CURSO DE PROFUNDIZACION CISCO

CASO DE ESTUDIO CCNA1 Y CCNA2

ROSA LUDY JAIMES PARRA

CODIGO: 33516357

UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA – UNAD

ESCUELA DE CIENCIAS BÁSICAS, TECNOLOGÍA E INGENIERÍA

INGENIERÍA DE SISTEMAS

CURSO DE PROFUNDIZACION CISCO

CASO DE ESTUDIO CCNA1 Y CCNA2

MONOGRAFIA PARA OPTAR AL TITULO DE INGENIERA DE SISTEMAS

ROSA LUDY JAIMES PARRA

CODIGO: 33516357

TUTOR:

ING. YHON JERSON ROBLES PUENTES

UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA – UNAD

ESCUELA DE CIENCIAS BÁSICAS, TECNOLOGÍA E INGENIERÍA

INGENIERÍA DE SISTEMAS

JUNIO 20 DE 2013

DEDICATORIA

A Dios total agradecimiento por haberme permitido cumplir uno de mis objetivos trazados en mi vida, a mis padres por su apoyo incondicional, por su buenos consejos, por el amor y motivación a seguir adelante, a mi esposo e hijo por su amor y comprensión ante las dificultades presentadas, a la universidad UNAD por estar más cerca que quienes queremos salir adelante, a mis compañeros y amigos por su apoyo en el desarrollo de nuestra formación profesional.

Tabla de contenido

LISTA DE ILUSTRACIONES

LISTA DE TABLAS

JUSTIFICACION

El curso de profundización a travez del programa Cisco Networking Academy, nos proporciona un contenido bastante significativo para nuestro crecimiento profesional, el cual hace que nuestro desempeño en cada una de las labores que emprendemos surja de la mejor manera.
A través de este programa se logró desarrollar varias actividades el cual evalúan nuestro aprendizaje en el desarrollo del curso, permitiendo desarrollar actividades prácticas que permiten demostrar nuestras habilidades en la creación de redes y subredes a travez del programa packet tracer.

En el presente trabajo se desarrollaron dos casos de estudio donde se emplearon los protocolos de enrutamiento planteados en el módulo de estudio el cual fueron desarrolladas con el uso de la aplicación packet tracer.

OBJETIVOS

- Diseñar la topología de red propuesta para cada uno de los casos de estudio CCNA1 y CCNA2
- Elaborar las tablas donde identifique número de host, Gateway, primer y último equipo broadcast,
- Aplicar una configuración básica a los dispositivos según el caso propuesto.
- Implementar el protocolo RIP y OSPF para los casos1 y 2
- Diseñar y documentar un esquema de direccionamiento según los requisitos de la guia.
- Configurar una prioridad de routers y RID.
- Desactivación de las actualizaciones de enrutamiento en las interfaces adecuadas.
- Verificación de la completa conectividad entre todos los dispositivos de la topología.

CASO DE ESTUDIO: CCNA 1 EXPLORATION

Una empresa denominada COMERCIANTES S.A. desea implementar una red WAN acorde con la estructura que se ilustra en la siguiente figura.

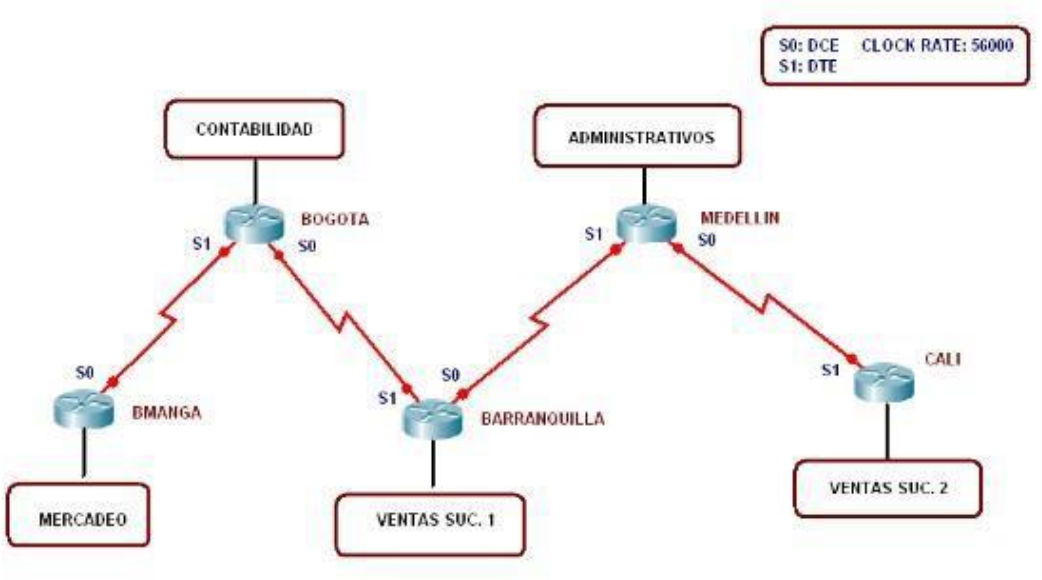

Ilustración 1: Topologia Caso De Estudio CCNA1

La cantidad de host requeridos por cada una de las LAN es la siguiente:

Contabilidad: 15

Mercadeo: 10

Ventas Sucursal 1 : 30

Ventas Sucursal 2 : 40

Administrativos: 25

Para el desarrollo de esta actividad se requiere un protocolo de enrutamiento RIP versión 2, que los puertos seriales 0 sean terminales DCE y lo puerto seriales 1 sean terminales DTE.

TABLA DE DIRECCIONES POR CADA LAN CCNA1

LAN	DIRECCIÓN DE RED	MÁSCARA DE SUBRED	GATEWAY	PRIMER HOST	ULTIMO HOST	DIRECCIÓN DE
Ventas Suc 2	192.168.1.0	255.255.255.192	192.168.1.1	192.168.1.2	192.168.1.6	192.168.1.63
Ventas suc 1	192.168.2.0	255.255.255.192	192.168.2.1	192.168.2.2	192.168.2.6	192.168.2.63
Administrativo	192.168.3.0	255.255.255.224	192.168.3.1	192.168.3.2	192.168.3.3	192.168.3.31
Contabilidad	192.168.4.0	255.255.255.224	192.168.4.1	192.168.4.2	192.168.4.3	192.168.4.31
Mercadeo	192.168.5.0	255.255.255.240	192.168.5.1	192.168.5.2	192.168.5.1	192.168.5.15

Tabla 1: Direccionamiento para cada LAN

En esta tabla podemos encontrar la dirección de red para cada Lan propuesta para la solución del caso CCNA1, es importantes identificar estas direcciones de red el cual nos permiten desarrollar la topología en la aplicación Packet tracer de manera más rápida.

TABLA DE DIRECCIONES POR CADA CONEXIÓN SERIAL

	Dirección IP s 0	Dirección IP s1	Dirección de BROADCAST	Máscara de subred
Bmanga-Bogotá	172.16.1.1	172.16.1.2	172.16.1.3	255.255.255.252
Bogotá-Bquilla	172.16.2.1	172.16.2.2	172.16.2.3	255.255.255.252
Bquilla-Medellín	172.16.3.1	172.16.3.2	172.16.3.3	255.255.255.252
Medellín-Cali	172.16.4.1	172.16.4.2	172.16.4.3	255.255.255.252

Tabla 2: Direccionamiento por cada conexión serial

CONFIGURACION PARA CADA ROUTER

ROUTER BUCARAMANGA	
FastEthernetF0/0	192.168.5.1
Serial S 0/1/0	172.16.1.1
Serial S 0/1/1	
ROUTER BOGOTA	
FastEthernetF0/0	192.168.4.1
Serial S 0/1/0	172.16.2.1
Serial S 0/1/1	172.16.1.2
ROUTER BARRANQUILLA	
FastEthernetF0/0	192.168.3.1
Serial S 0/1/0	172.16.3.1
Serial S 0/1/1	172.16.2.2
ROUTER MEDELLIN	
FastEthernetF0/0	192.168.2.1
Serial S 0/1/0	172.16.4.1
Serial S 0/1/1	172.16.3.2
ROUTER CALI	
FastEthernetF0/0	192.168.1.1
Serial S 0/1/0	
Serial S 0/1/1	172.16.4.2

Tabla 3: Conexiones de routers

INTERFAZ DE CONEXIÓN RED LAN

CONFIGURACION EQUIPOS LAN MERCADEO			
MERCADEO	**DIRECCION IP**	**MASCARA**	**GATEWAY**
merc-pc 1	192.168.5.2	255.255.255.240	192.168.5.1
merc-pc 10	192.168.5.11	255.255.255.240	192.168.5.1
CONFIGURACION EQUIPOS LAN CONTABILIDAD			
MERCADEO	**DIRECCION IP**	**MASCARA**	**GATEWAY**
conta-pc 1	192.168.4.2	255.255.255.224	192.168.4.1
conta-pc 15	192.168.5.16	255.255.255.224	192.168.4.1
CONFIGURACION EQUIPOS LAN VENTAS SUCURSAL 1			
MERCADEO	**DIRECCION IP**	**MASCARA**	**GATEWAY**
suc1-pc 1	192.168.2.2	255.255.255.192	192.168.2.1

suc1-pc 30	192.168.2.31	255.255.255.192	192.168.2.1
CONFIGURACION EQUIPOS LAN ADMINISTRATIVOS			
MERCADEO	**DIRECCION IP**	**MASCARA**	**GATEWAY**
adm-pc 1	192.168.3.2	255.255.255.224	192.168.3.1
adm-pc 25	192.168.3.26	255.255.255.224	192.168.3.1
CONFIGURACION EQUIPOS LAN VENTAS SUCURSAL 2			
MERCADEO	**DIRECCION IP**	**MASCARA**	**GATEWAY**
suc2-pc 1	192.168.1.2	255.255.255.192	192.168.1.1
suc2-pc 40	192.168.1.41	255.255.255.192	192.168.1.1

Tabla 4: Interfaz de conexión red LAN

Configuración Del Router Bucarmanga

Bucaramanga#show running-config
Building configuration...

Current configuration : 915 bytes
!
version 12.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Bucaramanga
!
!
!
enable secret 5 1mERr$NJdjwh5wX8Ia/X8aC4RIu.
enable password cisco
!
!
!
!

```
!
!
!
!
!
!
!
!
spanning-tree mode pvst
!
!
!
!
interface FastEthernet0/0
 description interface conexion a la LAN mercadeo
 ip address 192.168.5.1 255.255.255.240
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/1/0
 description interface conexion a la WAN Bogota
 ip address 172.16.1.1 255.255.255.252
 clock rate 56000
!
interface Serial0/1/1
```

```
 no ip address
 clock rate 56000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
router rip
 version 2
 network 172.16.0.0
 network 192.168.5.0
!
ip classless
!
!
!
!
!
!
!
line con 0
 password CISCO
 login
line vty 0 4
 password CISCO
 login
!
!
!
end
```

Bucaramanga#
Bucaramanga#

Configuración Del Router Bogota

Bogota#SHOW RUNNING-CONFIG
Building configuration...

Current configuration : 969 bytes
!
version 12.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Bogota
!
!
!
enable secret 5 1mERr$NJdjwh5wX8Ia/X8aC4RIu.
enable password cisco
!
!
!
!
!
!
!

```
!
!
!
!
!
spanning-tree mode pvst
!
!
!
!
interface FastEthernet0/0
 description interface conexion a la Lan contabilidad
 ip address 192.168.4.1 255.255.255.224
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/1/0
 description interface conexion a la WAN Barranquilla
 ip address 172.16.2.1 255.255.255.252
 clock rate 56000
!
interface Serial0/1/1
 description interface conexion a la WAN Bucaramanga
 ip address 172.16.1.2 255.255.255.252
!
```

```
interface Vlan1
 no ip address
 shutdown
!
router rip
 version 2
 network 172.16.0.0
 network 192.168.4.0
!
ip classless
!
!
!
!
!
!
!
line con 0
 password CISCO
 login
line vty 0 4
 password CISCO
 login
!
!
!
end


Bogota#
```

Configuración Del Router Barranquilla

```
Barranquilla#show running-config
Building configuration...

Current configuration : 970 bytes
!
version 12.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Barranquilla
!
!
!
enable secret 5 $1$mERr$NJdjwh5wX8Ia/X8aC4RIu.
enable password cisco
!
!
!
!
!
!
!
!
!
!
!
!
!
```

```
spanning-tree mode pvst
!
!
!
!
interface FastEthernet0/0
 description interface conexion a la lan ventas sucursal1
 ip address 192.168.2.1 255.255.255.192
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/1/0
 description interface conexion a la WAN Medellin
 ip address 172.16.3.1 255.255.255.252
 clock rate 56000
!
interface Serial0/1/1
 description interface conexion a la WAN Bogota
 ip address 172.16.2.2 255.255.255.252
!
interface Vlan1
 no ip address
 shutdown
!
router rip
```

```
 version 2
 network 172.16.0.0
 network 192.168.2.0
!
ip classless
!
!
!
!
!
!
!
line con 0
 password CISCO
 login
line vty 0 4
 password CISCO
 login
!
!
!
end
```

Barranquilla#

Configuración Del Router Medellin

Medellin#show running-config
Building configuration...

```
Current configuration : 945 bytes
!
version 12.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Medellin
!
!
!
enable secret 5 $1$mERr$NJdjwh5wX8Ia/X8aC4RIu.
!
!
!
!
!
!
!
!
!
!
!
!
spanning-tree mode pvst
!
!
!
!
interface FastEthernet0/0
 description interface conexion a la Lan administrativos
```

```
 ip address 192.168.3.1 255.255.255.224
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/1/0
 description interface conexion a la WAN Cali
 ip address 172.16.4.1 255.255.255.252
 clock rate 56000
!
interface Serial0/1/1
 description interface conexion a la WAN Barranquilla
 ip address 172.16.3.2 255.255.255.252
!
interface Vlan1
 no ip address
 shutdown
!
router rip
 version 2
 network 172.16.0.0
 network 192.168.3.0
!
ip classless
!
!
```

```
!
!
!
!
!
line con 0
 password CISCO
 login
line vty 0 4
 password CISCO
 login
!
!
!
end


Medellin#
```

Configuración Del Router Cali

```
Cali#show running-config
Building configuration...

Current configuration : 849 bytes
!
version 12.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
```

```
hostname Cali
!
!
!
enable secret 5 $1$mERr$NJdjwh5wX8Ia/X8aC4RIu.
!
!
!
!
!
!
!
!
!
!
!
!
spanning-tree mode pvst
!
!
!
!
interface FastEthernet0/0
 description interface conexion a la Lan ventas suc 2
 ip address 192.168.1.1 255.255.255.192
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 duplex auto
```

```
 speed auto
 shutdown
!
interface Serial0/1/0
 no ip address
 shutdown
!
interface Serial0/1/1
 description interface conexion a la WAN Medellin
 ip address 172.16.4.2 255.255.255.252
!
interface Vlan1
 no ip address
 shutdown
!
router rip
 version 2
 network 172.16.0.0
 network 192.168.1.0
!
ip classless
!
!
!
!
!
!
!
line con 0
 password CISCO
line vty 0 4
```

```
 password CISCO
 login
!
!
!
end


Cali#
```

TOPOLOGIA DE RED

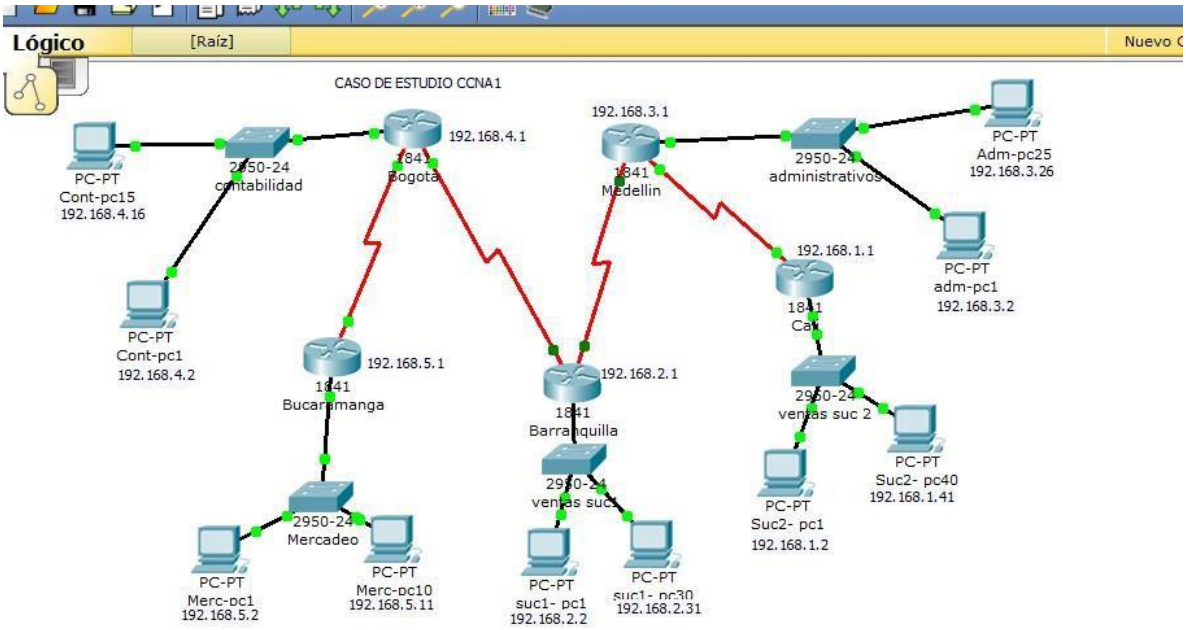

Ilustración 2: Topologia de Red Caso de Estudio CCNA1

PRUEBAS DE CONEXIÓN

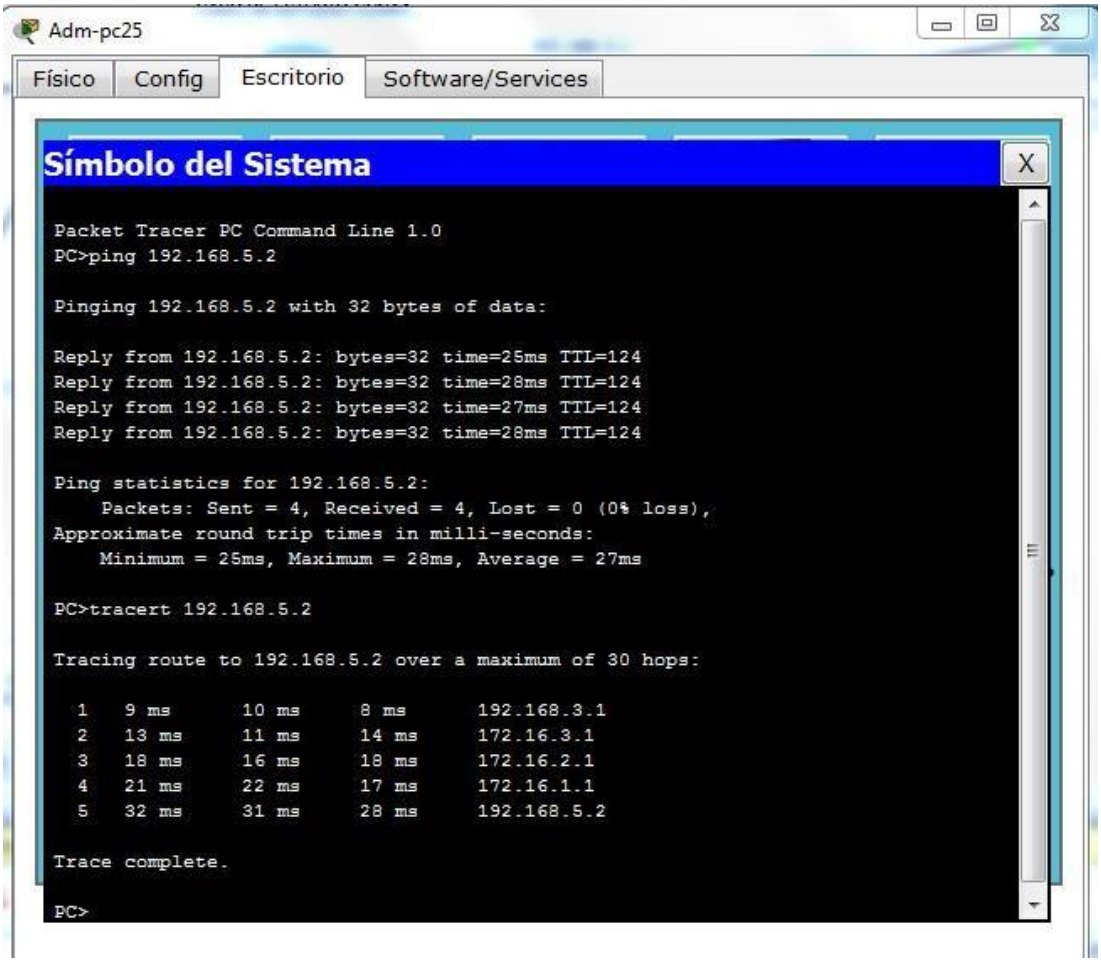

Ilustración 3: Prueba de conexión desde Adm-pc25 a Merc-pc1

Para esta prueba de conexión se utilizo el comado ping y el comando traceroute, verificando el buen funcionamiento de la topología.

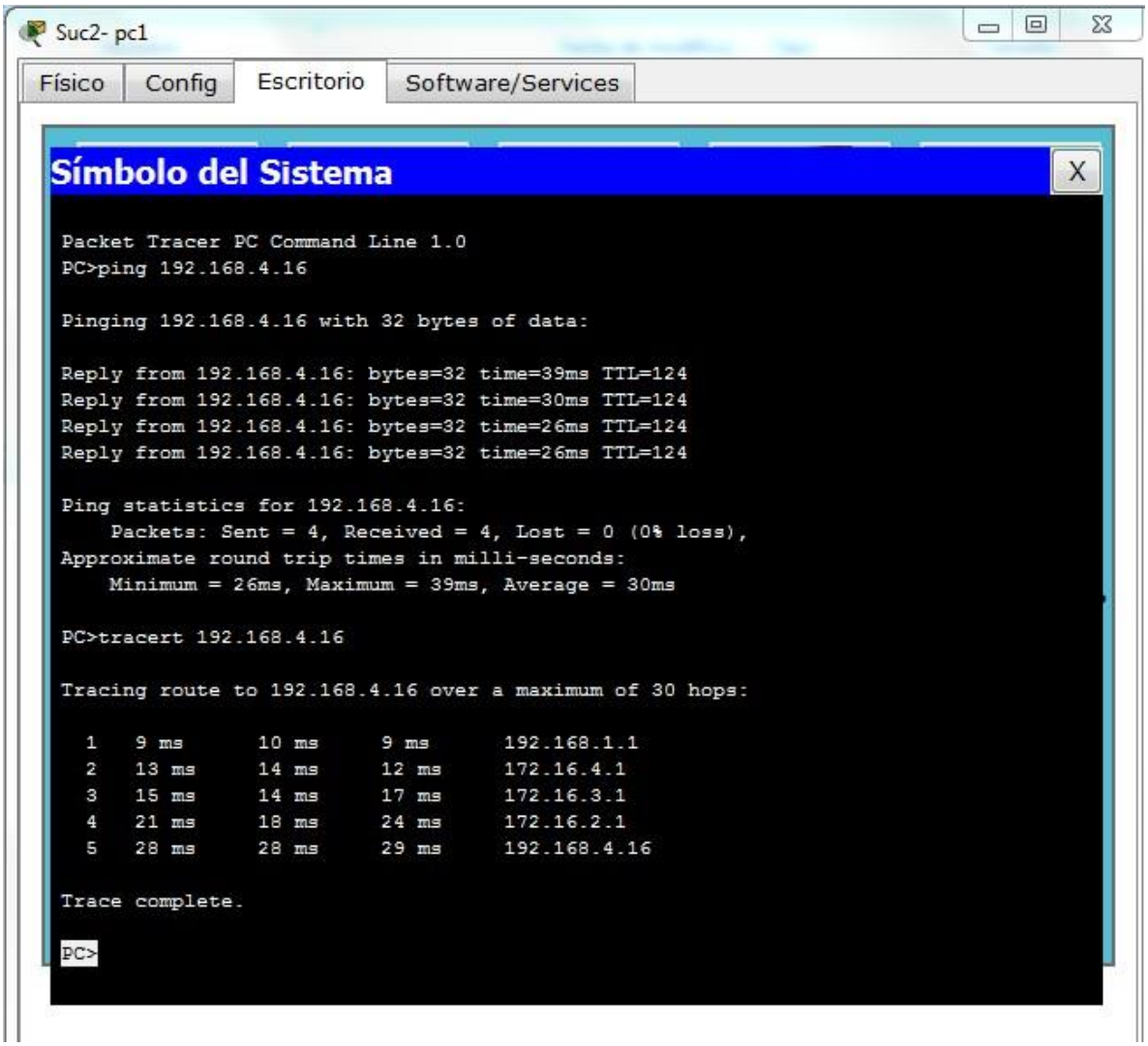

Ilustración 4: Prueba de conexión desde Suc2-pc1 a Cont-pc15

CASO DE ESTUDIO CCNA 2 EXPLORATION

Se desea diseñar todo el esquema de enrutamiento para la topología que se ilustra en la siguiente figura, acorde con las pautas establecidas en cada una de las tareas que se definen a continuación. El estudiante deberá realizar el diseño completo y documentarlo indicando paso a paso la solución del mismo y las estrategias que utilizó para alcanzar el objetivo.

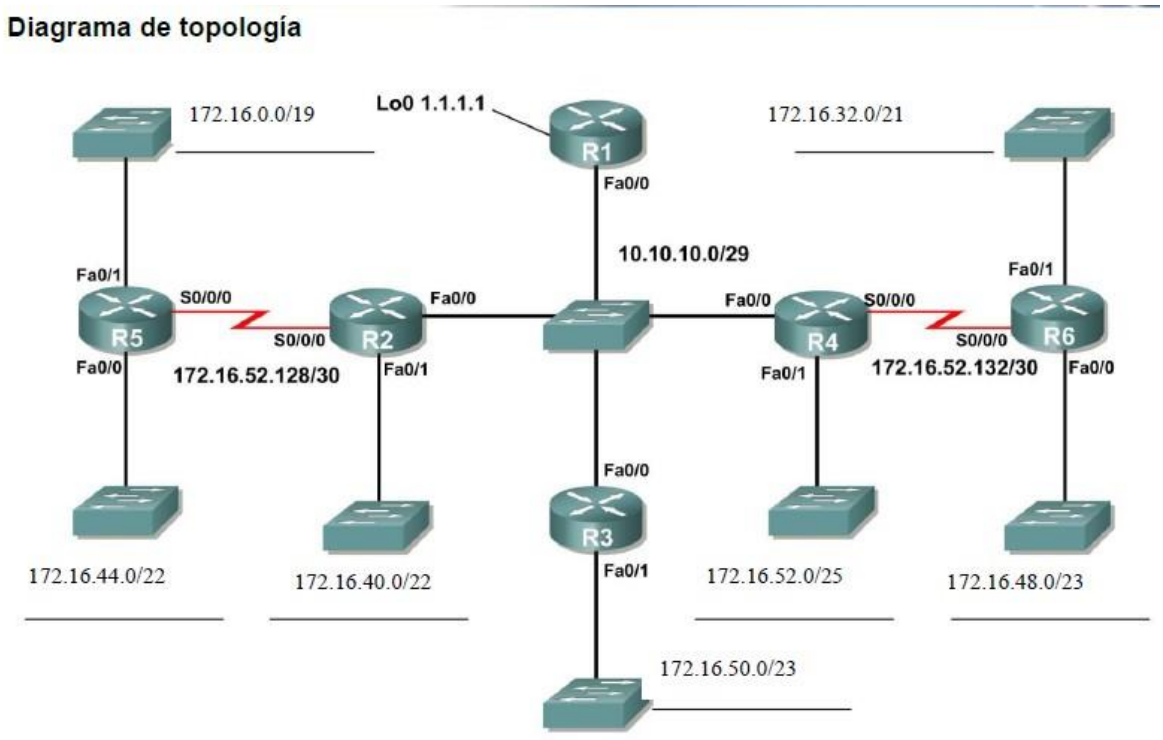

Ilustración 5: TopologiaCaso de Estudio CCNA2

Tarea 1:

Diseño y documentación de un esquema de direccionamiento

Utilice la 172.16.0.0/16 para crear un esquema de direccionamiento eficiente que cumpla los siguientes requisitos:

Nombre de host	Interfaz	Cantidad de hosts
R2	**Fa0/1**	1000
R3	**Fa0/1**	400
R4	**Fa0/1**	120
R5	**Fa0/1**	6000
R5	**Fa0/0**	800
R6	**Fa0/1**	2000
R6	**Fa0/0**	500

TABLA DE DIRECCIONES CCNA2

Dispositivo	Interfaz	Dirección IP	Máscara de subred
R1	Fa0/0	10.10.10.1	255.255.255.248
	Loopback0	1.1.1.1	255.255.255.255
R2	Fa0/0	10.10.10.2	255.255.255.248
	Fa0/1	172.16.40.1	255.255.252.0
	S0/0/0	172.16.52.130	255.255.255.252
R3	Fa0/0	10.10.10.3	255.255.255.248
	Fa0/1	172.16.50.1	255.255.254.0

R4	Fa0/0	10.10.10.4	255.255.255.248
	Fa0/1	172.16.52.1	255.255.255.128
	S0/0/0	172.16.52.133	255.255.255.252
R5	Fa0/0	172.16.44.1	255.255.252.0
	Fa0/1	172.16.0.1	255.255.224.0
	S0/0/0	172.16.52.129	255.255.255.252
R6	Fa0/0	172.16.48.1	255.255.254.0
	Fa0/1	172.16.32.1	255.255.248.0
	S0/0/0	172.16.52.134	255.255.255.252

Tabla 5: Direccionamiento por cada Routeç

Se debe tener en cuenta que para establecer las direcciones IP para cada subred debe hacer uso de VLSM e identificar para cada una de ellas las siguientes direcciones IP:

1. Dirección de Subred

2. Dirección de Gateway

3. Dirección IP del primer PC de la subred

4. Dirección IP de último PC requerido en la subred. (Por ejemplo: Si la subred posee 800 host, cuál será la dirección IP del Host 800)

5. Dirección de Broadcast

6. Máscara de Subred

TABLA DE DIRECCIONES PARA CADA SUBRED

SUBRED	No HOST	N	DESCRIPCION	DIRECCION IP	MASCARA DE SUBRED
1 R5 Fa0/1	6000	13	DIR. SUBRED	172.16.0.0	255.255.224.0
			GATEWAY	172.16.0.1	
			PC1	172.16.0.2	
			PC 6000	172.16.23.113	
			BROADCAST	172.16.31.255	
2 R6 Fa0/1	2000	11	DIR. SUBRED	172.16.32.0	255.255.248.0
			GATEWAY	172.16.32.1	
			PC1	172.16.32.2	
			PC 2000	172.16.39.209	
			BROADCAST	172.16.39.255	
3 R2 Fa0/1	1000	10	DIR. SUBRED	172.16.40.0	255.255.252.0
			GATEWAY	172.16.40.1	
			PC1	172.16.40.2	
			PC 1000	172.16.43.233	
			BROADCAST	172.16.43.255	
4 R5 Fa0/0	800	10	DIR. SUBRED	172.16.44.0	255.255.252.0
			GATEWAY	172.16.44.1	
			PC1	172.16.44.2	
			PC 800	172.16.47.33	
			BROADCAST	172.16.47.255	
5 R6 Fa0/0	500	9	DIR. SUBRED	172.16.48.0	255.255.254.0
			GATEWAY	172.16.48.1	
			PC1	172.16.48.2	
			PC 500	172.16.49.245	
			BROADCAST	172.16.49.255	
6 R3 Fa0/1	400	9	DIR. SUBRED	172.16.50.0	255.255.254.0
			GATEWAY	172.16.50.1	
			PC1	172.16.50.2	
			PC 400	172.16.51.145	

			BROADCAST	172.16.51.255	
7 R4 Fa0/1	120	7	DIR. SUBRED	172.16.52.0	255.255.255.128
			GATEWAY	172.16.52.1	
			PC1	172.16.52.2	
			PC 120	172.16.52.121	
			BROADCAST	172.16.52.127	

Tabla 6: Tabla de dirrecionamiento de cada subred

RED WAN 1

DIR. SUBRED	172.16.52.128	255.255.255.252
ROUTER 5 S0	172.16.52.129	
ROUTER 2 S0	172.16.52.130	
BROADCAST	172.16.52.131	

RED WAN 2

DIR. SUBRED	172.16.52.132	255.255.255.252
ROUTER 4 S0	172.16.52.133	
ROUTER 6 S0	172.16.52.134	
BROADCAST	172.16.52.135	

Tarea 2:

Aplicación de una configuración básica.

Paso 1: En cada router, utilice el siguiente cuadro para completar las configuraciones básicas del router.

Contraseña de consola	Contraseña de VTY	Contraseña secreta de enable	Frecuencia de reloj (si corresponde)

cisco	cisco	cisco	56000

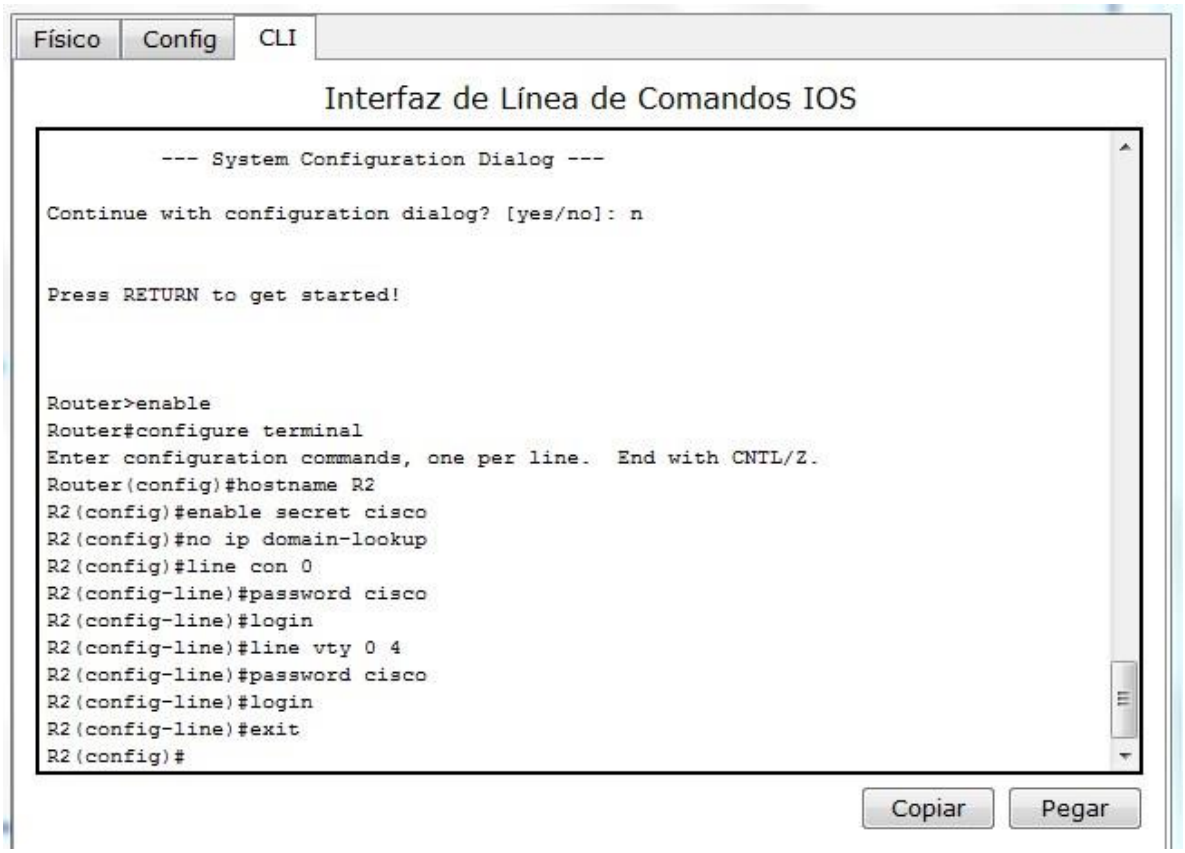

Ilustración 6: Configuracion básica del Router

Tarea 3:

Configurar el enrutamiento OSPF

Paso 1: .Configurar el enrutamiento OSPF en cada router.

Paso 2: Verifique que se hayan aprendido todas las rutas.

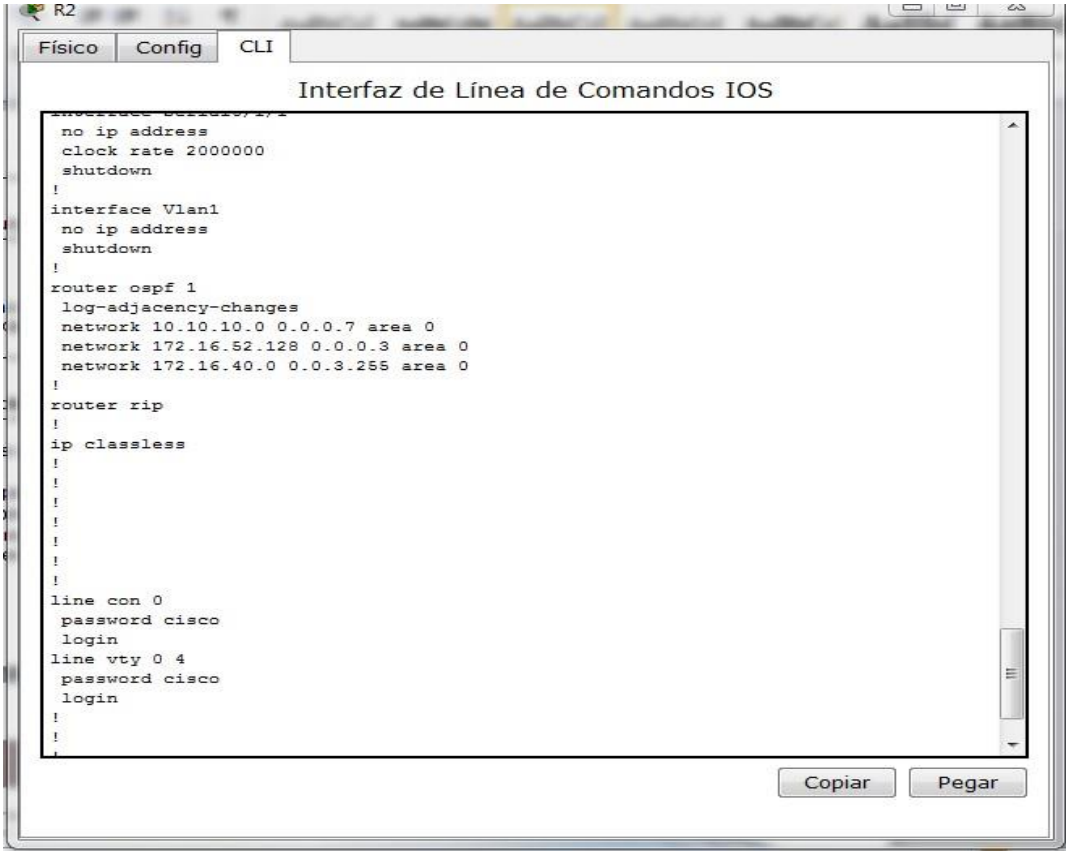

Ilustración 7: Enrutamiento OSPF

Todas la rutas han prendido correctamente al configurar el enrutamiento OSPF en cada uno de los router dispuestos en la presente topología.

Tarea 4: Ajuste refinado de OSPF

Paso 1: Utilice las siguientes pautas para completar esta tarea:

- R1 nunca participará en una elección DR/BDR.

- R2 siempre será el DR
- R3 y R4 tendrán la misma prioridad de 100
- R4 debe ser siempre el BDR

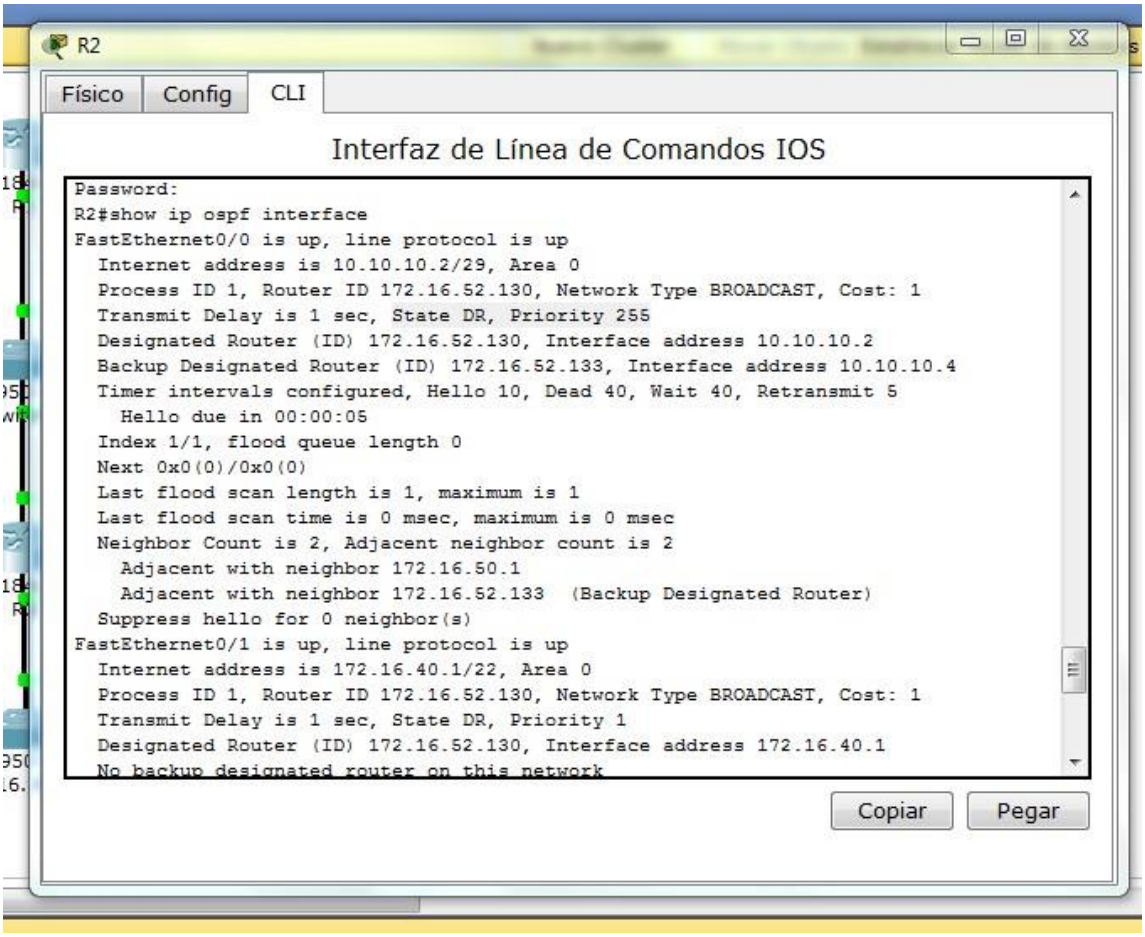

Ilustración 8:Configuracion DR

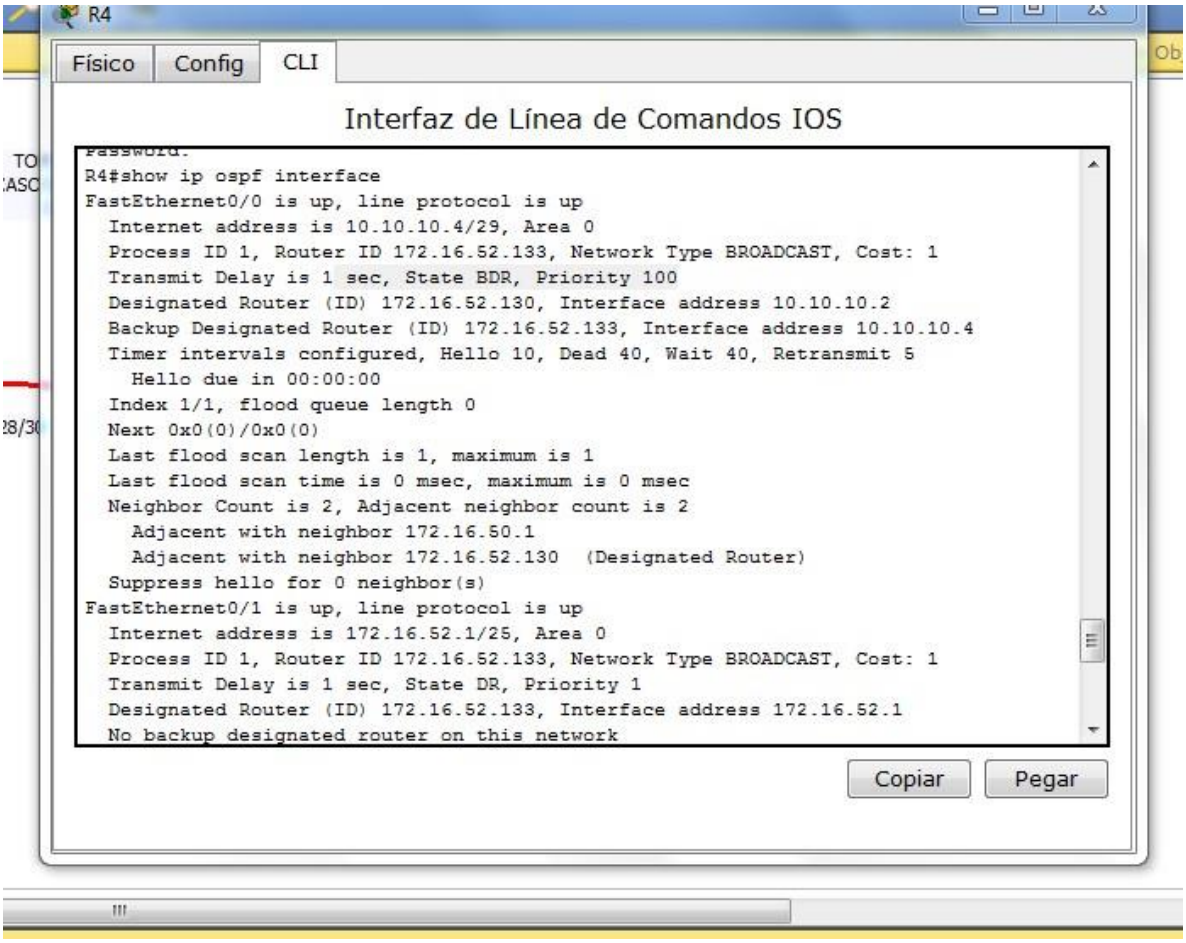

Ilustración 9: configuración BDR

Paso 2: Fuerce una elección DR/DBR.

Tarea 5: Configuración de un loopback

Paso 1: En R1 configure un loopback con una dirección 1.1.1.1/32.

Paso 2: Cree una ruta por defecto al loopback

Paso 3: Propague la ruta con actualizaciones OSPF.

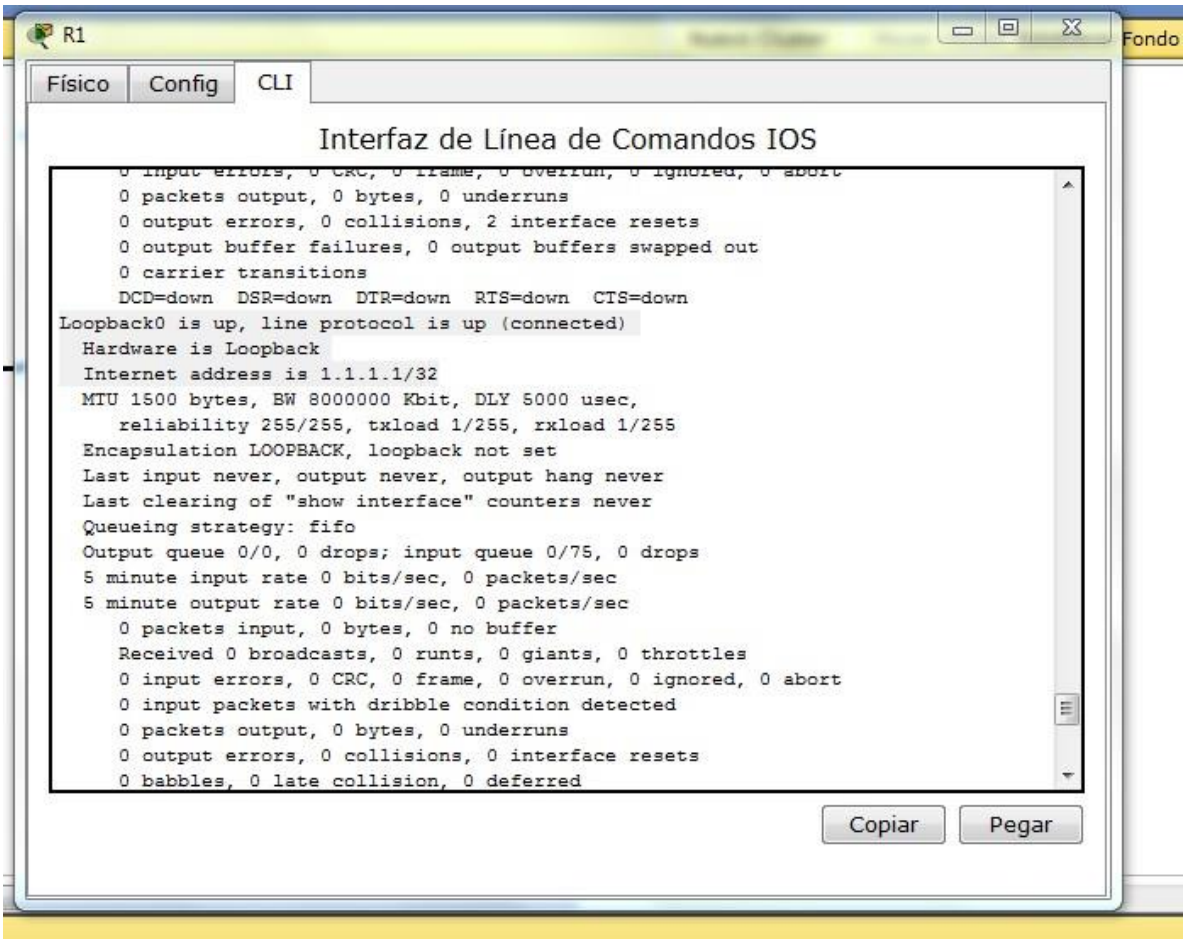

Ilustración 10: Configuracion de Loopback en R1

Tarea 6: Visualización de las actualizaciones OSPF.

Paso 1: Ingrese al modo Simulación

Paso 2: Seleccione solamente OSPF en el filtro.

Paso 3: Visualice las actualizaciones.

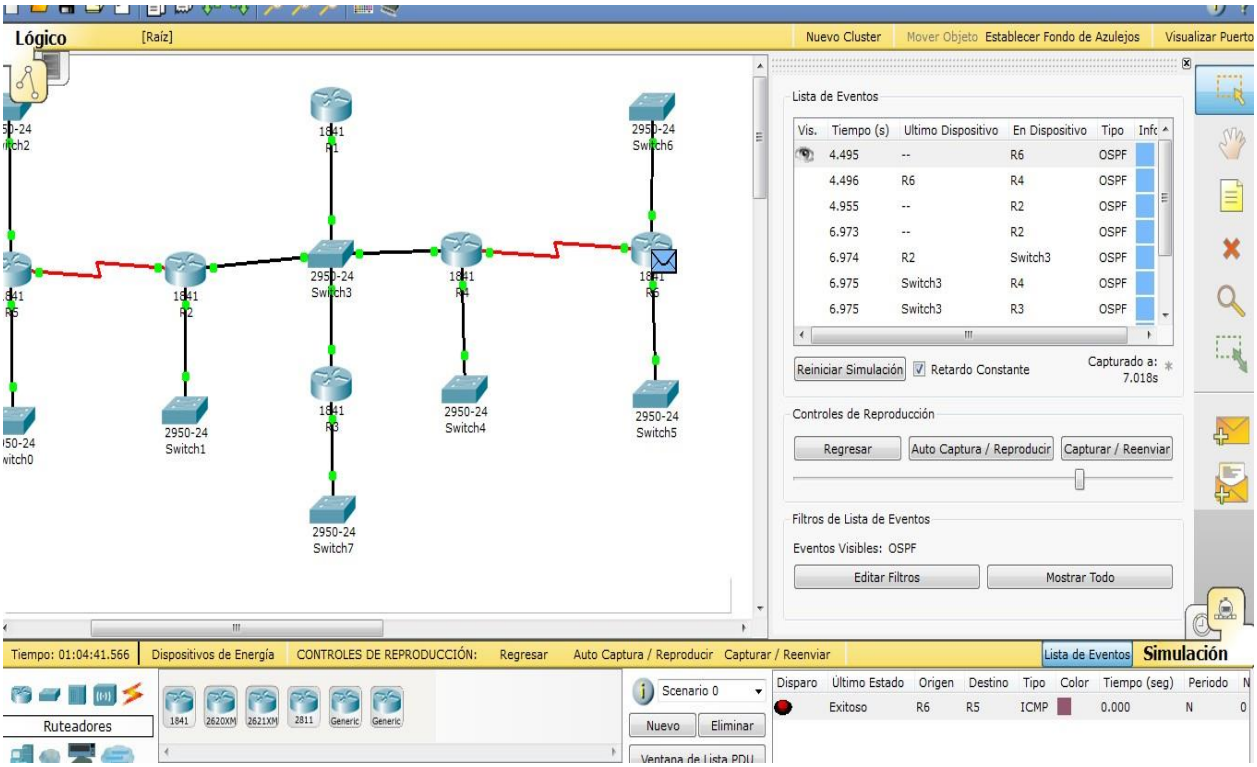

Ilustración 11: Filtro OSPF

CONFIGURACION FINAL ROUTER 1

R1#show running-config

Building configuration...

Current configuration : 1253 bytes

!

version 12.4

no service timestamps log datetime msec

no service timestamps debug datetime msec

```
no service password-encryption
!
hostname R1
!
!
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
!
!
!
!
!
!
!
!
!
no ip domain-lookup
!
!
spanning-tree mode pvst
!
!
!
!
interface Loopback0
 ip address 1.1.1.1 255.255.255.255
!
interface FastEthernet0/0
 description interface con la lan R1, R2, R3 y R4
 ip address 10.10.10.1 255.255.255.248
```

```
 ip ospf priority 0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/0/0
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial0/0/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial0/1/0
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial0/1/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
```

```
 no ip address
 shutdown
!
router ospf 1
 log-adjacency-changes
 network 10.10.10.0 0.0.0.7 area 0
!
router rip
!
ip classless
ip route 0.0.0.0 0.0.0.0 Loopback0
!
!
!
banner motd ^C
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
!!!!!acceso restringido !!!!!!!!!!
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
^C
!
!
!
!
line con 0
 password cisco
 login
line vty 0 4
 password cisco
 login
!
!
```

```
!
end
```

R1#show ip ospf interface

```
FastEthernet0/0 is up, line protocol is up
  Internet address is 10.10.10.1/29, Area 0
  Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DROTHER, Priority 0
  Designated Router (ID) 172.16.52.130, Interface address 10.10.10.2
  Backup Designated Router (ID) 172.16.52.133, Interface address 10.10.10.4
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:09
  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 3, Adjacent neighbor count is 2
    Adjacent with neighbor 172.16.52.130  (Designated Router)
    Adjacent with neighbor 172.16.52.133  (Backup Designated Router)
  Suppress hello for 0 neighbor(s)
R1#show ip protocols
```

Routing Protocol is "ospf 1"

```
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 1.1.1.1
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    10.10.10.0 0.0.0.7 area 0
```

Routing Information Sources:

Gateway	Distance	Last Update
1.1.1.1	110	00:05:19
172.16.50.1	110	00:08:25
172.16.52.129	110	00:08:55
172.16.52.130	110	00:08:26
172.16.52.133	110	00:08:26
172.16.52.134	110	00:08:55

Distance: (default is 110)

R1#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

1.0.0.0/32 is subnetted, 1 subnets
C 1.1.1.1 is directly connected, Loopback0
10.0.0.0/29 is subnetted, 1 subnets
C 10.10.10.0 is directly connected, FastEthernet0/0
172.16.0.0/16 is variably subnetted, 9 subnets, 6 masks
O 172.16.0.0/19 [110/66] via 10.10.10.2, 00:08:14, FastEthernet0/0
O 172.16.32.0/21 [110/66] via 10.10.10.4, 00:08:14, FastEthernet0/0
O 172.16.40.0/22 [110/2] via 10.10.10.2, 00:08:14, FastEthernet0/0
O 172.16.44.0/22 [110/66] via 10.10.10.2, 00:08:14, FastEthernet0/0
O 172.16.48.0/23 [110/66] via 10.10.10.4, 00:08:14, FastEthernet0/0

O 172.16.50.0/23 [110/2] via 10.10.10.3, 00:08:14, FastEthernet0/0

O 172.16.52.0/25 [110/2] via 10.10.10.4, 00:08:14, FastEthernet0/0

O 172.16.52.128/30 [110/65] via 10.10.10.2, 00:08:14, FastEthernet0/0

O 172.16.52.132/30 [110/65] via 10.10.10.4, 00:08:14, FastEthernet0/0

S* 0.0.0.0/0 is directly connected, Loopback0

R1#show ip ospf neighbor

Neighbor ID Pri State Dead Time Address Interface

172.16.52.133 100 FULL/BDR 00:00:39 10.10.10.4 FastEthernet0/0

172.16.52.130 255 FULL/DR 00:00:39 10.10.10.2 FastEthernet0/0

172.16.50.1 100 2WAY/DROTHER 00:00:39 10.10.10.3 FastEthernet0/0

R1#

CONFIGURACION FINAL ROUTER 2

R2#show running-config

Building configuration...

Current configuration : 1304 bytes

!

version 12.4

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

!

hostname R2

!

```
!
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
!
!
!
!
!
!
!
!
!
no ip domain-lookup
!
!
spanning-tree mode pvst
!
!
!
!
interface FastEthernet0/0
 description con la Lan R1, R3 y R4
 ip address 10.10.10.2 255.255.255.248
 ip ospf priority 255
 duplex auto
 speed auto
!
interface FastEthernet0/1
 description interfaz con la lan R2
 ip address 172.16.40.1 255.255.252.0
```

```
 duplex auto
 speed auto
!
interface Serial0/0/0
 description con la WAN R5
 ip address 172.16.52.130 255.255.255.252
!
interface Serial0/0/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial0/1/0
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial0/1/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
router ospf 1
 log-adjacency-changes
 network 10.10.10.0 0.0.0.7 area 0
 network 172.16.52.128 0.0.0.3 area 0
 network 172.16.40.0 0.0.3.255 area 0
```

```
!
router rip
!
ip classless
!
!
!
banner motd ^C
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
!!!!!!! acceso restringido!!!!!!!!!!!!!!
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
^C
!
!
!
!
line con 0
 password cisco
 login
line vty 0 4
 password cisco
 login
!
!
!
end
```

R2#show ip ospf interface

```
FastEthernet0/0 is up, line protocol is up
  Internet address is 10.10.10.2/29, Area 0
```

Process ID 1, Router ID 172.16.52.130, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State DR, Priority 255
Designated Router (ID) 172.16.52.130, Interface address 10.10.10.2
Backup Designated Router (ID) 172.16.52.133, Interface address 10.10.10.4
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:03
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 3, Adjacent neighbor count is 3
Adjacent with neighbor 1.1.1.1
Adjacent with neighbor 172.16.52.133 (Backup Designated Router)
Adjacent with neighbor 172.16.50.1
Suppress hello for 0 neighbor(s)
FastEthernet0/1 is up, line protocol is up
Internet address is 172.16.40.1/22, Area 0
Process ID 1, Router ID 172.16.52.130, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 172.16.52.130, Interface address 172.16.40.1
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 0, Adjacent neighbor count is 0
Suppress hello for 0 neighbor(s)
Serial0/0/0 is up, line protocol is up
Internet address is 172.16.52.130/30, Area 0

Process ID 1, Router ID 172.16.52.130, Network Type POINT-TO-POINT, Cost: 64
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 3/3, 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 172.16.52.129
Suppress hello for 0 neighbor(s)

R2#show ip protocols

Routing Protocol is "ospf 1"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Router ID 172.16.52.130
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
Maximum path: 4
Routing for Networks:
10.10.10.0 0.0.0.7 area 0
172.16.52.128 0.0.0.3 area 0
172.16.40.0 0.0.3.255 area 0
Routing Information Sources:

Gateway	Distance	Last Update
1.1.1.1	110	00:09:17
172.16.50.1	110	00:12:23

172.16.52.129	110	00:12:53
172.16.52.130	110	00:12:24
172.16.52.133	110	00:12:24
172.16.52.134	110	00:12:53

Distance: (default is 110)

R2#show ip route

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

Gateway of last resort is not set

10.0.0.0/29 is subnetted, 1 subnets
C 10.10.10.0 is directly connected, FastEthernet0/0
172.16.0.0/16 is variably subnetted, 9 subnets, 6 masks
O 172.16.0.0/19 [110/65] via 172.16.52.129, 00:12:56, Serial0/0/0
O 172.16.32.0/21 [110/66] via 10.10.10.4, 00:12:21, FastEthernet0/0
C 172.16.40.0/22 is directly connected, FastEthernet0/1
O 172.16.44.0/22 [110/65] via 172.16.52.129, 00:12:56, Serial0/0/0
O 172.16.48.0/23 [110/66] via 10.10.10.4, 00:12:21, FastEthernet0/0
O 172.16.50.0/23 [110/2] via 10.10.10.3, 00:12:21, FastEthernet0/0
O 172.16.52.0/25 [110/2] via 10.10.10.4, 00:12:21, FastEthernet0/0
C 172.16.52.128/30 is directly connected, Serial0/0/0
O 172.16.52.132/30 [110/65] via 10.10.10.4, 00:12:21, FastEthernet0/0

R2#show ip ospf neighbor

```
Neighbor ID     Pri   State           Dead Time   Address         Interface
1.1.1.1           0   FULL/DROTHER    00:00:32    10.10.10.1      FastEthernet0/0
172.16.52.133   100   FULL/BDR        00:00:36    10.10.10.4      FastEthernet0/0
172.16.50.1     100   FULL/DROTHER    00:00:36    10.10.10.3      FastEthernet0/0
172.16.52.129     0   FULL/  -        00:00:36    172.16.52.129   Serial0/0/0
R2#
```

CONFIGURACION FINAL ROUTER 3

R3#show running-config

```
Building configuration...

Current configuration : 1261 bytes
!
version 12.4
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname R3
!
!
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
!
!
!
```

```
!
!
!
!
!
!
no ip domain-lookup
!
!
spanning-tree mode pvst
!
!
!
!
interface FastEthernet0/0
 description interface con la lan R2, R1 y R4
 ip address 10.10.10.3 255.255.255.248
 ip ospf priority 100
 duplex auto
 speed auto
!
interface FastEthernet0/1
 description interface con la lan R3
 ip address 172.16.50.1 255.255.254.0
 duplex auto
 speed auto
!
interface Serial0/0/0
 no ip address
 clock rate 2000000
 shutdown
```

```
!
interface Serial0/0/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial0/1/0
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial0/1/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
router ospf 1
 log-adjacency-changes
 network 10.10.0.0 0.0.31.255 area 0
 network 172.16.50.0 0.0.1.255 area 0
!
ip classless
!
!
!
banner motd ^C
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

```
|!!!!!!acceso restringido!!!!!!!!!!!!!!!!!!!
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
$
%

^C
!
!
!
!
line con 0
 password cisco
 login
line vty 0 4
 password cisco
 login
!
!
!
end
```

R3#show ip ospf interface

```
FastEthernet0/0 is up, line protocol is up
  Internet address is 10.10.10.3/29, Area 0
  Process ID 1, Router ID 172.16.50.1, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DROTHER, Priority 100
  Designated Router (ID) 172.16.52.130, Interface address 10.10.10.2
  Backup Designated Router (ID) 172.16.52.133, Interface address 10.10.10.4
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:08
```

```
  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 3, Adjacent neighbor count is 2
    Adjacent with neighbor 172.16.52.130  (Designated Router)
    Adjacent with neighbor 172.16.52.133  (Backup Designated Router)
  Suppress hello for 0 neighbor(s)
FastEthernet0/1 is up, line protocol is up
  Internet address is 172.16.50.1/23, Area 0
  Process ID 1, Router ID 172.16.50.1, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 172.16.50.1, Interface address 172.16.50.1
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:08
  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 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
R3# show ip protocols

Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 172.16.50.1
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
```

10.10.0.0 0.0.31.255 area 0

172.16.50.0 0.0.1.255 area 0

Routing Information Sources:

Gateway	Distance	Last Update
1.1.1.1	110	00:11:11
172.16.50.1	110	00:14:18
172.16.52.129	110	00:14:47
172.16.52.130	110	00:14:18
172.16.52.133	110	00:14:18
172.16.52.134	110	00:14:47

Distance: (default is 110)

R3#show ip route

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

Gateway of last resort is not set

10.0.0.0/29 is subnetted, 1 subnets
C 10.10.10.0 is directly connected, FastEthernet0/0
172.16.0.0/16 is variably subnetted, 9 subnets, 6 masks
O 172.16.0.0/19 [110/66] via 10.10.10.2, 00:14:13, FastEthernet0/0
O 172.16.32.0/21 [110/66] via 10.10.10.4, 00:14:13, FastEthernet0/0
O 172.16.40.0/22 [110/2] via 10.10.10.2, 00:14:13, FastEthernet0/0
O 172.16.44.0/22 [110/66] via 10.10.10.2, 00:14:13, FastEthernet0/0
O 172.16.48.0/23 [110/66] via 10.10.10.4, 00:14:13, FastEthernet0/0

C 172.16.50.0/23 is directly connected, FastEthernet0/1

O 172.16.52.0/25 [110/2] via 10.10.10.4, 00:14:13, FastEthernet0/0

O 172.16.52.128/30 [110/65] via 10.10.10.2, 00:14:13, FastEthernet0/0

O 172.16.52.132/30 [110/65] via 10.10.10.4, 00:14:13, FastEthernet0/0

R3#show ip ospf neighbor

Neighbor ID	Pri	State	Dead Time	Address	Interface
172.16.52.130	255	FULL/DR	00:00:34	10.10.10.2	FastEthernet0/0
1.1.1.1	0	2WAY/DROTHER	00:00:30	10.10.10.1	FastEthernet0/0
172.16.52.133	100	FULL/BDR	00:00:34	10.10.10.4	FastEthernet0/0

R3#

CONFIGURACION FINAL ROUTER 4

R4#show running-config

Building configuration...

Current configuration : 1334 bytes

!

version 12.4

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

!

hostname R4

!

!

!

enable secret 5 1mERr$hx5rVt7rPNoS4wqbXKX7m0

```
!
!
!
!
!
!
!
!
!
!
no ip domain-lookup
!
!
spanning-tree mode pvst
!
!
!
!
interface FastEthernet0/0
 description interface con la lan R1, R2 y R3
 ip address 10.10.10.4 255.255.255.248
 ip ospf priority 100
 duplex auto
 speed auto
!
interface FastEthernet0/1
 description interface con la lan R4
 ip address 172.16.52.1 255.255.255.128
 duplex auto
 speed auto
!
```

```
interface Serial0/0/0
 description con la wan R6
 ip address 172.16.52.133 255.255.255.252
 clock rate 56000
!
interface Serial0/0/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial0/1/0
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial0/1/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
router ospf 1
 log-adjacency-changes
 network 10.10.10.0 0.0.0.7 area 0
 network 172.16.52.0 0.0.0.127 area 0
 network 172.16.52.132 0.0.0.3 area 0
!
ip classless
```

```
!
!
!
banner motd ^C
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
!!!!!!!!!!!!!acceso restringido!!!!!!!!!!!!!!
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
^C
!
!
!
!
line con 0
 password cisco
 login
line vty 0 4
 password cisco
 login
!
!
!
end
```

R4#show ip ospf interface

```
FastEthernet0/0 is up, line protocol is up
  Internet address is 10.10.10.4/29, Area 0
  Process ID 1, Router ID 172.16.52.133, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State BDR, Priority 100
  Designated Router (ID) 172.16.52.130, Interface address 10.10.10.2
  Backup Designated Router (ID) 172.16.52.133, Interface address 10.10.10.4
```

```
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:07
  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 3, Adjacent neighbor count is 3
    Adjacent with neighbor 1.1.1.1
    Adjacent with neighbor 172.16.50.1
    Adjacent with neighbor 172.16.52.130  (Designated Router)
  Suppress hello for 0 neighbor(s)
FastEthernet0/1 is up, line protocol is up
  Internet address is 172.16.52.1/25, Area 0
  Process ID 1, Router ID 172.16.52.133, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 172.16.52.133, Interface address 172.16.52.1
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:07
  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 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
Serial0/0/0 is up, line protocol is up
  Internet address is 172.16.52.133/30, Area 0
  Process ID 1, Router ID 172.16.52.133, Network Type POINT-TO-POINT, Cost:
64
  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 00:00:07
Index 3/3, 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 172.16.52.134
Suppress hello for 0 neighbor(s)

R4#show ip protocols

Routing Protocol is "ospf 1"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Router ID 172.16.52.133
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
Maximum path: 4
Routing for Networks:
10.10.10.0 0.0.0.7 area 0
172.16.52.0 0.0.0.127 area 0
172.16.52.132 0.0.0.3 area 0
Routing Information Sources:

Gateway	Distance	Last Update
1.1.1.1	110	00:12:41
172.16.50.1	110	00:15:47
172.16.52.129	110	00:16:17
172.16.52.130	110	00:15:48
172.16.52.133	110	00:15:48
172.16.52.134	110	00:16:17

Distance: (default is 110)

R4#show ip route

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

Gateway of last resort is not set

10.0.0.0/29 is subnetted, 1 subnets
C 10.10.10.0 is directly connected, FastEthernet0/0
172.16.0.0/16 is variably subnetted, 9 subnets, 6 masks
O 172.16.0.0/19 [110/66] via 10.10.10.2, 00:15:39, FastEthernet0/0
O 172.16.32.0/21 [110/65] via 172.16.52.134, 00:16:19, Serial0/0/0
O 172.16.40.0/22 [110/2] via 10.10.10.2, 00:15:39, FastEthernet0/0
O 172.16.44.0/22 [110/66] via 10.10.10.2, 00:15:39, FastEthernet0/0
O 172.16.48.0/23 [110/65] via 172.16.52.134, 00:16:19, Serial0/0/0
O 172.16.50.0/23 [110/2] via 10.10.10.3, 00:15:39, FastEthernet0/0
C 172.16.52.0/25 is directly connected, FastEthernet0/1
O 172.16.52.128/30 [110/65] via 10.10.10.2, 00:15:39, FastEthernet0/0
C 172.16.52.132/30 is directly connected, Serial0/0/0

R4#show ip ospf neighbor

Neighbor ID	Pri	State	Dead Time	Address	Interface
1.1.1.1	0	FULL/DROTHER	00:00:39	10.10.10.1	FastEthernet0/0
172.16.50.1	100	FULL/DROTHER	00:00:33	10.10.10.3	FastEthernet0/0

172.16.52.130 255 FULL/DR 00:00:33 10.10.10.2 FastEthernet0/0

172.16.52.134 0 FULL/ - 00:00:31 172.16.52.134 Serial0/0/0

R4#

CONFIGURACION FINAL ROUTER 5

R5#show running-config

Building configuration...

Current configuration : 1315 bytes

!

version 12.4

no service timestamps log datetime msec

no service timestamps debug datetime msec

no service password-encryption

!

hostname R5

!

!

!

enable secret 5 1mERr$hx5rVt7rPNoS4wqbXKX7m0

!

!

!

!

!

!

!

!

!

```
!
no ip domain-lookup
!
!
spanning-tree mode pvst
!
!
!
!
interface FastEthernet0/0
 description interfaz con la lan R5
 ip address 172.16.44.1 255.255.252.0
 duplex auto
 speed auto
!
interface FastEthernet0/1
 description interfaz con la lan R5
 ip address 172.16.0.1 255.255.224.0
 duplex auto
 speed auto
!
interface Serial0/0/0
 description interfaz con la wan R2
 ip address 172.16.52.129 255.255.255.252
 clock rate 56000
!
interface Serial0/0/1
 no ip address
 clock rate 2000000
 shutdown
!
```

```
interface Serial0/1/0
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial0/1/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
router ospf 1
 log-adjacency-changes
 network 172.16.44.0 0.0.3.255 area 0
 network 172.16.0.0 0.0.31.255 area 0
 network 172.16.52.128 0.0.0.3 area 0
!
router rip
!
ip classless
!
!
!
banner motd ^C
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
!!!!!!!acceso restringido!!!!!!!!!!!!!!!!!
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
^C
```

```
!
!
!
!
line con 0
 password cisco
 login
line vty 0 4
 password cisco
 login
!
!
!
end
```

R5#show ip ospf interface

```
FastEthernet0/0 is up, line protocol is up
  Internet address is 172.16.44.1/22, Area 0
  Process ID 1, Router ID 172.16.52.129, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 172.16.52.129, Interface address 172.16.44.1
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:05
  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)
```

FastEthernet0/1 is up, line protocol is up
  Internet address is 172.16.0.1/19, Area 0
  Process ID 1, Router ID 172.16.52.129, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 172.16.52.129, Interface address 172.16.0.1
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in 00:00:05
  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 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
Serial0/0/0 is up, line protocol is up
  Internet address is 172.16.52.129/30, Area 0
  Process ID 1, Router ID 172.16.52.129, Network Type POINT-TO-POINT, Cost: 64
  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 00:00:05
  Index 3/3, 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 172.16.52.130
  Suppress hello for 0 neighbor(s)

R5#show ip protocols

Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 172.16.52.129
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.16.44.0 0.0.3.255 area 0
    172.16.0.0 0.0.31.255 area 0
    172.16.52.128 0.0.0.3 area 0
  Routing Information Sources:
    Gateway   Distance   Last Update
    1.1.1.1   110   00:15:29
    172.16.50.1   110   00:18:31
    172.16.52.129   110   00:19:05
    172.16.52.130   110   00:18:36
    172.16.52.133   110   00:18:31
    172.16.52.134   110   00:19:05
  Distance: (default is 110)

R5#show ip route

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

Gateway of last resort is not set

10.0.0.0/29 is subnetted, 1 subnets
O 10.10.10.0 [110/65] via 172.16.52.130, 00:18:35, Serial0/0/0
172.16.0.0/16 is variably subnetted, 9 subnets, 6 masks
C 172.16.0.0/19 is directly connected, FastEthernet0/1
O 172.16.32.0/21 [110/130] via 172.16.52.130, 00:18:25, Serial0/0/0
O 172.16.40.0/22 [110/65] via 172.16.52.130, 00:19:10, Serial0/0/0
C 172.16.44.0/22 is directly connected, FastEthernet0/0
O 172.16.48.0/23 [110/130] via 172.16.52.130, 00:18:25, Serial0/0/0
O 172.16.50.0/23 [110/66] via 172.16.52.130, 00:18:25, Serial0/0/0
O 172.16.52.0/25 [110/66] via 172.16.52.130, 00:18:25, Serial0/0/0
C 172.16.52.128/30 is directly connected, Serial0/0/0
O 172.16.52.132/30 [110/129] via 172.16.52.130, 00:18:25, Serial0/0/0

R5#show ip ospf neighbor

Neighbor ID	Pri	State	Dead Time	Address	Interface
172.16.52.130	0	FULL/ -	00:00:39	172.16.52.130	Serial0/0/0

R5#

CONFIGURACION FINAL ROUTER 6

R6#show running-config

Building configuration...

Current configuration : 1295 bytes
!
version 12.4
no service timestamps log datetime msec

```
no service timestamps debug datetime msec
no service password-encryption
!
hostname R6
!
!
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
!
!
!
!
!
!
!
!
!
!
no ip domain-lookup
!
!
spanning-tree mode pvst
!
!
!
!
interface FastEthernet0/0
 description interface con la lan R6
 ip address 172.16.48.1 255.255.254.0
 duplex auto
 speed auto
```

```
!
interface FastEthernet0/1
 description interface con la lan R6
 ip address 172.16.32.1 255.255.248.0
 duplex auto
 speed auto
!
interface Serial0/0/0
 description interface con la wan R4
 ip address 172.16.52.134 255.255.255.252
!
interface Serial0/0/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial0/1/0
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial0/1/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
router ospf 1
```

```
 log-adjacency-changes
 network 172.16.48.0 0.0.1.255 area 0
 network 172.16.32.0 0.0.7.255 area 0
 network 172.16.52.132 0.0.0.3 area 0
!
ip classless
!
!
!
banner motd ^C
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
!!!!!!!!acceso restringido!!!!!!!!!!!!!!!!!!!!
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
^C
!
!
!
!
line con 0
 password cisco
 login
line vty 0 4
 password cisco
 login
```

R6#show ip ospf interface

```
FastEthernet0/0 is up, line protocol is up
  Internet address is 172.16.48.1/23, Area 0
  Process ID 1, Router ID 172.16.52.134, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 172.16.52.134, Interface address 172.16.48.1
```

No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:07
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)
FastEthernet0/1 is up, line protocol is up
Internet address is 172.16.32.1/21, Area 0
Process ID 1, Router ID 172.16.52.134, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 172.16.52.134, Interface address 172.16.32.1
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:07
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 0, Adjacent neighbor count is 0
Suppress hello for 0 neighbor(s)
Serial0/0/0 is up, line protocol is up
Internet address is 172.16.52.134/30, Area 0
Process ID 1, Router ID 172.16.52.134, Network Type POINT-TO-POINT, Cost: 64
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 00:00:06
Index 3/3, 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 172.16.52.133
Suppress hello for 0 neighbor(s)

R6# show ip protocols

Routing Protocol is "ospf 1"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Router ID 172.16.52.134
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
Maximum path: 4
Routing for Networks:
172.16.48.0 0.0.1.255 area 0
172.16.32.0 0.0.7.255 area 0
172.16.52.132 0.0.0.3 area 0
Routing Information Sources:

Gateway	Distance	Last Update
1.1.1.1	110	00:17:10
172.16.50.1	110	00:20:16
172.16.52.129	110	00:20:46
172.16.52.130	110	00:20:07
172.16.52.133	110	00:20:17
172.16.52.134	110	00:20:46

Distance: (default is 110)

R6#show ip route

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

Gateway of last resort is not set

10.0.0.0/29 is subnetted, 1 subnets
O 10.10.10.0 [110/65] via 172.16.52.133, 00:20:03, Serial0/0/0
172.16.0.0/16 is variably subnetted, 9 subnets, 6 masks
O 172.16.0.0/19 [110/130] via 172.16.52.133, 00:20:03, Serial0/0/0
C 172.16.32.0/21 is directly connected, FastEthernet0/1
O 172.16.40.0/22 [110/66] via 172.16.52.133, 00:20:03, Serial0/0/0
O 172.16.44.0/22 [110/130] via 172.16.52.133, 00:20:03, Serial0/0/0
C 172.16.48.0/23 is directly connected, FastEthernet0/0
O 172.16.50.0/23 [110/66] via 172.16.52.133, 00:20:03, Serial0/0/0
O 172.16.52.0/25 [110/65] via 172.16.52.133, 00:20:48, Serial0/0/0
O 172.16.52.128/30 [110/129] via 172.16.52.133, 00:20:03, Serial0/0/0
C 172.16.52.132/30 is directly connected, Serial0/0/0

R6#show ip ospf neighbor

Neighbor ID	Pri	State	Dead Time	Address	Interface
172.16.52.133	0	FULL/ -	00:00:35	172.16.52.133	Serial0/0/0

R6#

CONCLUSIONES

- Se realizó las topologías propuestas para los casos de estudio ccna1 y ccna2 en la aplicación packet tracer.
- Se realizó configuración básica a cada uno de los routers de cada caso.
- se logró establecer direcciones teniendo en cuenta el uso VLSM
- De realizo el filtro del enrutamiento OSPF verificando las cambios que se presentan en la lista de eventos donde podemos observar el dispositivo por donde va haciendo recorrido el paquete, el tiempo utilizado.
- Se configuro de acuerdo a enrutamiento sugerido encada caso.
- Se configuro cada uno de los dispositivos de acuerdo a la ip de red logrando una buena conexión.

BIBLIOGRAFIA

- CASO DE ESTUDIO CCNA1
- MODULO_DE_ESTUDIO_CCNA_1_EXPLORATION
- MODULO_DE_ESTUDIO_CCNA_2_EXPLORATION
- EJEMPLO RESUELTO VLSM (campus virtual)
- VIDEOS Y MATERIAL COMPLEMENTARIO CCNA 2 (campus virtual).

WEBGRAFIA

- http://www.youtube.com/watch?v=aXz43mgQxGM
- http://www.youtube.com/watch?v=lK1RLB2vQUQ
- http://www.youtube.com/watch?v=-D6cD8gEIAE
- http://www.garciagaston.com.ar/verpost.php?id_noticia=193