



Instituto Tecnológico de Salina Cruz

Fundamentos de Redes

Semestre Enero – Julio 2015

Reporte de Practica

Practica nº 3

Unidad 5

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**Fecha:** 29 de Mayo del 2015

**Objetivos:**

- Conectar una red de acuerdo con el Diagrama de topología.
- Eliminar la configuración de inicio y recargar un router al estado por defecto.
- Realizar tareas de configuración básicas en un router.
- Configurar y activar interfaces.
- Configurar el enrutamiento EIGRP en todos los routers.
- Verificar que el enrutamiento EIGRP utilice comandos **show**.
- Desactive la sumarización automática.
- Configurar el resumen manual.
- Configurar una ruta estática por defecto.
- Propagar la ruta por defecto a los EIGRP vecinos.
- Documentar la configuración RIP.

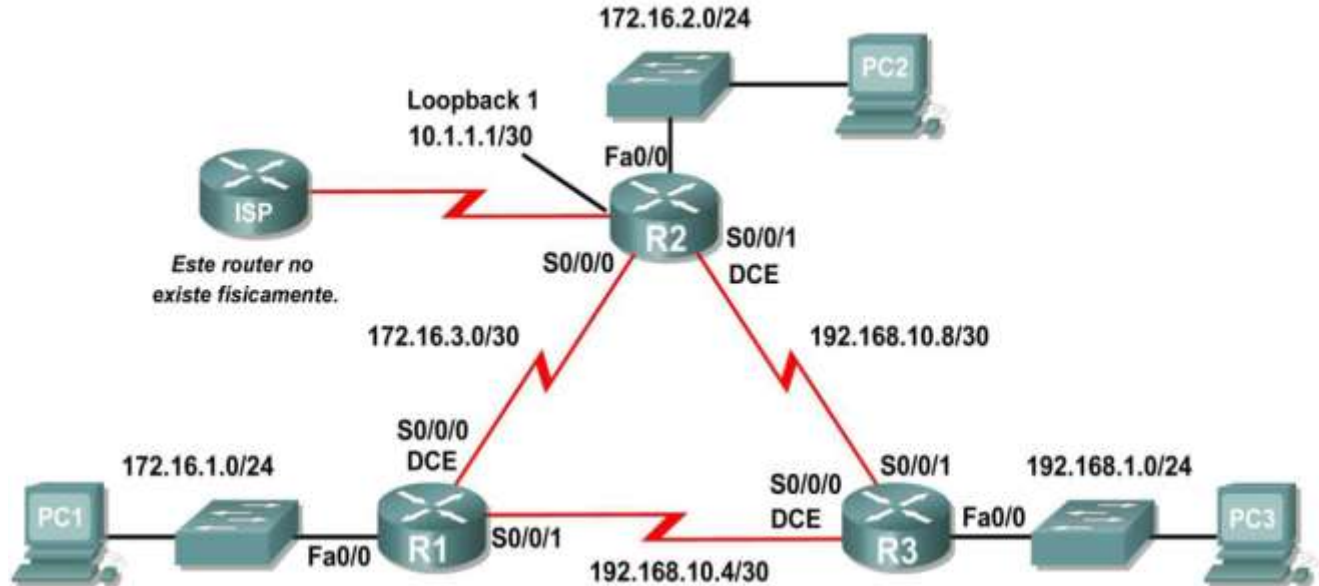
**Instrucciones:**

- 1.- Realizar la tabla de ruteo.
- 2.- Realizar configuraciones iniciales.
- 3.- Identificar comandos a utilizar.
- 4.- configuración y activación de las direcciones serial y Ethernet.
- 5.- configurar EIGRP en el router 1.
- 6.- Configurar EIGRP en los routers R2 y R3.
- 7.- Verificar las operaciones de EIGRP.
- 8.- Examinar las rutas EIGRP en las tablas de enrutamiento.
- 9.- Configurar las métricas EIGRP etc.

**Materiales:**

- Computadoras.
- Cisco Packet Tracer.
- Silla.

## Escenario:

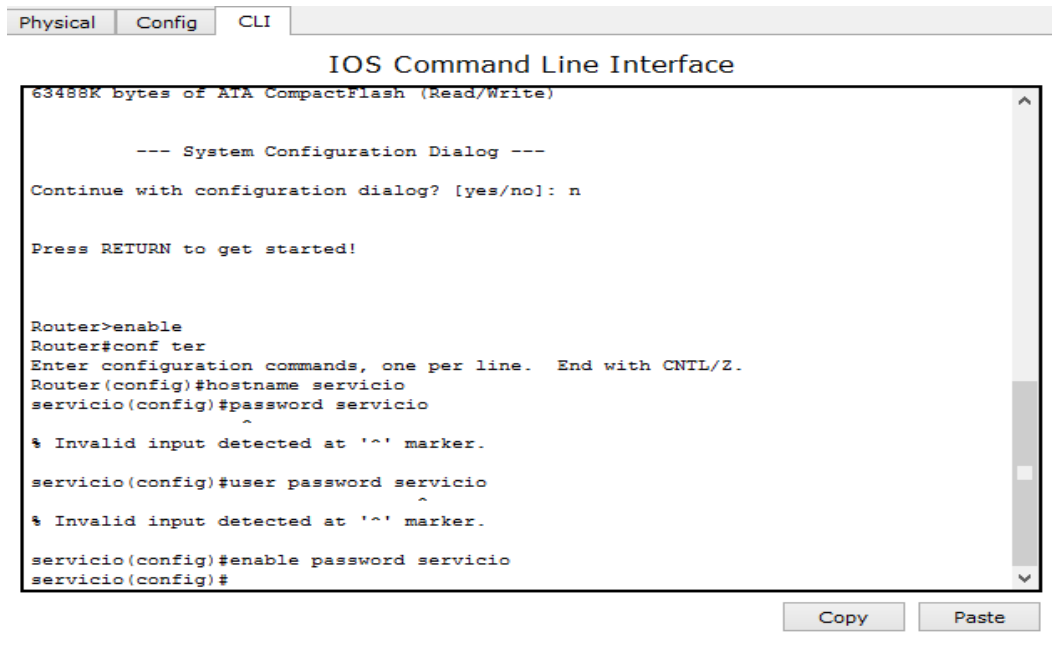


## Tabla de enrutamiento

Dispositivo	Interfaz	Dirección IP	Máscara de subred	Gateway por defecto
R1	Fa0/0	172.16.1.1	255.255.255.0	No aplicable
	S0/0/0	172.16.3.1	255.255.255.252	No aplicable
	S0/0/1	192.168.10.5	255.255.255.252	No aplicable
R2	Fa0/0	172.16.2.1	255.255.255.0	No aplicable
	S0/0/0	172.16.3.2	255.255.255.252	No aplicable
	S0/0/1	192.168.10.9	255.255.255.252	No aplicable
	Lo1	10.1.1.1	255.255.255.252	No aplicable
R3	Fa0/0	192.168.1.1	255.255.255.0	No aplicable
	S0/0/0	192.168.10.6	255.255.255.252	No aplicable
	S0/0/1	192.168.10.10	255.255.255.252	No aplicable
PC1	NIC	172.16.1.10	255.255.255.0	172.16.1.1
PC2	NIC	172.16.2.10	255.255.255.0	172.16.2.1
PC3	NIC	192.168.1.10	255.255.255.0	192.168.1.1

A continuación se configuraran los Routers con las opciones básicas, que son el cambio de nombre, asignación de contraseñas e insertar un banner de bienvenida a cada uno de ellos de la siguiente manera.

Router 1 (servicio), cambio de nombre y contraseña.



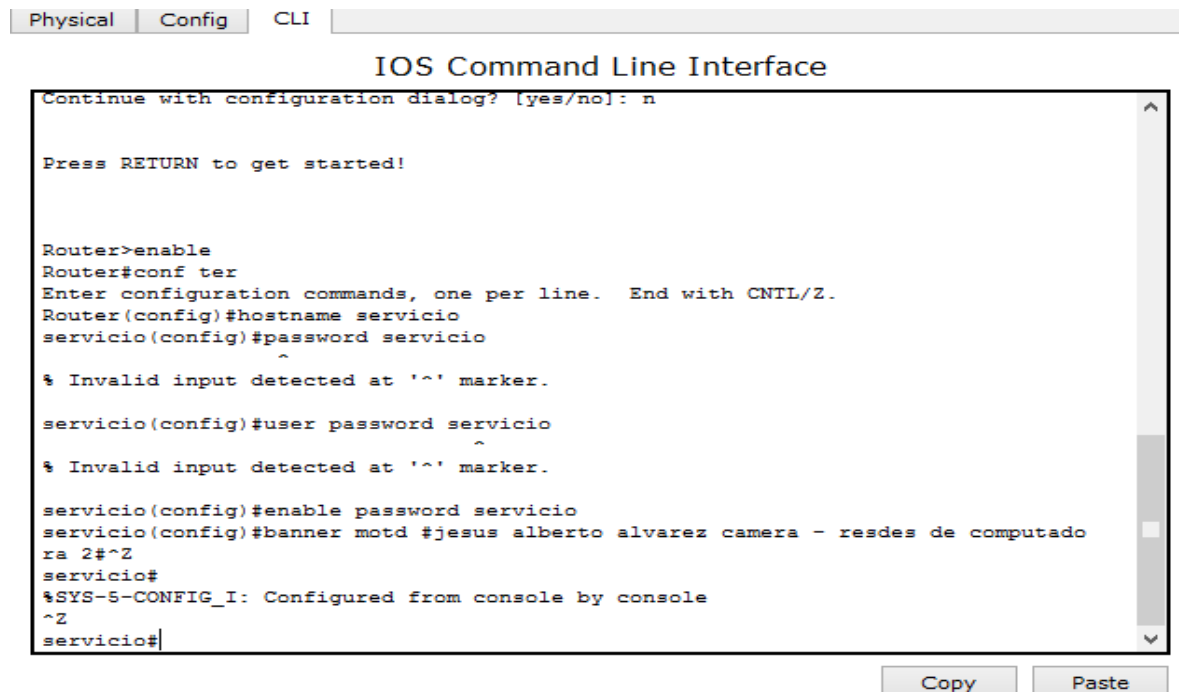
```
Physical Config CLI
IOS Command Line Interface
63488K bytes of ATA CompactFlash (Read/Write)

--- System Configuration Dialog ---
Continue with configuration dialog? [yes/no]: n

Press RETURN to get started!

Router>enable
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname servicio
servicio(config)#password servicio
^
% Invalid input detected at '^' marker.
servicio(config)#user password servicio
^
% Invalid input detected at '^' marker.
servicio(config)#enable password servicio
servicio(config)#
```

Asignación de un banner.



```
Physical Config CLI
IOS Command Line Interface
Continue with configuration dialog? [yes/no]: n

Press RETURN to get started!

Router>enable
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname servicio
servicio(config)#password servicio
^
% Invalid input detected at '^' marker.
servicio(config)#user password servicio
^
% Invalid input detected at '^' marker.
servicio(config)#enable password servicio
servicio(config)#banner motd #jesus alberto alvarez camera - resdes de computado
ra 2#^Z
servicio#
%SYS-5-CONFIG_I: Configured from console by console
^Z
servicio#
```

Router 2 (musica), cambio de nombre y contraseña.

```
Physical Config CLI
IOS Command Line Interface
X.25 software, Version 3.0.0.
4 FastEthernet/IEEE 802.3 interface(s)
2 Low-speed serial(sync/async) network interface(s)
32K bytes of non-volatile configuration memory.
63488K bytes of ATA CompactFlash (Read/Write)

--- System Configuration Dialog ---
Continue with configuration dialog? [yes/no]: n

Press RETURN to get started!

Router>enable
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#host name musica
      ^
% Invalid input detected at '^' marker.

Router(config)#hostname musica
musica(config)#enable password musica
musica(config)#
```

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Asignación de un banner.

```
Physical Config CLI
IOS Command Line Interface

--- System Configuration Dialog ---
Continue with configuration dialog? [yes/no]: n

Press RETURN to get started!

Router>enable
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#host name musica
      ^
% Invalid input detected at '^' marker.

Router(config)#hostname musica
musica(config)#enable password musica
musica(config)#banner motd #jesus alberto alvarez camera - redes de comutadoras
2#^Z
musica#
%SYS-5-CONFIG_I: Configured from console by console
^Z
musica#
```

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Router 3 (brisa), cambio de nombre y contraseña.

```
Physical Config CLI
IOS Command Line Interface
-
Processor board ID PT0123 (0123)
PT2005 processor: part number 0, mask 01
Bridging software.
X.25 software, Version 3.0.0.
4 FastEthernet/IEEE 802.3 interface(s)
2 Low-speed serial(sync/async) network interface(s)
32K bytes of non-volatile configuration memory.
63488K bytes of ATA CompactFlash (Read/Write)

--- System Configuration Dialog ---
Continue with configuration dialog? [yes/no]: n

Press RETURN to get started!

Router>enable
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname brisa
brisa(config)#enable password brisa
brisa(config)#
```

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Asignación de un banner.

```
Physical Config CLI
IOS Command Line Interface
4 FastEthernet/IEEE 802.3 interface(s)
2 Low-speed serial(sync/async) network interface(s)
32K bytes of non-volatile configuration memory.
63488K bytes of ATA CompactFlash (Read/Write)

--- System Configuration Dialog ---
Continue with configuration dialog? [yes/no]: n

Press RETURN to get started!

Router>enable
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname brisa
brisa(config)#enable password brisa
brisa(config)#banner motd #jeeus alberto alvarez camera - redes de computadoras
2#^Z
brisa#
%SYS-5-CONFIG_I: Configured from console by console
^Z
brisa#
```

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A continuación se establecerán los puertos seriales0/0 y los fastethernet0/0 para cada uno de los routers

## Router 1

### Levantamiento del Puerto fa0/0

```
Physical | Config | CLI | IOS Command Line Interface

Bienvenido a la materia de redes de computadoras
banner motd

kavi>enable
Password:
Password:
kavi#conf t
Enter configuration commands, one per line. End with CRTL/Z.
kavi(config)#interface fa0/0
kavi(config-if)#ip address 172.16.1.1 255.255.0.0
kavi(config-if)#no shut

kavi(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

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

kavi(config-if)#
```

### Levantamiento del puerto Serial 2/0

```
Physical | Config | CLI | IOS Command Line Interface

Enter configuration commands, one per line. End with CRTL/Z.
kavi(config)#interface fa0/0
kavi(config-if)#ip address 172.16.1.1 255.255.0.0
kavi(config-if)#no shut

kavi(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

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

kavi(config-if)#exit
kavi(config)#interface s2
_
% Invalid input detected at '^' marker.

kavi(config)#interface s2/0
kavi(config-if)#ip address 172.16.3.1 255.255.0.0
% 172.16.0.0 overlaps with FastEthernet0/0
kavi(config-if)#ip address 172.16.3.1 255.255.255.0
% 172.16.3.0 overlaps with FastEthernet0/0
kavi(config-if)#ip address 172.160.3.1 255.255.0.0
kavi(config-if)#no shut

%LINK-5-CHANGED: Interface Serial2/0, changed state to down
kavi(config-if)#
```

### Levantamiento del puerto Serial 3/0.

```
Physical | Config | CLI | IOS Command Line Interface

s up
kavi(config-if)#exit
_
% Invalid input detected at '^' marker.

kavi(config-if)#exit
kavi(config)#interface s2/0
kavi(config-if)#ip address 172.160.3.1 255.255.0.0
kavi(config-if)#no shut

kavi(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

kavi(config-if)#exit
kavi(config)#interface s3/0
kavi(config-if)#interface s3/0
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up
kavi(config-if)#interface s3/0
kavi(config-if)#ip address 192.16.10.5 255.255.255.0
kavi(config-if)#no shut

kavi(config-if)#
%LINK-5-CHANGED: Interface Serial3/0, changed state to up

kavi(config-if)#
```

## Router 2

### Levantamiento del Puerto fa0/0

```
Physical | Config | CLI
IOS Command Line Interface

:

banner motd

Balotelli>enable
Password:
Password:
Balotelli#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Balotelli(config)#interface fa0/0
Balotelli(config-if)#ip address 172.16.2.1 255.255.0.0
Balotelli(config-if)#no shut

Balotelli(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state t
o up
Balotelli(config-if)#

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```

### Levantamiento del puerto Serial 2/0

```
Physical | Config | CLI
IOS Command Line Interface

Banner motd

Balotelli>enable
Password:
Password:
Balotelli#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Balotelli(config)#interface fa0/0
Balotelli(config-if)#ip address 172.16.2.1 255.255.0.0
Balotelli(config-if)#no shut

Balotelli(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state t
o up

Balotelli(config-if)#exit
Balotelli(config)#interface s2/0
Balotelli(config-if)#ip address 172.168.3.2 255.255.0.0
Balotelli(config-if)#no shut

Balotelli(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up
Balotelli(config-if)#

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```

### Levantamiento del puerto Serial 3/0

```
Physical | Config | CLI
IOS Command Line Interface

Balotelli(config-if)#no shut

Balotelli(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state t
o up

Balotelli(config-if)#exit
Balotelli(config)#interface s2/0
Balotelli(config-if)#ip address 172.168.3.2 255.255.0.0
Balotelli(config-if)#no shut

Balotelli(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

Balotelli(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Balotelli(config-if)#exit
Balotelli(config)#interface s3/0
Balotelli(config-if)#ip address 192.168.10.9 255.255.255.0
Balotelli(config-if)#no shut

%LINK-5-CHANGED: Interface Serial3/0, changed state to down
Balotelli(config-if)#

Copy Paste
```

## Router 3

### Levantamiento del Puerto fa0/0

```
Physical | Config | CLI |
IOS Command Line Interface

banner motd
Puyol>enable
Password:
Puyol#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Puyol(config)#interface fa0/0
Puyol(config-if)#ip address 192.168.1.1 255.255.255.0
Puyol(config-if)#no shut

Puyol(config-if)#
%LINK-S-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-S-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
Puyol(config-if)#
```

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### Levantamiento del puerto Serial 2/0

```
Physical | Config | CLI |
IOS Command Line Interface

banner motd
Puyol>enable
Password:
Puyol#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Puyol(config)#interface fa0/0
Puyol(config-if)#ip address 192.168.1.1 255.255.255.0
Puyol(config-if)#no shut

Puyol(config-if)#
%LINK-S-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-S-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

Puyol(config-if)#exit
Puyol(config)#interface s2/0
Puyol(config-if)#ip address 192.168.10.6 255.255.255.0
Puyol(config-if)#no shut

Puyol(config-if)#
%LINK-S-CHANGED: Interface Serial2/0, changed state to up
Puyol(config-if)#
```

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### Levantamiento del puerto Serial 3/0.

```
Physical | Config | CLI |
IOS Command Line Interface

o up
Puyol(config-if)#exit
Puyol(config)#interface s2/0
Puyol(config-if)#ip address 192.168.10.6 255.255.255.0
Puyol(config-if)#no shut

Puyol(config-if)#
%LINK-S-CHANGED: Interface Serial2/0, changed state to up

Puyol(config-if)#
%LINEPROTO-S-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Puyol(config-if)#exit
Puyol(config)#interface s3/0
Puyol(config-if)#ip address 192.168.10.10 255.255.255.0
% 192.168.10.0 overlaps with Serial2/0
Puyol(config-if)#ip address 192.168.10.10 255.255.255.0
% 192.168.10.0 overlaps with Serial2/0
Puyol(config-if)#ip address 192.16.10.10 255.255.255.0
Puyol(config-if)#no shut

Puyol(config-if)#
%LINK-S-CHANGED: Interface Serial3/0, changed state to up
Puyol(config-if)#
```

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A continuación se procede a Verificar el direccionamiento IP y las interfaces de todos los Routers de la siguiente manera.

### Router 1

```

Physical | Config | CLI | IOS Command Line Interface
-----|-----|-----|-----
Rav1#enable
Password:
Password:
Rav1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Rav1(config)#enab
Rav1#
SYS-6-CONFIG_I: Configured from console by console
Rav1#show ip interface brief
Interface                IP-Address      OK? Method Status  Protocol
FastEthernet0/0          172.16.1.1      YES manual up      up
FastEthernet1/0          unassigned      YES unset  administratively down down
Serial2/0                 172.168.3.1     YES manual up      up
Serial3/0                 192.16.10.8     YES manual up      up
FastEthernet4/0          unassigned      YES unset  administratively down down
FastEthernet5/0          unassigned      YES unset  administratively down down
Rav1#
    
```

### Router 2

```

Physical | Config | CLI | IOS Command Line Interface
-----|-----|-----|-----
Eduardo salazar irizarri unidad5
banner motd
Salote111#enable
Password:
Salote111#show ip interface brief
Interface                IP-Address      OK? Method Status  Protocol
FastEthernet0/0          172.16.2.1      YES manual up      up
FastEthernet1/0          unassigned      YES unset  administratively down down
Serial2/0                 172.168.2.2     YES manual up      up
Serial3/0                 192.168.10.8    YES manual up      up
FastEthernet4/0          unassigned      YES unset  administratively down down
FastEthernet5/0          unassigned      YES unset  administratively down down
Salote111#
    
```

### Router 3

```

Physical | Config | CLI | IOS Command Line Interface
-----|-----|-----|-----
redes de computadoras unidad5
banner motd
Duyol#enable
Password:
Duyol#show ip interface brief
Interface                IP-Address      OK? Method Status  Protocol
FastEthernet0/0          192.168.1.1     YES manual up      up
FastEthernet1/0          unassigned      YES unset  administratively down down
Serial2/0                 192.168.10.6    YES manual up      up
Serial3/0                 192.16.10.10    YES manual up      up
FastEthernet4/0          unassigned      YES unset  administratively down down
FastEthernet5/0          unassigned      YES unset  administratively down down
Duyol#
    
```

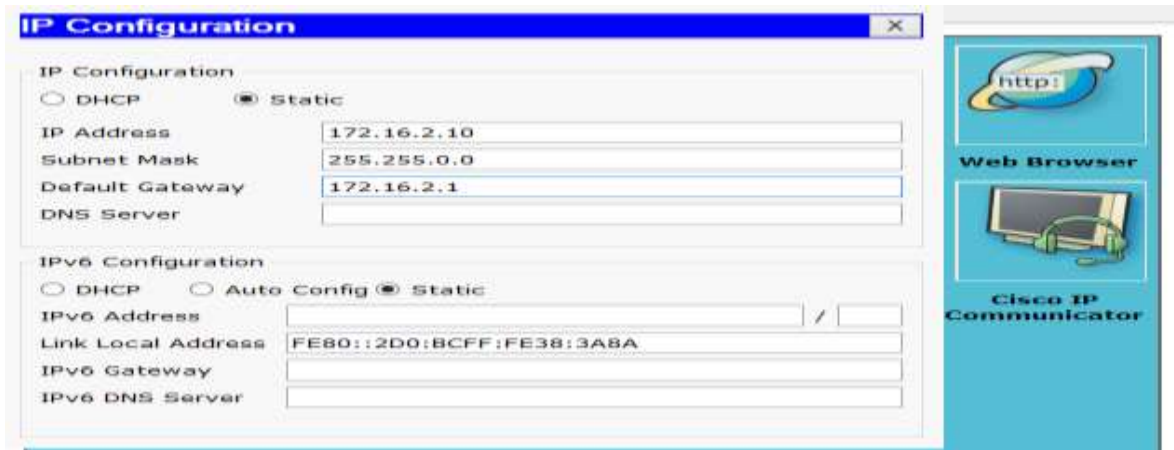
Como siguiente punto se debe Configurar las interfaces Ethernet de las PC1, PC2 y PC3 de la siguiente manera.

PC1.



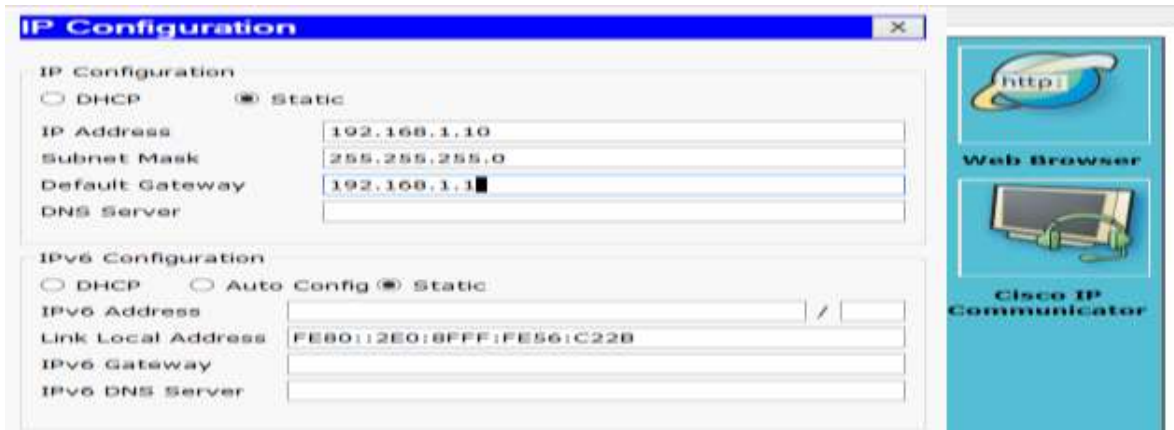
The screenshot shows the 'IP Configuration' window for PC1. It is divided into two sections: 'IP Configuration' and 'IPv6 Configuration'. In the 'IP Configuration' section, the 'Static' radio button is selected. The fields are filled with: IP Address: 172.16.1.10, Subnet Mask: 255.255.0.0, Default Gateway: 172.16.1.1, and DNS Server: (empty). In the 'IPv6 Configuration' section, the 'Static' radio button is selected. The fields are filled with: IPv6 Address: (empty), Link Local Address: FE80::208:BEFF:FE33:3B67, IPv6 Gateway: (empty), and IPv6 DNS Server: (empty). On the right side of the window, there are two icons: 'Web Browser' (with an http:// icon) and 'Cisco IP Communicator' (with a computer monitor icon).

PC2.



The screenshot shows the 'IP Configuration' window for PC2. It is divided into two sections: 'IP Configuration' and 'IPv6 Configuration'. In the 'IP Configuration' section, the 'Static' radio button is selected. The fields are filled with: IP Address: 172.16.2.10, Subnet Mask: 255.255.0.0, Default Gateway: 172.16.2.1, and DNS Server: (empty). In the 'IPv6 Configuration' section, the 'Static' radio button is selected. The fields are filled with: IPv6 Address: (empty), Link Local Address: FE80::2D0:BCFF:FE38:3A8A, IPv6 Gateway: (empty), and IPv6 DNS Server: (empty). On the right side of the window, there are two icons: 'Web Browser' (with an http:// icon) and 'Cisco IP Communicator' (with a computer monitor icon).

PC3.



The screenshot shows the 'IP Configuration' window for PC3. It is divided into two sections: 'IP Configuration' and 'IPv6 Configuration'. In the 'IP Configuration' section, the 'Static' radio button is selected. The fields are filled with: IP Address: 192.168.1.10, Subnet Mask: 255.255.255.0, Default Gateway: 192.168.1.1, and DNS Server: (empty). In the 'IPv6 Configuration' section, the 'Static' radio button is selected. The fields are filled with: IPv6 Address: (empty), Link Local Address: FE80::2E0:8FFF:FE56:C22B, IPv6 Gateway: (empty), and IPv6 DNS Server: (empty). On the right side of the window, there are two icons: 'Web Browser' (with an http:// icon) and 'Cisco IP Communicator' (with a computer monitor icon).

A continuación se configurara el protocolo EIGRP en el router 1.

```
Physical | Config | CLI | IOS Command Line Interface

Bienvenido a la materia de redes de computadores
banner motd
Kavi#enable
Password:
Kavi#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Kavi(config)#router eigrp 1
Kavi(config-router)#autonomous system
% Invalid input detected at '^' marker.
Kavi(config-router)# network 172.16.0.0
Kavi(config-router)# network 172.168.0.0
Kavi(config-router)# network 192.168.10.4 0.0.0.255
Kavi(config-router)#end
Kavi#
%SYS-5-CONFIG_I: Configured from console by console
Kavi#
```

Como siguiente punto se Habilitara el enrutamiento EIGRP en el router R2 con el comando router eigrp.

```
Physical | Config | CLI | IOS Command Line Interface

-----
banner motd
Balotelli#enable
Password:
Balotelli#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Balotelli(config)#router eigrp 1
Balotelli(config-router)#network 172.16.0.0
Balotelli(config-router)#network 192.168.10.8 0.0.0.255
Balotelli(config-router)#end
Balotelli#
%SYS-5-CONFIG_I: Configured from console by console
Balotelli#
```

A continuación habilite el enrutamiento EIGRP en el router R3 con el comando router eigrp.

```
Physical | Config | CLI | IOS Command Line Interface

redes de computadores unidad5
banner motd
Puyol#enable
Password:
Puyol#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Puyol(config)#router eigrp 1
Puyol(config-router)#network 192.168.1.0
Puyol(config-router)#network 192.168.10.4 0.0.0.255
Puyol(config-router)#network 192.168.10.8 0.0.0.255
Puyol(config-router)#end
Puyol#
%SYS-5-CONFIG_I: Configured from console by console
Puyol#
```

Como siguiente punto se Verificaran las operaciones de EIGRP.

En el router R1 utilice el comando show ip eigrp neighbors para ver la tabla de vecinos y verificar que EIGRP haya establecido una adyacencia con los routers R2 y R3.

¿Cuál es la dirección IP del router EIGRP vecino?

172.16.3.1

¿Qué interfaz del router R2 es el vecino adyacente?

Serial2/0

```
Bienvenido a la materia de redes de computadora
banner motd

Xavi>enable
Password:
Xavi#show ip eigrp neighbors
IP-EIGRP neighbors for process 1

Xavi#
Xavi#show ip protocols

Routing Protocol is "eigrp 1 "
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Default networks flagged in outgoing updates
  Default networks accepted from incoming updates
  EIGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0
  EIGRP maximum hopcount 100
  EIGRP maximum metric variance 1
  Redistributing: eigrp 1
    Automatic network summarization is in effect
  Automatic address summarization:
    Maximum path: 4
  Routing for Networks:
    172.16.0.0
    172.168.0.0
    192.168.10.0
  Routing Information Sources:
    Gateway         Distance         Last Update
  Distance: internal 90 external 170
```

De igual manera Visualice la tabla de enrutamiento en el router R1.

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

Gateway of last resort is not set

C    172.16.0.0/16 is directly connected, FastEthernet0/0
C    172.168.0.0/16 is directly connected, Serial2/0
C    192.16.10.0/24 is directly connected, Serial3/0
```

A continuación Visualice la tabla de enrutamiento en el router R3.

```
Physical | Config | CLI |
IOS Command Line Interface

redes de computadoras unidad5

banner motd

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

Gateway of last resort is not set

C    192.16.10.0/24 is directly connected, Serial3/0
C    192.168.1.0/24 is directly connected, FastEthernet0/0
C    192.168.10.0/24 is directly connected, Serial2/0
Puyol#
```

Como siguiente punto Visualice la información métrica de EIGRP.

```
Bienvenido a la materia de redes de computadora

banner motd

Xavi>enable
Password:
Xavi#show interface serial2/0
Serial2/0 is up, line protocol is up (connected)
Hardware is HD64570
Internet address is 172.168.3.1/16
MTU 1500 bytes, BW 128 Kbit, DLY 20000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
Encapsulation HDLC, loopback not set, keepalive set (10 sec)
Last input never, output never, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0 (size/max/drops); Total output drops: 0
Queueing strategy: weighted fair
Output queue: 0/1000/64/0 (size/max total/threshold/drops)
Conversations 0/0/255 (active/max active/max total)
Reserved Conversations 0/0 (allocated/max allocated)
Available Bandwidth 96 kilobits/sec
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 104 bits/sec, 0 packets/sec
  0 packets input, 0 bytes, 0 no buffer
  Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
  0 input errors, 0 CRC, 0 frames, 0 overrun, 0 ignored, 0 abort
  343 packets output, 20580 bytes, 0 underruns
  0 output errors, 0 collisions, 1 interface resets
  0 output buffer failures, 0 output buffers swapped out
  0 carrier transitions
DCD=up DSR=up DIR=up RIS=up CTS=up
Xavi#
```

A continuación modifique el ancho de banda de las interfaces seriales.

Router 1

```
Bienvenido a la materia de redes de computadora

banner motd

Xavi>enable
Password:
Xavi#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Xavi(config)#interface serial2/0
Xavi(config-if)#bandwidth
% Incomplete command.
Xavi(config-if)#bandwidth 64
Xavi(config-if)#
```

## Router 2

```
Eduardo salazar irrizari unidad5
banner motd

Balotelli>enable
Password:
Balotelli#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Balotelli(config)#interface s2/0
Balotelli(config-if)#bandwidth 64
Balotelli(config-if)#exit
Balotelli(config)#interface s3/0
Balotelli(config-if)#bandwidth 1024
Balotelli(config-if)#
```

## Router 3

```
redes de computadoras unidad5

banner motd

Puyol>enable
Password:
Puyol#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Puyol(config)#interface s2/0
Puyol(config-if)#exit
Puyol(config)#interface s3/0
Puyol(config-if)#bandwidth 1024
Puyol(config-if)#
```

Como punto siguiente verifique las modificaciones del ancho de banda.

## Router 1

```
Bienvenido a la materia de redes de computadora

banner motd

Xavi>enable
Password:
Xavi#show interface serial2/0
Serial2/0 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 172.168.3.1/16
  MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0 (size/max/drops); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
    Conversations 0/0/256 (active/max active/max total)
    Reserved Conversations 0/0 (allocated/max allocated)
    Available Bandwidth 48 kilobits/sec
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 102 bits/sec, 0 packets/sec
    0 packets input, 0 bytes, 0 no buffer
    Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    503 packets output, 30180 bytes, 0 underruns
    0 output errors, 0 collisions, 1 interface resets
    0 output buffer failures, 0 output buffers swapped out
    0 carrier transitions
  DCD=up  DSR=up  DTR=up  RTS=up  CTS=up
```

## Router 2

```
banner motd

Balotelli>enable
Password:
Balotelli#show interface serial2/0
Serial2/0 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 172.168.3.2/16
  MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0 (size/max/drops); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
    Conversations 0/0/256 (active/max active/max total)
    Reserved Conversations 0/0 (allocated/max allocated)
    Available Bandwidth 48 kilobits/sec
  5 minute input rate 104 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
  527 packets input, 31620 bytes, 0 no buffer
  Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
  0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
  0 packets output, 0 bytes, 0 underruns
  0 output errors, 0 collisions, 1 interface resets
  0 output buffer failures, 0 output buffers swapped out
  0 carrier transitions
  DCD=up DSR=up DTR=up RTS=up CTS=up
```

## Router 3

```
redes de computadoras unidad5

banner motd

Puyol>enable
Password:
Puyol#show interface serial3/0
Serial3/0 is up, line protocol is up (connected)
  Hardware is HD64570
  Internet address is 192.16.10.10/24
  MTU 1500 bytes, BW 1024 Kbit, DLY 20000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0 (size/max/drops); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
    Conversations 0/0/256 (active/max active/max total)
    Reserved Conversations 0/0 (allocated/max allocated)
    Available Bandwidth 768 kilobits/sec
  5 minute input rate 104 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
  446 packets input, 26760 bytes, 0 no buffer
  Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
  0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
  0 packets output, 0 bytes, 0 underruns
  0 output errors, 0 collisions, 1 interface resets
  0 output buffer failures, 0 output buffers swapped out
  0 carrier transitions
  DCD=up DSR=up DTR=up RTS=up CTS=up
```

Examine los sucesores y las distancias factibles en la tabla de enrutamiento de R2.

```
10.0.0.0/30 is subnetted, 1 subnets
C    10.1.1.0 is directly connected, Loopback1
172.16.0.0/16 is variably subnetted, 4 subnets, 3 masks
D    172.16.0.0/16 is a summary, 00:00:52, Null0
D    172.16.1.0/24 [90/40514560] via 172.16.3.1, 00:00:52, Serial0/0/0
C    172.16.2.0/24 is directly connected, FastEthernet0/0
C    172.16.3.0/30 is directly connected, Serial0/0/0
D    192.168.1.0/24 [90/3014400] via 192.168.10.10, 00:00:11, Serial0/0/1
192.168.10.0/24 is variably subnetted, 3 subnets, 2 masks
D    192.168.10.0/24 is a summary, 00:00:11, Null0
D    192.168.10.4/30 [90/3523840] via 192.168.10.10, 00:00:11,
```

Como último paso Conteste las siguientes preguntas:

1.- ¿Cuál es la mejor ruta hacia PC1?

De R2 –R1-PC1 Dirección de siguiente salto 172.16.3.1

2.- ¿Cuál es la dirección IP y el nombre del router sucesor en esta ruta?

172.16.3.1 R1 (Xavi).

3.- ¿Cuál es la distancia factible hacia la red en la que se encuentra PC1?

40514560

4.- Examine la tabla de enrutamiento en R1.

```
172.16.0.0/16 is variably subnetted, 4 subnets, 3 masks
D    172.16.0.0/16 is a summary, 00:42:59, Null0
C    172.16.1.0/24 is directly connected, FastEthernet0/0
D    172.16.2.0/24 [90/40514560] via 172.16.3.2, 00:43:00, Serial0/0/0
C    172.16.3.0/30 is directly connected, Serial0/0/0
D    192.168.1.0/24 [90/2172416] via 192.168.10.6, 00:42:26, Serial0/0/1
192.168.10.0/24 is variably subnetted, 3 subnets, 2 masks
D    192.168.10.0/24 is a summary, 00:42:20, Null0
C    192.168.10.4/30 is directly connected, Serial0/0/1
D    192.168.10.8/30 [90/3523840] via 192.168.10.6, 00:42:20,
Serial0/0/1
R1#
```

5.- ¿Cuál es la distancia notificada hacia la red 192.168.1.0?

2172416

6.- Utilice el comando ip eigrp topology para visualizar la tabla de topología EIGRP en R2.

```
R2#show ip eigrp topology
IP-EIGRP Topology Table for AS 1

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

P 172.16.2.0/24, 1 successors, FD is 28160
   via Connected, FastEthernet0/0
P 172.16.3.0/30, 1 successors, FD is 40512000
   via Connected, Serial0/0/0
P 192.168.10.8/30, 1 successors, FD is 3011840
   via Connected, Serial0/0/1
P 172.16.0.0/16, 1 successors, FD is 28160
   via Summary (28160/0), Null0
P 192.168.10.0/24, 1 successors, FD is 3011840
   via Summary (3011840/0), Null0
P 172.16.1.0/24, 1 successors, FD is 40514560
   via 172.16.3.1 (40514560/28160), Serial0/0/0
P 192.168.1.0/24, 1 successors, FD is 3014400
   via 192.168.10.10 (3014400/28160), Serial0/0/1
   via 172.16.3.1 (41026560/2172416), Serial0/0/0
P 192.168.10.4/30, 1 successors, FD is 3523840
   via 192.168.10.10 (3523840/2169856), Serial0/0/1

R2#
```

7.- Visualice la información detallada de la topología EIRGP.

```
R2#show ip eigrp topology 192.168.1.0
IP-EIGRP (AS 1): Topology entry for 192.168.1.0/24
  State is Passive, Query origin flag is 1, 1 Successor(s), FD is 3014400
  Routing Descriptor Blocks:
  192.168.10.10 (Serial0/0/1), from 192.168.10.10, Send flag is 0x0
    Composite metric is (3014400/28160), Route is Internal
    Vector metric:
      Minimum bandwidth is 1024 Kbit
      Total delay is 20100 microseconds
      Reliability is 255/255
      Load is 1/255
      Minimum MTU is 1500
      Hop count is 1
  172.16.3.1 (Serial0/0/0), from 172.16.3.1, Send flag is 0x0
    Composite metric is (41026560/2172416), Route is Internal
    Vector metric:
      Minimum bandwidth is 64 Kbit
      Total delay is 40100 microseconds
      Reliability is 255/255
      Load is 1/255
      Minimum MTU is 1500
      Hop count is 2

R2#
```

8.- ¿Cuál es la distancia factible hacia la red 192.168.1.0?

3014400

9.- ¿R2 consideraría a R1 como un sucesor factible hacia la red 192.168.1.0?

NO

10.- ¿Cuántos sucesores hay para esta red?

1

11.- ¿Cuál es la distancia factible hacia esta red?

3014400

12.- ¿Cuál es la dirección IP del sucesor factible?

192.168.10.10

13.- ¿Cuál es la distancia notificada para 192.168.1.0 desde el sucesor factible?

28160

14.- ¿Cuál sería la distancia factible hacia 192.168.1.0 si R1 fuera el sucesor?

41026560

15.- ¿Por qué el router R1 (192.168.10.5) es el único sucesor para la ruta hacia la red 172.16.0.0/16?

16.- Por qué el enlace de R1 y R3 tiene un ancho de banda mayor y por lo tanto una métrica menor.

17.- Desactive el resumen automático en los tres routers con el comando no auto-summary.

Router 1

```
Bienvenido a la materia de redes de computadora
banner motd
Xavi>enable
Password:
Xavi#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Xavi(config)#router eigrp 1
Xavi(config-router)#no auto-summary
Xavi(config-router)#end
Xavi#
%SYS-5-CONFIG_I: Configured from console by console
|
```

Router 2

```
banner motd
Balotelli>enable
Password:
Balotelli#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Balotelli(config)#router eigrp 1
Balotelli(config-router)#no auto-summary
Balotelli(config-router)#end
Balotelli#
%SYS-5-CONFIG_I: Configured from console by console
|
```

## Router 3

```
redes de computadoras unidad5
banner motd
Puyol>enable
Password:
Puyol#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Puyol(config)#router eigrp 1
Puyol(config-router)#no auto-summary
Puyol(config-router)#end
Puyol#
%SYS-5-CONFIG_I: Configured from console by console
```

18.- Agregue dos direcciones loopback, 192.168.2.1/24 y 192.168.3.1/24, al router R3.

```
Puyol>enable
Password:
Puyol#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Puyol(config)#interface loopback1

Puyol(config-if)#
%LINK-5-CHANGED: Interface Loopback1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state to up
Puyol(config-if)#ip address 192.168.2.1 255.255.255.0
Puyol(config-if)#interface loopback2

Puyol(config-if)#
%LINK-5-CHANGED: Interface Loopback2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback2, changed state to up
Puyol(config-if)#ip address 192.168.3.1 255.255.255.0
Puyol(config-if)#end
```

19.- Agregue las redes 192.168.2.0 y 192.168.3.0 a la configuración EIGRP en R3.

```
Puyol#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Puyol(config)#router eigrp 1
Puyol(config-router)#network 192.168.2.0
Puyol(config-router)#network 192.168.3.0
Puyol(config-router)#end
Puyol#
%SYS-5-CONFIG_I: Configured from console by console

Puyol#
```

## **Conclusión**

En esta práctica se aprendió a configurar un router desde sus comandos más simples hasta levantar el protocolo eigrp del mismo, se empezó por el clásico cambio de nombre de router, el abastecimiento de una contraseña y la colocación de un banner de bienvenida para cada uno de ellos. A continuación se mostró como se levantan los puertos seriales y los fastethernet de todos los Routers para su comunicación. Se mostró también la funcionalidad de algunos códigos de acceso al router para la configuración del protocolo eigrp y sus características mediante un comando.