINEPRO changed	CHANGEI IO-5-UI state t	D: Int DOWN: to up	erfa Lir	ace Se ne pro	rial	.0/0/1 ol on	, cha Inte	anged rface	l sta Ser	te (to up 0/0/1,		
%LINK-5- %LINEPRO changed MEDELLIN	CHANGEI IO-S-UI state t 2>EN	D: Int DOWN: to up	erfa : Lir	ice Se le pro	rial	.0/0/1 ol on	, cha Inte	anged rface	l sta Ser	te t	to up 0/0/1,		
%LINK-5- %LINEPRO changed MEDELLIN MEDELLIN	CHANGEI IO-5-UI state t 2>EN 2≠CONF	D: Int DOWN: to up	cerfa : Lir	ice Se le pro	rial	0/0/1 01 on	, cha Inte:	anged rface	l sta Ser	ite t	to up 0/0/1,		
<pre>%LINK-5- %LINEPRO changed MEDELLIN MEDELLIN Enter co</pre>	CHANGEI IO-5-UI state t 2>EN 2#CONF nfigura	D: Int DOWN: to up T	com	ace Se ne pro mands,	tocc	.0/0/1 ol on	, cha Inte line	anged rface . En	l sta Ser Id wi	te t ial(to up 0/0/1, CNTL/2		
<pre>%LINK-5- %LINEPRO changed MEDELLIN MEDELLIN Enter co MEDELLIN</pre>	CHANGEI IO-5-UI state t 2>EN 2#CONF nfigura 2 (confi	D: Int DOWN: to up T ation ig)#R0	comm	ace Se ne pro mands, RIP	rial tocc	0/0/1 ol on per	, cha Inte: line	anged rface . En	l sta Ser Id wi	te t ial(to up 0/0/1, CNTL/2		
<pre>\$LINK-5- \$LINEPRO changed MEDELLIN MEDELLIN Enter co MEDELLIN MEDELLIN</pre>	CHANGEI IO-5-UI state t 2>EN 2#CONF nfigura 2 (confi	T ation ig #R0	comm OUTER ater)	ace Se ne pro mands, RIP #VERS	rial tocc one ION	.0/0/1 ol on per 2	, cha Inter line	anged rface . En	l sta Ser Id wi	te 1 ial(to up 0/0/1, CNTL/2		
LINK-5- LINEPRO changed MEDELLIN MEDELLIN MEDELLIN MEDELLIN MEDELLIN	CHANGEI IO-5-UI state t 2>EN 2#CONF nfigura 2(confi 2(confi	T T ig) #RC ig-rou	comm OUTEF iter)	ace Se ne pro nands, RIP #VERS #NO A	rial tocc one ION UTO-	2 SUMM2	Inter Inter	anged rface . En	l sta Ser Id wi	te t ial(to up 0/0/1, CNTL/2	s _	
<pre>\$LINK-5- \$LINEPRO changed MEDELLIN MEDELLIN MEDELLIN MEDELLIN MEDELLIN</pre>	CHANGEI IO-5-UI state t 2>EN 2#CONF nfigura 2 (confi 2 (confi 2 (confi 2 (confi	T T ation ig-rou ig-rou	comm Comm DUTEF Iter) Iter)	ace Se ne pro mands, RIP #VERS #NO A #DO S	rial tocc one ION UTO- HOW	0/0/1 ol on per 2 -SUMMZ IP RC	Inter Inter line	anged rface . En CONNE	l sta : Ser ud wi	te t ial(th (to up 0/0/1, CNTL/2		
<pre>\$LINK-5- \$LINEPRO changed MEDELLIN MEDELLIN Enter co MEDELLIN MEDELLIN MEDELLIN MEDELLIN C 172</pre>	CHANGEI IO-5-UI state t 2>EN 2#CONF nfigura 2 (confi 2 (confi 2 (confi 2 (confi	T ation ig)#R0 ig-rou ig-rou jg-rou	comm Comm DUTER NUTER Nter) Nter) S c	ace Se ands, RIP #VERS #NO A #DO S Lirect	one ION UTO- HOW	o/o/j ol on per 2 SUMMI IP RO	, cha Intes line RY SUTE (sted,	anged rface . En CONNE Giga	l sta : Ser nd wi :CTED :bitE	te t ial(th (cNTL/2		
<pre>\$LINK-5- \$LINEPRO changed MEDELLIN MEDELLIN MEDELLIN MEDELLIN C 172 C 172</pre>	CHANGEI IO-5-UF state t 2>EN 2#CONF afigura 2 (confi 2 (confi 2 (confi 2 (confi 2 (confi 2 (confi 2 (confi 2 (confi	T T tion ig=rou ig=rou ig=rou ig=rou ig=rou ig=rou	comm Comm DUTER Nter) iter) is c is c	ace Se he pro RIP #VERS #NO A #DO S Lirect Lirect	one ION UTO- HOW Ly c	2 SUMMZ SUMMZ Sonnec	, cha Intes line RY UTE (sted, sted,	anged rface . En CONNE Giga Seri	sta Ser d wi CTED bitE al0/	te (ial) th (the: 0/0	to up 0/0/1, CNTL/2 rnet0/	·-	

REDELLIN 3

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Physical	Config	CLI	Attributes					
			IOS Con	nmand Line	Interface			
Gigabi	tEtherne	et0/0,	changed st	tate to 1	up			~
%LINEP change	ROTO-5-U d state	PDOWN: to up	Line prot	tocol on	Interfa	ace Seria	10/0/0,	
%LINEP change	ROTO-5-U d state	to up	Line prot	tocol on	Interf	ace Seria	10/1/0,	
%LINEP change	ROTO-5-U d state	to up	Line prov	tocol on	Interfa	ace Seria	10/0/1,	
MEDELL MEDELL Enter MEDELL MEDELL MEDELL	IN3>en IN3#conf configur IN3(conf IN3(conf IN3(conf	t ation ig)#ro ig-rou ig-rou	commands, uter rip ter)#vers: ter)#no au	one per ion 2 uto-summ	line. ary	End with	CNTL/Z.	
MEDELL C 1 C 1 C 1 C 1	IN3 (conf 72.29.4. 72.29.6. 72.29.6. 72.29.6.	ig-rou 128/25 4/30 8/30 12/30	ter)#do sl is direct is direct is direct is direct	how ip ro ctly come ly conne ly conne tly conne	oute con nected, cted, Se cted, Se ected, S	GigabitE GigabitE Fial0/1/ Fial0/0/ Serial0/0	thernet0/0 0 /1	
MEDELL	IN3 (conf	fig-rou	ter)#					\sim

Regota1

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Physical Config CLI Attributes	
IOS Command Line Interface	
<pre>\$LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up</pre>	^
<pre>\$LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up</pre>	
<pre>%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up</pre>	
BOGOTAl> BOGOTAl>en BOGOTAl#conf t Enter configuration commands, one per line. End with CNTL/Z.	
BOGOTAl(config) #router rip BOGOTAl(config-router) #version 2 BOGOTAl(config-router) #no auto-summary BOGOTAl(config-router) #do show ip route connected	
C 172.29.3.0/30 is directly connected, Serial0/1/0 C 172.29.3.4/30 is directly connected, Serial0/1/1 C 172.29.3.8/30 is directly connected, Serial0/0/1 C 209.17.220.4/30 is directly connected, Serial0/0/0	
BOGOTAl(config-router)#	~

Regeleration Bog	DTA 2						_		\times
Physica	al Config	CLI	Attributes						
			IOS Con	nmand Line Inte	rface				
&LIN	K-5-CHANGE	D: Int	erface Sei	rial0/0/1,	changed :	state	to up		^
%LIN Giga	EPROTO-5-U	JPDOWN: t0/0,	Line prot changed st	cocol on In Cate to up	terface				
%LIN char	EPROTO-5-U ged state	to up	Line prot	cocol on In	terface :	Serial	0/0/1,		
%LIN char	EPROTO-5-U ged state	JPDOWN: to up	Line prot	cocol on In	terface :	Serial	0/0/0,		
BOGO	TA2>en TA2#conf t	-							
Ente BOGO	r configu TA2(config	ration g) #rout	commands, er rip	one per li	ne. End	with	CNTL/Z	-	
BOGO	TA2 (config TA2 (config	g-route g-route	er) #version er) #no auto	12 o-summarv					
BOGO	TA2 (config	g-route	er)#do shou	v ip route	connected	d			
c	172.29.1.	.0/24 .8/30	is direct is direct	ly connecte ly connecte	d, Gigab: d, Seria	itEthe 10/0/0	rnet0/	0	
C	172.29.3.	.12/30	is direct	ly connect	ed, Seri	a10/0/	1		
BOCC	TA2 (confid		ar) #						\sim

ROGOTA 3 \times Physical Config CLI Attributes IOS Command Line Interface GigabitEthernet0/0, changed state to up %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up BOGOTA3>en BOGOTA3#conf t Enter configuration commands, one per line. End with CNTL/Z. BOGOTA3(config) #router rip BOGOTA3(config-router) #version 2 BOGOTA3(config-router)#version 2 BOGOTA3(config-router)#no auto-summary BOGOTA3(config-router)#do show ip route connected C 172.29.0.0/24 is directly connected, GigabitEthernet0/0 C 172.29.3.0/30 is directly connected, Serial0/0/0 C 172.29.3.12/30 is directly connected, Serial0/0/1 C 172.29.3.12/30 is directly connected, Serial0/1/0 BOGOTA3 (config-router)

En las tablas podemos apreciar las rutas que están conectadas con su dirección ip y el puerto de conexión.

Parte 5: Configurar encapsulamiento y autenticación PPP.

a. Según la topología se requiere que el enlace Medellín1 con ISP sea configurado con autenticación PAT.

ISP

Enable Configure terminal Hostname ISP Username MEDELLIN1 password cisco Int s0/0/0 Encapsulation ppp Ppp authentication pap Ppp pap sent-username ISP password cisco End

MEDELLIN1

Enable Configure terminal Hostname MEDELLIN1 Username ISP password cisco Int s0/0/0 Encapsulation ppp Ppp authentication pap Ppp pap sent-username ISP password cisco End

Comprobamos por medio de un ping de MEDELLIN1 a ISP

MEDELL	IN1							
Physical	Config	CLI	Attributes					
			IOS Co	mmand Line Interface				
Succes	s rate 1	ls 0 p	ercent (0/	(5)				Π
MEDELL	TN14							
MEDELL	IN1#ping	209.	17.220.1					
Type e	scape se	equence	e to abort	11) 				
Sendin	g 5, 100 s:)-byte	ICMP Echo	s to 209.17.220.1	, timeou	t is 2		
		1001000						
Succes	s rate 1	ls 0 p	ercent (0/	5)				
MEDELL	TN1#							
ALINEP	ROTO-5-0	PDOWN	Line pro	tocol on Interfac	e Serial	0/0/0,		
change	d state	to up						
MEDELL	IN1#ping	g 209	17.220.1					
Tune e	scape se	mience	to abort					
Sendin	g 5, 100	-byte	ICMP Echo	s to 209.17.220.1	, timeou	t is 2		
second	5:	1			MARCA 10585			
11111								. 1
Succes	s rate i	s 100	percent (5/5), round-trip	min/avg/	max =	1/1/2	
ms								
MEDELL	TN14							

b. El enlace Bogotá1 con ISP se debe configurar con autenticación CHAT.

BOGOTA1

Enable Configure terminal Hostname BOGOTA 1 Username ISP password cisco Int s0/0/0 Encapsulation ppp Ppp authentication chap End

ISP

Enable Configure terminal Hostname ISP Username BOGOTA1 password cisco Int s0/0/0 Encapsulation ppp Ppp authentication chap End

Comprobamos con un ping de ISP a BOGOTA1

-ity sinds	Config	CLI	Attributes					
			IOS Co	ommand Line	Interface			
%LINEP change	ROTO-5-U d state	to dow	Line pro n	otocol on	Interface	Serial0/0	0/1,	^
*LINEP	ROTO-5-U	PDOWN:	Line pro	stocol on	Interface	Serial0/0	J/1,	
change	d state	to up						
ISP(co	nfig-if)	#ping	209.17.23	20.6				
% Inva	lid inpu	t dete	cted at	'' marke	r.			
ISP(co	nfig-if)	fexit						
ISP(co	nfig) ‡en	d						
ISP#								
SSYS-5	-CONFIG_	I: Con	figured	from cons	ole by con	sole		
ISP#pi	ng 209.1	7.220.	e					
Type e	scape se	quence	to abort	6 .				
Sendin	g 5, 100 s:	-byte	ICMP Ech	os to 209	.17.220.6,	timeout :	Ls 2	
TITLE								

Parte 6: Configuración de PAT.

a. En la topología, si se activa NAT en cada equipo de salida (Bogotá1 y Medellín1), los routers internos de una ciudad no podrán llegar hasta los routers internos en el otro extremo, sólo existirá comunicación hasta los routers Bogotá1, ISP y Medellín1.

b. Después de verificar lo indicado en el paso anterior proceda a configurar el NAT en el router Medellín1. Compruebe que la traducción de direcciones indique las interfaces de entrada y de salida. Al realizar una prueba de ping, la dirección debe ser traducida automáticamente a la dirección de la interfaz serial 0/1/0 del router Medellín1, cómo diferente puerto.

c. Proceda a configurar el NAT en el router Bogotá1. Compruebe que la traducción de direcciones indique las interfaces de entrada y de salida. Al realizar una prueba de ping, la dirección debe ser traducida automáticamente a la dirección de la interfaz serial 0/1/0 del router Bogotá1, cómo diferente puerto.

MEDELLIN1

En

Conf t Ip nat inside source list 1 interface s0/0/0 overload Access-list 1 permit 172.29.4.0 0.0.3.255 Int s0/0/0 Ip nat outside Int s0/0/1 Ip nat inside Int s0/1/0 Ip nat inside Int s0/1/1 Ip nat inside

BOGOTA1

En

Conf t Ip nat inside source list 1 interface s0/0/0 overload Access-list 1 permit 172.29.0.0 0.0.3.255 Int s0/0/0 Ip nat outside Int s0/0/1 Ip nat inside Int s0/1/0 Ip nat inside Int s0/1/1 Ip nat inside Comprobamos por medio de ping desde la computadora PC2 a ISP cuya dirección IP por esa red es: 209.17.220.5

FILYSELCE	Config	Desktop	Programming	Attributes
-		-		
Command	Prompt			
_				
Packet	Tracer	PC Command	d Line 1.0	
C:\>pi	ng 209.	17.220.5		
Pingin	g 209.1	7.220.5 W1	th 32 byte:	s of data:
Reply	from 20	9.17.220.5	: bytes=32	time=3ms TTL=253
Reply	from 20	9.17.220.5	: bytes=32	time=2ms TTL=253
Reply	from 20	9.17.220.5	: bytes=32	time=4ms TTL=253
Reply	from 20	9.17.220.5	: bytes=32	time=2ms TTL=253
	tatisti	cs for 209.	.17.220.5:	
Ping s		Cont - A 1	Received =	4, Lost = 0 (0% loss
Ping s Pa	ckets:	Senc - 4, A		
Ping a Pa Approx	ckets: imate r	ound trip	times in m	illi-seconds:

Ahora usamos *show ip nat translations* en BOGOTA1 para comprobar las traducciones de las interfaces

hysical Config CLI	Attributes		
BOGOTAl>en			
Password:			
BOGOTA1#conf t			
Enter configuration c	commands, one per	line. End with CNTL	/Z.
BOGOTAl(config) #ip na	t inside source 1:	ist 1 interface s0/0.	/0 overload
BOGOTAl (config) #acces	-list 1 permit 17:	2.29.0.0 0.0.3.255	
	-		
Invalid input detection	ted at '~' marker		
BOGOTAl (config) #acces	s-list 1 permit 1	72.29.0.0 0.0.3.255	
BOGOTAl (config) #int s	0/0/0		
BOGOTAl (config-if) #ip	nat outside		
BOGOTAl (config-if) #in	t s0/0/1		
BOGOTAl (config-if) #ip	nat inside		
BOGOTAl (config-if) #in	t s0/1/0		
BOGOTAl (config-if) fip	nat inside		
BOGOTAl (config-if) #in	t s0/1/1		
BOGOTAl (config-if) #ip	nat inside		
BOGOTAl(config-if) #			
BOGOTAl (config-if) #ex	it		
BOGOTAl (config) #end			
BOGOTAL#			
SYS-5-CONFIG_I: Conf	igured from conso.	le by console	
BOGOTAlfshow ip nat t	ranslations		
Pro Inside global	Inside local	Outside local	Outside global
icmp 209.17.220.6:1	172.29.0.6:1	209.17.220.5:1	209.17.220.5:1
icmp 209.17.220.6:2	172.29.0.6:2	209.17.220.5:2	209.17.220.5:2
	172 20 0 0.0	209 17 220 5-2	209 17 220 5-3
icmp 209.17.220.6:3	112-23-0-0-0		

Ahora comprobamos también por el lado de MEDELLIN1 con ping a ISP



Ahora usamos *show ip nat translations* en MEDELLIN1 para comprobar las traducciones de las interfaces

hysical	Config	CLI	Attributes		
	arra rubas				
MEDE	LLIN1 (confi	g) #MED	ELLIN1 (config-if)	fip nat inside	
% Int	valid input	detec	ted at '^' marker	42	
MEDE	LLIN1 (confi	g) #MED	ELLIN1 (config-if)	\$int \$0/1/1	
s In	valid input	detec	ted at '^' marker	-	
MEDE	LTNI (confi	01 #HED	FLLTNI (config-1f)	tin nat incide	
110.0101	DALL'S COULS		Sparter (courty it)	erp net inside	
% Inv	valid input	detec	ted at '^' marker		
MEDE	LLIN1 (confi	g) SHED	ELLIN1 (config-if)	S exit	
% Inv	valid input	detec	ted at '^' marker	2	
MEDE	LLIN1 (confi	g) SHED	ELLIN1 (config) #		
§ In	valid input	detec	ted at '^' marker		
MEDE	LLIN1 (confi	g)#			
MEDEI	LLIN1 (confi	g) #end			
MEDEI	LLIN1#				
SYS-	-5-CONFIG_I	: Conf	igured from conso	le by console	
MEDEI	LLINIShow	ip nat	inside		
% Inv	valid input	detec	ted at '^' marker	12	
MEDE	LLINISshow	ip nat	translations		
Pro	Inside glo	bal	Inside local	Outside local	Outside globa
icmp	209.17.220	.2:1	172.29.4.6:1	209.17.220.1:1	209.17.220.1:
icmp	209.17.220	.2:2	172.29.4.6:2	209.17.220.1:2	209.17.220.1:
1 cmp	209.17.220	.2:3	172.29.4.6:3	209.17.220.1:3	209.17.220.1:
1 cmp	209.17.220	.2:4	172.29.4.6:4	209.17.220.1:4	209.17.220.1

Podemos observar las traducciones de los puertos y cada vez que se hace una conexión el puerto cambia y van al destino que ISP.

Si llegaramos a intentar conexión de punto a punto a punto no lo lograríamos porque NAT bloque la traducción de afuera hacia adentro.

Parte 7: Configuración del servicio DHCP.

a. Configurar la red Medellín2 y Medellín3 donde el router Medellín 2 debe ser el servidor DHCP para ambas redes Lan.

b. El router Medellín3 deberá habilitar el paso de los mensajes broadcast hacia la IP del router Medellín2.

Desarrollamos lo requerido en ambos puntos para optimizar.

MEDELLIN2

Conf t Ip dhcp excluded-address 172.29.4.1 172.29.4.5 Ip dhcp excluded-address 172.29.4.129 172.29.4.133 Ip dhcp pool MEDELLIN2 Network 172.29.4.0 255.255.255.128 Default-router 172.29.4.1 Dns-server 5.5.5 Exit Ip dhcp pool MEDELLIN3 Network 172.29.4.128 255.255.255.128 Default-router 172.29.4.129 Dns-server 5.5.5 Exit

Comprobamos configuración DHCP en PC0



Habilitamos MEDELLIN3 como paso de mensajes broadcast

MEDELLIN3

En conf t int g0/0 ip helper-address 172.29.6.5 exit

c. Configurar la red Bogotá2 y Bogotá3 donde el router Bogota2 debe ser el servidor DHCP para ambas redes Lan.

d. Configure el router Bogotá1 para que habilite el paso de los mensajes Broadcast hacia la IP del router Bogotá2.

BOGOTA2

Conf t Ip dhcp excluded-address 172.29.1..1 172.29.1.5 Ip dhcp excluded-address 172.29.0.1 172.29.0.5 Ip dhcp pool BOGOTA2 Network 172.29.1.0 255.255.255.0 Default-router 172.29.0.1 Dns-server 5.5.55 Exit Ip dhcp pool BOGOTA3 Network 172.29.4.128 255.255.255.128 Default-router 172.29.0.1 Dns-server 5.5.55 Exit

Comprobamos configuración DHCP en PC2



BOGOTA3

En conf t int g0/0 ip helper-address 172.29.3.13 exit

Comprobamos por medio de ping desde PC2 al resto de las computadoras para comprobar conexión entre la misma red y a su vez entre las dos redes, de punta a punta.

Physical	Config	Desktop	Programming	Attributes
Command	Prompt			
C:\>p1	ng 172.2	9.4.134		
Pingin	g 172.29	.4.134 wi	th 32 bytes	of data:
Reques	t timed	out		
Reply	from 172	.29.4.134	: bytes=32 t	ime=33ms TTL=123
Reply	from 172	.29.4.134	: bytes=32 t	ime=43ms TTL=123
Reply	from 172	.29.4.134	: bytes=32 t	ime=60ms TTL=123
Ping s	tatistic	s for 172	.29.4.134:	
Pa	ckets: S	ent = 4,	Received = 3	, Lost = 1 (25% loss),
Approx	imate ro	und trip	times in mil	li-seconds:
Mi	nimum =	33ms, Hax	imum = 60ms,	Average = 45ms
C:\>pi	ng 172.2	9.1.6		
Pingin	g 172.29	.1.€ with	32 bytes of	data:
Reques	t timed	out.		
Reply	from 172	.29.1.6:	bytes=32 tim	e=22ms TTL=126
Reply	from 172	.29.1.6:	bytes=32 tim	e=14ms TTL=126
Reply	from 172	.29.1.6:	bytes=32 tim	e=15ms TTL=126
Ping s	tatistic	s for 172	.29.1.6:	
Pa	ckets: S	ent = 4,	Received = 3	, Lost = 1 (25% loss)
Approx	imate ro	und trip	times in mil	li-seconds:
Hi	nimim =	14ms, Max	rimum = 22ms,	Average = 17ms
C:∖>pi	ng 172.2	9.4.6		
Pingin	g 172.29	.4.6 with	32 bytes of	data:
Reques	t timed	out.		
Reply	from 172	.29.4.6:	bytes=32 tim	e=40ms TTL=123
Reply	from 172	.29.4.6:	bytes=32 tim	w=42ms TTL=123
Reply	from 172	.29.4.6:	bytes=32 tim	e=38ms ITL=123
Ping s	tatistic	s for 172	.29.4.6:	
Da	ckets: S	ient = 4,	Received = 3	, Lost = 1 (25% loss),
Approx	imate re			

Escenario 2

Escenario: Una empresa de Tecnología posee tres sucursales distribuidas en las ciudades de Miami, Bogotá y Buenos Aires, 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.



Elementos utilizados

- 3 Routers 1841
- 2 switches 2960
- 3 computadores
- 1 servidor genérico
- Cableado

Topología solicitada



1. Configurar el direccionamiento IP acorde con la topología de red para cada uno de los dispositivos que forman parte del escenario

BOGOTA

Configure terminal Hostname BOGOTA Int s0/0/0 Ip add 172.31.21.1 255.255.255.252 Clock rate 64000 No shutdown Exit

```
BOGOTA#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#config t
%Invalid hex value
BOGOTA(config)#hostname BOGOTA
BOGOTA(config)#int s0/0/0
BOGOTA(config=if)#ip add 172.31.21.1 255.255.255.252
BOGOTA(config=if)#clock rate 64000
BOGOTA(config=if)#no shutdown
BOGOTA(config=if)#no shutdown
BOGOTA(config=if)#ex
BOGOTA(config=if)#ex
```

MIAMI

Configure terminal Hostname MIAMI Int loop0 Ip add 10.10.10.10 255.255.255.255 No shutdown Int s0/0/0 Ip add 172.31.23.1 255.255.255.252 Clock rate 64000 No shutdown Int s0/0/1 Ip add 172.31.21.2 255.255.255.252 No shutdown Int f0/0 Ip add 209.165.200.225 255.255.255.248 No shutdown Exit

```
MIAMI#configure terminal
Enter configuration commands, one per line. End with CNTL/2.
MIAMI (config) #hostname MIAMI
MIAMI (config) #int loop0
MIAMI (config-if) #
%LINK-5-CHANGED: Interface Loopback0, changed state to up
$LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0,
changed state to up
MIAMI(config-if) #ip add 10.10.10.10 255.255.255.255
% 10.10.10.10 overlaps with FastEthernet0/1
MIAMI(config-if)#no shutdown
MIAMI (config-if) #int s0/0/0
MIAMI(config-if) fip add 172.31.23.1 255.255.255.252
MIAMI(config-if) #clock rate 64000
MIAMI (config-if) #no shutdown
MIAMI(config-if) #int s0/0/1
MIAMI(config-if) fip add 172.31.21.2 255.255.255.252
MIAMI (config-if) #no shutdown
MIAMI (config-if) #int f0/0
MIAMI(config-if) #ip add 209,165.200.225 255.255.255.248
MIAMI (config-if) #no shutdown
MIAMI (config-if) #exi
```

BUENOSAIRES

Configure terminal Hostname BUENOS AIRES Int loop4 Ip add 192.168.4.1 255.255.255.0 No shutdown Exit Int loop5 Ip add 192.168.5.1 255.255.255.0 No shutdown Exit Int loop6 Ip add 192.168.6.1 255.255.255.0 No shutdown Exit Int s0/0/1 Ip add 172.31.23.2 255.255.255.252 No shutdown Exit



 Configurar el protocolo de enrutamiento OSPFv2 bajo los siguientes criterios:

OSPFv2 area 0

Configuration Item or Task	Specification
Router ID R1	1.1.1.1
Router ID R2	5.5.5.5
Router ID R3	8.8.8.8
Configurar todas las interfaces LAN como	
pasivas	
Establecer el ancho de banda para enlaces	
seriales en	256 Kb/s
Ajustar el costo en la métrica de S0/0 a	9500

BOGOTA

Configure terminal Router ospf 1 Router-id 1.1.1.1 Network 192.168.99.0 0.0.0.255 area 0 Network 172.31.21.0 0.0.0.3 area 0 Passive-interface f0/0 Int s0/0/0 Bandwidth 256 Ip ospf cost 9500 Int s0/0/1 bandwidth 256 Exit

```
BOGOTA#configure terminal
Enter configuration commands, one per line. End with CNTL/2.
BOGOTA(config) frouter ospf 1
BOGOTA(config-router) #router-id 1.1.1.1
BOGOTA(config-router) #network 192.168.99.0 0.0.0.255 area 0
BOGOTA(config-router) #network 172.31.21.0 0.0.0.3 area 0
BOGOTA(config-router) #passive interface f0/0
§ Invalid input detected at '^' marker.
BOGOTA(config-router) #passive interface fa0/0
S Invalid input detected at '^' marker.
BOGOTA(config-router) #passive interface gi0/0
S Invalid input detected at '-' marker.
BOGOTA(config-router) #passive-interface f0/0
BOGOTA(config-router) fint s0/0/0
BOGOTA(config-if) #bandwidth 256
BOGOTA(config-if) #ip ospf cost 9500
BOGOTA(config-if) #int s0/0/1
BOGOTA(config-if) #bandwidth 256
BOGOTA (config-if) fexit
```

MIAMI

Configure terminal Router ospf 1 Router-id 5.5.5.5 Network 209.165.200.224 0.0.0.7 area 0 Network 172.31.21.0 0.0.0.3 area 0 Network 10.10.10.0 0.0.0.3 area 0 Passive-interface f0/0 Int s0/0/0 Bandwidth 256 Ip ospf cost 9500 Int s0/0/1 Bandwidth 256 Exit

MIAMI#configure terminal
Enter configuration commands, one per line. End with CNTL/2.
MIAHI(config) frouter ospf 1
MIAMI(config=router) #router-id 5.5.5.5
MIAMI(config-router) #network 209.165.200.224 0.0.0.7
% Incomplete command.
MIAMI(config-router) #network 209.165.200.224 0.0.0.7 area 0
MIAMI(config-router) #network 172.31.21.0 0.0.0.3 area 0
MIAMI(config-router) #network 10.10.10.10 0.0.0.3 area 0
MIAMI(config-router) #passive-interface f0/0
MIAMI(config-router) fint \$0/0/0
MIAMI(config-if)\$bandwidth 256
MIAMI(config-if) #ip ospf cost 9500
MIAMI(config-if) #int s0/0/1
MIAMI(config-if) #bandwidth 256
MIAMI(config-if) fexit

BUENOSAIRES

Configure terminal Router ospf 1 Router-id 8.8.8.8 Network 172.31.23.0 0.0.0.3 area 0 Network 192.168.4.0 0.0.0.255 area 0 Network 192.168.5.0 0.0.0.255 area 0 Network 192.168.6.0 0.0.0.255 area 0 Int s0/0/0 Bandwidth 256 Ip ospf cost 9500 Int s0/0/1 Bandwidth 256 Exit

```
BUENOSAIRES#configure terminal
Enter configuration commands, one per line. End with CNTL/2.
BUENOSAIRES (config) #router ospf 1
BUENOSAIRES (config-router) #router-id 8.8.8.8
BUENOSAIRES(config-router)fnetwork 172.31.23.0 0.0.0.3 area 0
BUENOSAIRES(config-router)fnetwork 172.168.4.0 0.0.0.255 area 0
BUENOSAIRES(config-router) #network 192.168.5.0 0.0.0.255 area0
* Invalid input detected at '^' marker.
BUENOSAIRES(config-router) #network 192.168.5.0 0.0.0.255 area 0
BUENOSAIRES (config-router) #network 192.160.6.0 0.0.0.255 area 0
BUENOSAIRES (config-router) #int $0/0/0
BUENOSAIRES (config-if) $banwidth 256
S Invalid input detected at '^' marker.
BUENOSAIRES (config-if) #bandwidth 256
BUENOSAIRES (config-if) fip ospf cost 9500
BUENOSAIRES (config-if) #int s0/0/1
BUENOSAIRES (config-if) #bandwidth 256
BUENOSAIRES (config-if) fexit
BUENOSAIRES (config) #
```

Verificar información de OSPF

- Visualizar tablas de enrutamiento y routers conectados por OSPFv2
- Visualizar lista resumida de interfaces por OSPF en donde se ilustre el costo de cada interface
- Visualizar el OSPF Process ID, Router ID, Address summarizations, Routing Networks, and passive interfaces configuradas en cada router.

Usamos el comando show ip route

BOGOTA

```
BOGOTA#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
      D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
      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 - ODR
       P - periodic downloaded static route
Gateway of last resort is 0.0.0.0 to network 0.0.0.0
     10.0.0/24 is subnetted, 1 subnets
        10.10.10.0 (110/9501) via 172.31.21.2, 00:27:04, Serial0/0/0
0
     172.31.0.0/30 is subnetted, 2 subnets
c
        172.31.21.0 is directly connected, Serial0/0/0
0
        172.31.23.0 [110/19000] via 172.31.21.2, 00:17:18, Serial0/0/0
    192.168.4.0/32 is subnetted, 1 subnets
0
        192.160.4.1 [110/19001] via 172.31.21.2, 00:12:30, Serial0/0/0
     192.168.5.0/32 is subnetted, 1 subnets
0
        192.168.5.1 [110/19001] via 172.31.21.2, 00:12:30, Serial0/0/0
    192.168.6.0/32 is subnetted, 1 subnets
0
       192.168.6.1 [110/19001] via 172.31.21.2, 00:12:30, Serial0/0/0
C C C
     192.168.30.0/24 is directly connected, FastEthernet0/0.30
    192.168.40.0/24 is directly connected, FastEthernet0/0.40
     192.168.200.0/24 is directly connected, FastEthernet0/0.200
     209.165.200.0/29 is subnetted, 1 subnets
0
        209.165.200.224 [110/9501] via 172.31.21.2, 00:19:40, Serial0/0/0
S*
    0.0.0.0/0 is directly connected, Serial0/0/0
```

Usamos el commando do sh ip ospf interface

```
BOGOTA#do sh ip ospf interface
% Invalid input detected at '^' marker.
BOGOTA#conf t
Enter configuration commands, one per line. End with CNTL/Z.
BOGOTA(config)#do sh ip ospf interface
FastEthernet0/0.30 is up, line protocol is up
 Internet address is 192.168.30.1/24, Area 0
  Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
 Transmit Delay is 1 sec, State DR, Priority 1
 Designated Router (ID) 1.1.1.1, Interface address 192.168.30.1
 No backup designated router on this network
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
   No Hellos (Passive interface)
 Index 1/1, flood queue length 0
 Next 0x0(0)/0x0(0)
 Last flood scan length is 1, maximum is 1
 Last flood scan time is 0 msec, maximum is 0 msec
 Neighbor Count is 0, Adjacent neighbor count is 0
 Suppress hello for 0 neighbor(s)
FastEthernet0/0.40 is up, line protocol is up
Internet address is 192.168.40.1/24, Area 0
 Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
 Transmit Delay is 1 sec, State DR, Priority 1
 Designated Router (ID) 1.1.1.1, Interface address 192.168.40.1
 No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
```

MIAMI

Usamos el comando show ip route

0.00

MIA	MI\$show ip route
Cod	es: 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
	EL - OSDE external tune 1 E2 - OSDE external tune 2 E - EGD
	i - IS-IS LI - IS-IS level-1 L2 - IS-IS level-2 is - IS-IS inter area
	* - candidate default II - percuser static route o - ODR
	P - periodic downloaded static route
Gat	eway of last resort is 0.0.0.0 to network 0.0.0.0
	10.0.0/24 is subnetted, 1 subnets
C	10.10.10.0 is directly connected, FastEthernet0/1
12565	172.31.0.0/30 is subnetted, 2 subnets
C	172.31.21.0 is directly connected, Serial0/0/1
C	172.31.23.0 is directly connected, Serial0/0/0
	192.168.4.0/32 is subnetted, 1 subnets
0	192.168.4.1 [110/9501] via 172.31.23.2, 00:14:27, Serial0/0/0
0.00	192.168.5.0/32 is subnetted, 1 subnets
0	192.168.5.1 [110/9501] via 172.31.23.2, 00:14:27, Serial0/0/0
	192.168.6.0/32 is subnetted, 1 subnets
0	192.168.6.1 [110/9501] via 172.31.23.2, 00:14:27, Serial0/0/0
0	192.168.30.0/24 [110/391] via 172.31.21.1, 00:18:46, Serial0/0/1
0	192.168.40.0/24 [110/391] via 172.31.21.1, 00:10:46, Serial0/0/1
0	192.168.200.0/24 [110/391] via 172.31.21.1, 00:10:46, Serial0/0/1
	209.165.200.0/29 is subnetted, 1 subnets
C	209.165.200.224 is directly connected, FastEthernet0/0
S*	0.0.0.0/0 is directly connected, FastEthernet0/0

Usamos el commando do sh ip ospf interface

```
MIAMI (config) #do sh ip ospf interface
FastEthernet0/1 is up, line protocol is up
  Internet address is 10.10.10.1/24, Area 0
  Process ID 1, Router ID 5.5.5.5, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 5.5.5.5, Interface address 10.10.10.1
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
   No Hellos (Passive interface)
  Index 1/1, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
Serial0/0/0 is up, line protocol is up
  Internet address is 172.31.23.1/30, Area 0
  Process ID 1, Router ID 5.5.5.5, Network Type POINT-TO-POINT, Cost: 9500
  Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:03
  Index 2/2, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 1 , Adjacent neighbor count is 1
   Adjacent with neighbor 8.8.8.8
  Suppress hello for 0 neighbor(s)
Serial0/0/1 is up, line protocol is up
  Internet address is 172.31.21.2/30, Area 0
  Process ID 1, Router ID 5.5.5.5, Network Type POINT-TO-POINT, Cost: 390
  Transmit Delay is 1 sec, State FOINT-TO-POINT, Priority 0
  No designated router on this network
```

BUENOSAIRES

Usamos el comando show ip route

BUENOSAIRES#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 0.0.0.0 to network 0.0.0.0 10.0.0/24 is subnetted, 1 subnets 0 10.10.10.0 [110/391] via 172.31.23.1, 00:10:06, Serial0/0/1 172.31.0.0/30 is subnetted, 2 subnets 0 172.31.21.0 [110/780] via 172.31.23.1, 00:10:06, Serial0/0/1 C 172.31.23.0 is directly connected, Serial0/0/1 192.168.4.0/24 is directly connected, Loopback4 C C 192.168.5.0/24 is directly connected, Loopback5 C 192.168.6.0/24 is directly connected, Loopback6 192.168.30.0/24 [110/781] via 172.31.23.1, 00:10:06, Seria10/0/1 0 192.168.40.0/24 [110/781] via 172.31.23.1, 00:10:06, Serial0/0/1 0 192.168.200.0/24 [110/781] via 172.31.23.1, 00:10:06, Seria10/0/1 0 209.165.200.0/29 is subnetted, 1 subnets 0 209.165.200.224 [110/391] via 172.31.23.1, 00:10:06, Serial0/0/1 S* 0.0.0.0/0 is directly connected, Serial0/0/1

Usamos el commando do sh ip ospf interface

```
BUENOSAIRES (config)#do sh ip ospf interface
Loopback4 is up, line protocol is up
 Internet address is 192.168.4.1/24, Area 0
 Process ID 1, Router ID 8.8.8.8, Network Type LOOPBACK, Cost: 1
 Loopback interface is treated as a stub Host
Loopback5 is up, line protocol is up
 Internet address is 192.160.5.1/24, Area 0
 Process ID 1, Router ID 8.8.8.8, Network Type LOOPBACK, Cost: 1
 Loopback interface is treated as a stub Host
Loopback6 is up, line protocol is up
 Internet address is 192.160.6.1/24, Area 0
 Process ID 1, Router ID 0.0.0.0, Network Type LOOPBACK, Cost: 1
 Loopback interface is treated as a stub Host
Serial0/0/1 is up, line protocol is up
 Internet address is 172.31.23.2/30, Area 0
 Process ID 1, Router ID 0.0.0.0, Network Type POINT-TO-POINT, Cost: 390
 Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
 No designated router on this network
 No backup designated router on this network
 Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
   Hello due in 00:00:00
 Index 4/4, flood queue length 0
 Next 0x0(0)/0x0(0)
 Last flood scan length is 1, maximum is 1
 Last flood scan time is 0 msec, maximum is 0 msec
 Neighbor Count is 1 , Adjacent neighbor count is 1
   Adjacent with neighbor 5.5.5.5
 Suppress hello for 0 neighbor(s)
```

 Configurar VLANs, Puertos troncales, puertos de acceso, encapsulamiento, Inter-VLAN Routing y Seguridad en los Switches acorde a la topología de red establecida.

Configure terminal Vlan 30 Name ADMINISTRACION Exit Vlan 40 Name MERCADO Exit Vlan 200 Name MANTENIMIENTO Exit Int f0/3 Switchport mode trunk Switchport trunk native vlan Int f0/24 Switchport mode trunk Switchport trunk native vlan 1 No shutdown Exit Line console 0 Pass cisco Line vty 0 4 Enable secret cisco Int range f0/1 Switchport mode access Switchport access vlan 30 Exit

BOGOTA

Int f0/0.30 Description accounting LAN Encapsulation dot1q 30 Ip address 192.168.30.1 255.255.255.0 Int f0/0.40 Description accounting LAN Encapsulation dot1q 40 Ip address 192.168.40.1 255.255.255.0 Int f0/0.200 Description accounting LAN Encapsulation dot1q 200 Ip address 192.168.200.1 255.255.255.0 Int f0/0 No shutdown

```
Password:
Sl#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Sl(config) #vlan 30
S1(config-vlan) #name ADMINISTRACION
S1(config-vlan) #EXIT
S1(config)#vlan 40
S1(config-vlan) #name MERCADEO
S1(config-vlan) #EXIT
S1(config) #int f0/3
S1(config-if) fswitchport mode trunk
Sl(config-if) $switchport trunk native vlan 1
S1(config-if) #int f0/24
S1(config-if) #switchport mode trunk
Sl(config-if) #switchport trunk native vlanl
§ Invalid input detected at '^' marker.
S1(config-if) #switchport trunk native vlan 1
S1(config-if) #no shutdown
S1(config-if) #exit
S1(config) #line console
% Incomplete command.
S1(config) #line console 0
S1(config-line) fline console
% Invalid input detected at '^' marker.
S1(config-line) fconsole
S Invalid input detected at '^' marker.
Sl(config-line) #pass cisco
Sl(config-line) #line vty 0 4
Sl(config-line) #enable secret cisco
S1(config)#
```

4. En el Switch 3 deshabilitar DNS lookup

S3

No dns lookup No ip domain-lookup exit

5. Asignar direcciones IP a los Switches acorde a los lineamientos.

S1

Configure terminal Int vlan 1 Ip address 192.168.99.2 255.255.255.0 No shutdown Exit **S**3

Configure terminal Int vlan 1 Ip address 192.168.99.3 255.255.255.0 No shutdown Exit

6. Desactivar todas las interfaces que no sean utilizadas en el esquema de red.

S1

Configure terminal Int f0/1 Switchport mode access Switch access vlan 30 Int range f0/2, f0/4-23, g0/1-2 Shutdown exit

- 7. Implement DHCP and NAT for IPv4
- 8. Configurar R1 como servidor DHCP para las VLANs 30 y 40.
- 9. Reservar las primeras 30 direcciones IP de las VLAN 30 y 40 para configuraciones estáticas.

	Name: ADMINISTRACION	
Configurar DHCP pool para VLAN	DNS-Server: 10.10.10.11	
30	Domain-Name: ccna-unad.com	
	Establecer default gateway.	
	Name: MERCADEO	
Configurar DHCP pool para	DNS-Server: 10.10.10.11	
VLAN 40	Domain-Name: ccna-unad.com	
	Establecer default gateway.	

BOGOTA

Configure terminal

Ip dhcp excluded-address 192.168.30.1 192.168.30.30

Ip dhcp excluded-address 192.168.40.1 192.168.40.30

Ip dhcp pool ADMINISTRACION

Dns-server 10.10.10.11

Ip domain-name ccna-unad.com

Default-router 192.168.30.1

Network 192.168.30.0 255.255.255.0

Exit

Ip dhcp MERCADEO

Dns-server 10.10.10.11

Ip domain-name ccna-unad.com

Ip dhcp pool MERCADEO

Default-router 192.168.40.0 255.255.255.0

Exit

```
BOGOTA>en
Password:
BOGOTA#configure terminal
Enter configuration commands, one per line. End with CNTL/2.
BOGOTA(config) #ip dhcp exc
* Incomplete command,
BOGOTA(config) #ip dhcp excluded-address 192.168.30.1 192.168.30.30
BOGOTA(config) #ip dhcp excluded-address 192.168.40.1 192.168.40.30
BOGOTA(config) #ip dhep pool ADMINISTRACION
BOGOTA(dhcp-config)#dns-server 10.10.10.11
BOGOTA(dhcp-config)#domain-name ccna-unad.com
% Invalid input detected at '^' marker.
BOGOTA(dhcp-config) #ip domain-name ccna-unad.com
BOGOTA(config)#default-router 192.168.30.0
Invalid input detected at '^' marker.
BOGOTA(config) #ip dhep pool ADMINISTRACION
BOGOTA(dhcp-config)#default-router 192.168.30.1
BOGOTA(dhcp-config) #network 192.168.30.0 255.255.0
BOGOTA(dhcp-config) #exit
BOGOTA(config) #ip dchp pool MERCADEO
§ Invalid input detected at '^' marker.
BOGOTA(config) #ip dhep pool MERCADEO
BOGOTA(dhcp-config) #dns-server 10.10.10.11
BOGOTA(dhep-config) #ip domain-name cena-unad.com
BOGOTA(config) #ip dhep pool MERCADEO
BOGOTA(dhcp-config)#default-router 192.168.40.1
BOGOTA(dhcp-config)#network 192.168.40.0 255.255.255.0
BOGOTA(dhcp-config) #exit
BOGOTA(config) #
```

10. Configurar NAT en R2 para permitir que los host puedan salir a internet

MIAMI

Configure terminal User webuser privilege 15 secret cisco12345 *Ip http server Ip http authentication local* Ip nat inside source static 10.10.10.10 209.165.200.229 Int f0/0 Ip nat outsideint f0/1 Ip nat inside Exit Configure terminal Access-list 1 permit 192.168.30.0 0.0.0.255 Access-list 1 permit 192.168.40.0 0.0.0.255 Access-list 1 permit 192.168.4.0 0.0.3.255 Ip nat pool INTERNET 209.165.200.225 209.165.200.229 netmask 255.255.255.248 exit

11. Configurar al menos dos listas de acceso de tipo estándar a su criterio en para restringir o permitir tráfico desde R1 o R3 hacia R2.

MIAMI

Configure terminal Ip access-list standard ADMIN Permit host 172.31.21.1 Exit Line vty 0 4 Access-class ADMIN in exit

12. Configurar al menos dos listas de acceso de tipo extendido o nombradas a su criterio en para restringir o permitir tráfico desde R1 o R3 hacia R2.

MIAMI

Configure terminal Access-list 100 permit tcp any host 209.165.200.229 eq www Access-list 100 permit icmp any any echo-reply Exit 13. Verificar procesos de comunicación y redireccionamiento de tráfico en los routers mediante el uso de Ping y Traceroute



RC-A

Physical	Config	Desktop	Programming	Attributes		
Command	Prompt					
Dacket	Tracer	PC Comman	d Line 1 0			
Called	- 11acer	20 00mman	a hine 1.0			
C:\>p1	.ng 209.1	.65.200.23	0			
Pingin	g 209.16	5.200.230	with 32 byt	es of data	.:	
Reques	t timed	out.				
Reply from 209.165.200.230: bytes=32 time=13ms TTL=126						
Reply	Reply from 209.165.200.230: bytes=32 time=18ms TTL=126					
Reply from 209 165 200 230: bytes=32 time=30ms TTL=126					s TTL=126	
Ding						
Ping statistics for 209.165.200.230:						
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),						
Approximate round trip times in milli-seconds:						
Minimum = 13ms, Maximum = 30ms, Average = 20ms						
C:\>						

RC-C

Physical	Config	Desktop	Programming	Attributes	
Command	Prompt				
Packet	: Trace	r PC Comman	d Line 1.0		
C:\>pi	ng 209	165,200,23	0		
01 (° p.					
Dingir	va 209	165 200 230	with 32 but	as of data	-
Filigiti	ig 200.	103.200.230	WIGH 22 DYC	es or uaba	•
Doply	from 2	09 165 200	220: but oc=2	2 time=16m	- 771-126
Reply	From 2	09.165.200.	230: bytes-3	2 time-10m	5 IIL-126
Reply	From 2	09.165.200.	230: bytes=3	2 time=13m	5 111=126
Reply	from 2	09.165.200.	230: bytes=3	2 time=12m	5 TTL=126
Reply	from 2	09.165.200.	230: bytes=3	2 time=15m	5 TTL=126
Ping s	statist	ics for 209	.165.200.230	:	
Pa	ackets:	Sent = 4 ,	Received = 4	, Lost = 0	(0% loss),
Approximate round trip times in milli-seconds:					
Minimum = 12ms, Maximum = 16ms, Average = 14ms					
C:\>					

🧶 РС-С				
Physical Config	Desktop	Programming	Attributes	
Command Prompt				
Reply from 209	9.165.200.2	30: bytes=3	2 time=16ms TTL=126	
Reply from 209	9.165.200.2	30: bytes=3	2 time=13ms TTL=126	
Reply from 209	9.165.200.2	30: bytes=3	2 time=12ms IIL=126	
Reply flow 20.		So: Dytes-3	2 GIME-IONS IID-120	
Ping statistic	s for 209.	165.200.230) :	
Packets: S	Sent = 4, R	leceived = 4	, Lost = 0 (0% loss),	
Approximate ro	ound trip t	imes in mil	li-seconds:	
Minimum =	12ms, Maxi	mum = 16ms,	Average = 14ms	
C:\>traceroute	2			
Invalid Comman	nd.			
C:\>trace rout	e			
Invalid Comman	nd.			
C:\≥tracert 209 165 200 230				
Tracing route	to 209.165	.200.230 ov	ver a maximum of 30 hops:	
1 2 ms	3 ms	0 ms	192.168.40.1	
2 12 ms	20 ms	12 ms	172.31.21.2	
3 14 ms	12 ms	12 ms	209.165.200.230	
Irace complete	÷.			
C:\>				



RC-A

Physical	Config	Desktop	Programming	Attributes	
Command	Prompt				
C:\>					
C:\>pi	ng 10.10	0.10.10			
Pingin	ug 10.10.	.10.10 wit	h 32 bytes o	f data:	
Reques	t timed	out.			
Reply	from 10.	.10.10.10:	bytes=32 ti	me=13ms TT	L=126
Reply	from 10.	.10.10.10:	bytes=32 ti	me=15ms TT	L=126
Reply	from 10.	.10.10.10:	bytes=32 ti	me=15ms TT	L=126
Dime		5 10	10 10 10-		
Ping s	Catistic	25 for 10.	10.10.10: Doctored - 0	Teet - 1	
Pa	CKets: 2	bent = 4,	Received = 3	, Lost = 1	(25% 1055),
Approx	imate ro	lana trip	cimes in mil	li-seconds	1.4
	- m1mum –	ISMS, Hax	Imum - Ioms,	Average -	14ms
C-\>ni	ng 192 1	168 40 1			
01 (* p1					
Pinging 192 168 40 1 with 32 bytes of data:					
	· · · · · ·				
Reply	from 192	2.168.40.1	: bytes=32 t	ime=11ms T	TL=255
Reply	from 192	2.168.40.1	: bytes=32 t	ime=13ms T	TL=255
Reply from 192.168.40.1: bytes=32 time<1ms TTL=255					
Reply	from 192	2.168.40.1	: bytes=32 t	ime=13ms T	TL=255
Ping s	tatistic	es for 192	.168.40.1:		
Pa	ckets: S	Sent = 4 ,	Received = 4	, Lost = 0	(0% loss),
Approx	imate ro	ound trip	times in mil	li-seconds	

CONCLUSIONES

Este curso de profundización ha mostrado que es posible diseñar y poner en funcionamiento una red de comunicación integrando varios equipos cisco y elementos de interconexión.

En el desarrollo de la práctica pudimos observar que en la implementación de una red todos los aspectos son importantes empezando por el nombre del equipo y así mismo todos los pasos siguientes en la configuración.

Se ha podido reforzar el concepto de la utilidad de las herramientas cisco y su plataforma de aprendizaje interactivo. La colaboración entre estudiantes y tutores ha contribuido mucho en la satisfacción y bienestar de todos los estudiantes.

Con la orientación de los tutores los grupos colaborativos de estudiantes motivados por el nuevo conocimiento, trabajando de forma colaborativa y ordenada hemos logrado llevar a cabo este diplomado con gran éxito.

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