



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: 1 de JUNIO del 2015

Objetivo: Al completar esta práctica de laboratorio, usted podrá:

- 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.
- Determinar rutas de nivel 1 y nivel 2.
- Modificar la configuración para reflejar el enrutamiento estático y el enrutamiento predeterminado.
- Habilitar el enrutamiento con clase e investigar su comportamiento.
- Habilitar el enrutamiento sin clase e investigar su comportamiento.

Instrucciones:

- 1.- Crear la topología de la red.
- 2.- Realizar la tabla de enrutamiento.
- 3.- Realizar configuraciones iniciales.
- 4.- Comprobar la conectividad.

Materiales:

Programa de simulacion Packet Tracer

Escenario.

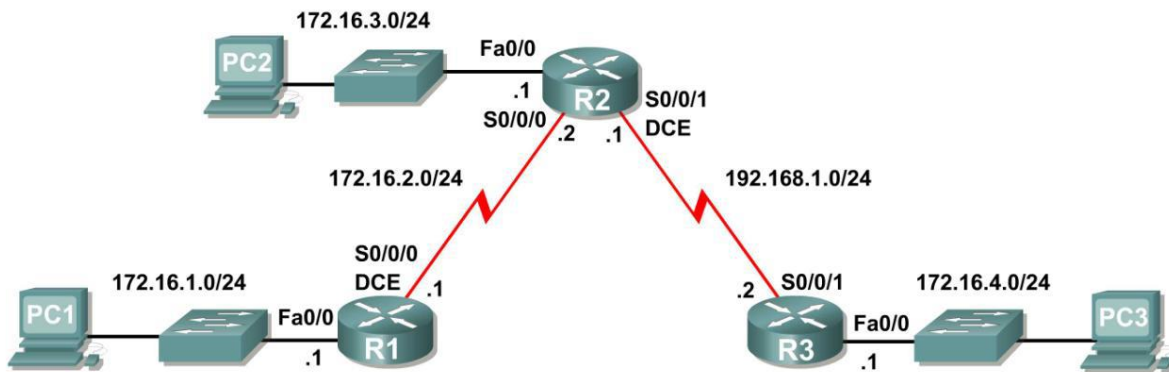


Tabla de enrutamiento

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	172.16.2.1	255.255.255.0	No aplicable
R2	Fa0/0	172.16.3.1	255.255.255.0	No aplicable
	S0/0/0	172.16.2.2	255.255.255.0	No aplicable
	S0/0/1	192.168.1.1	255.255.255.0	No aplicable
R3	Fa0/0	172.16.4.1	255.255.255.0	No aplicable
	S0/0/1	192.168.1.2	255.255.255.0	No aplicable
PC1	NIC	172.16.1.10	255.255.255.0	172.16.1.1
PC2	NIC	172.16.3.10	255.255.255.0	172.16.3.1
PC3	NIC	172.16.4.10	255.255.255.0	172.16.4.1

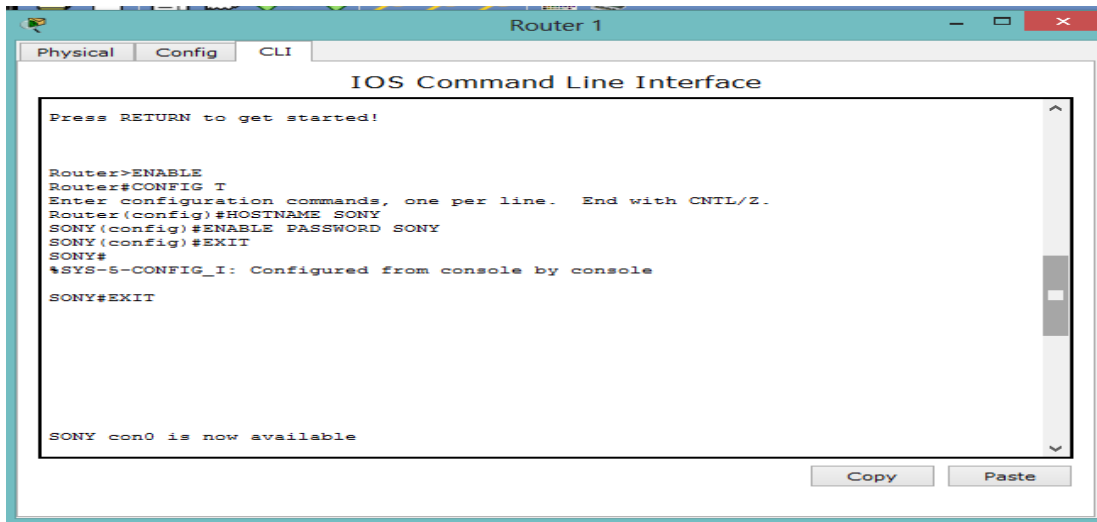
Realización de las configuraciones básicas del router.

R1 (SONY).

Cambio de nombre

Configuración de un password.

Configure un mensaje del día.



```
Router 1
Physical Config CLI
IOS Command Line Interface

Press RETURN to get started!

Router>ENABLE
Router#CONFIG T
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#HOSTNAME SONY
SONY(config)#ENABLE PASSWORD SONY
SONY(config)#EXIT
SONY#
%SYS-5-CONFIG_I: Configured from console by console

SONY#EXIT

SONY con0 is now available

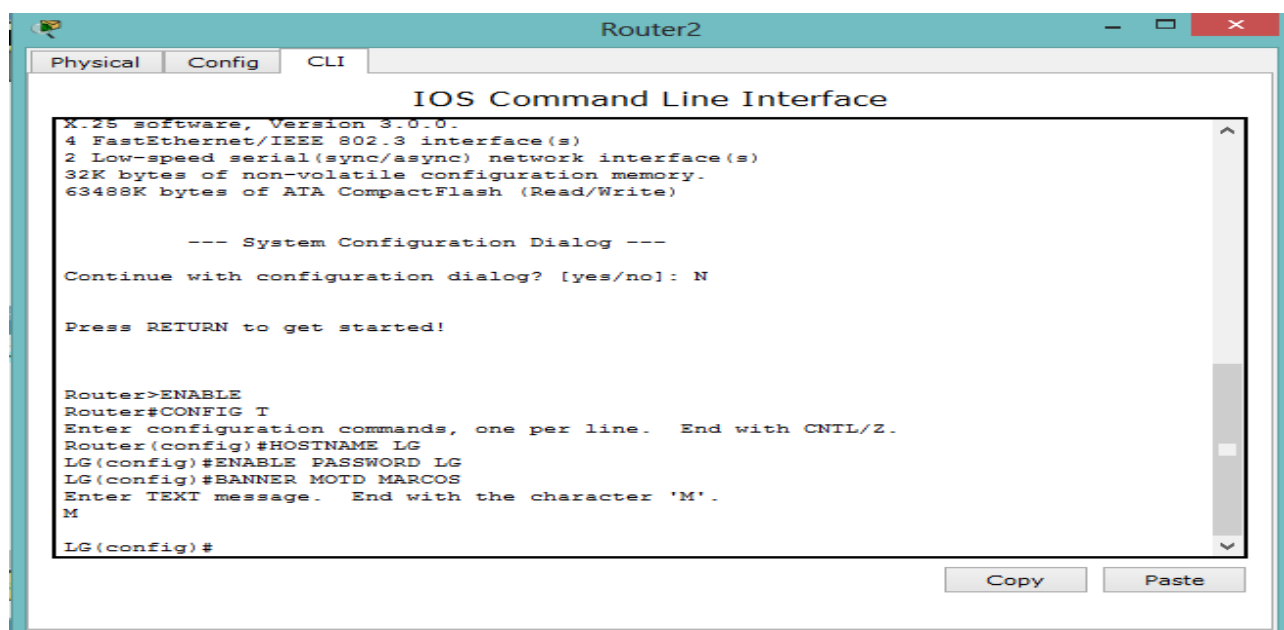
Copy Paste
```

R2 (LG).

Cambio del nombre.

Asignación de una contraseña.

Configure un mensaje del día.



```
Router2
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#CONFIG T
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#HOSTNAME LG
LG(config)#ENABLE PASSWORD LG
LG(config)#BANNER MOID MARCOS
Enter TEXT message. End with the character 'M'.
M
LG(config)#

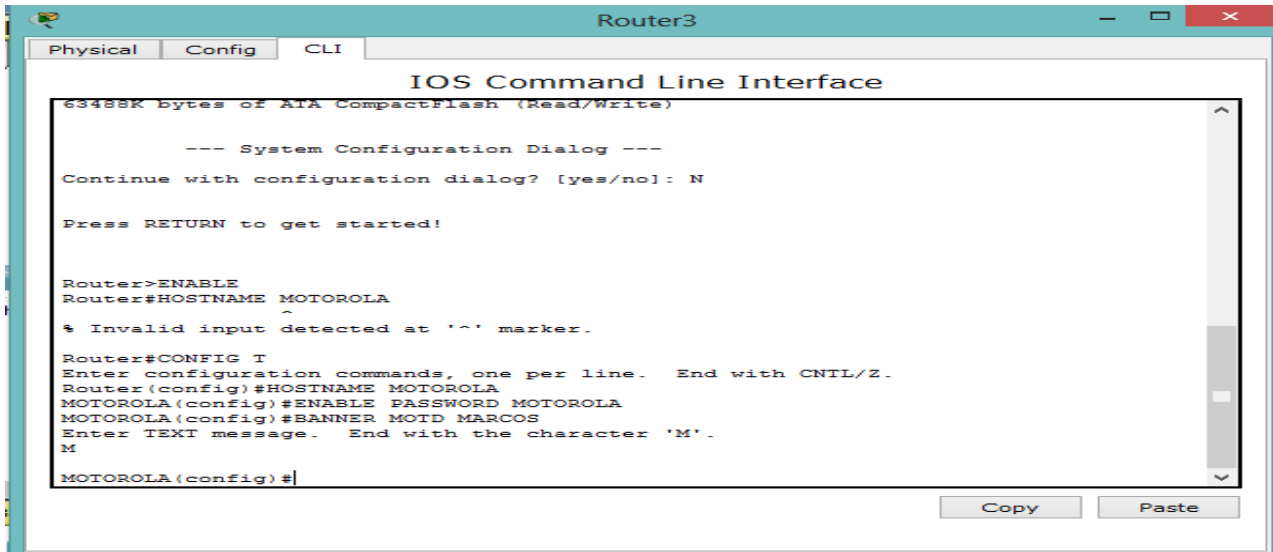
Copy Paste
```

R3 (MOTOROLA).

Cambio de nombre

Asignación de una contraseña.

Configure un mensaje del día.



```
Router3
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#HOSTNAME MOTOROLA
^
% Invalid input detected at '^' marker.
Router#CONFIG T
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#HOSTNAME MOTOROLA
MOTOROLA(config)#ENABLE PASSWORD MOTOROLA
MOTOROLA(config)#BANNER MOID MARCOS
Enter TEXT message. End with the character 'M'.
M
MOTOROLA(config)#
```

Configuración y activación de las direcciones serial y Ethernet.

Configure las interfaces de los routers R1, R2 y R3 con las direcciones IP de la tabla que se encuentra debajo del Diagrama de topología.

R1

Puerto fa0/0

```
Router>enable
Router#d:
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fa0/0
Router(config-if)#ip address 172.16.1.1 255.255.255.0
Router(config-if)#no shut

Router(config-if)#
%CHANGED: Interface FastEthernet0/0, changed state to up
%OTD-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to
Router(config-if)#
```

Serial 2/0.

```
>enable
:
:
:conf t
:configuration commands, one per line. End with CNTL/Z.
(config)#interface fa0/0
(config-if)#ip address 172.16.1.1 255.255.255.0
(config-if)#no shut

(config-if)#
!-CHANGED: Interface FastEthernet0/0, changed state to up

!PROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to down

(config-if)#exit
(config)#interface s2/0
(config-if)#ip address 172.16.2.1 255.255.255.0
(config-if)#no shut

!-CHANGED: Interface Serial2/0, changed state to down
(config-if)#
```

R2.

Puerto fa/0

```
>enable
ord:
#conf t
 configuration commands, one per line. End with CNTL/Z.
(config)#interface fa0/0
(config-if)#ip address 172.16.3.1 255.255.255.0
(config-if)#no shut

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

!PROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to down

(config-if)#
```

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Serial 2/0

```
>enable
>rd:
#conf t
  configuration commands, one per line.  End with CNTL/Z.
(config)#interface fa0/0
(config-if)#ip address 172.16.3.1 255.255.255.0
(config-if)#no shut

(config-if)#
-S-CHANGED: Interface FastEthernet0/0, changed state to up

PROTO-S-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state t

(config-if)#exit
(config)#interface s2/0
(config-if)#ip address 172.16.2.2 255.255.255.0
(config-if)#no shut

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

(config-if)#|
```

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Serial 3/0

```
config-if)#
-S-CHANGED: Interface FastEthernet0/0, changed state to up

PROTO-S-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state t

config-if)#exit
config)#interface s2/0
config-if)#ip address 172.16.2.2 255.255.255.0
config-if)#no shut

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

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

config-if)#exit
config)#interface s3/0
config-if)#ip address 192.168.1.1 255.255.255.0
config-if)#no shut

-S-CHANGED: Interface Serial3/0, changed state to down
config-if)#
```

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R3.

Puerto fa0/0.

```
>enable
rd:
#conf t
configuration commands, one per line. End with CNTL/Z.
(config)#interface fa0/0
(config-if)#ip address 172.16.4.1 255.255.255.0
(config-if)#no shut

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

ROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state t

(config-if)#
```

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Serial 2/0

```
>enable
rd:
#conf t
configuration commands, one per line. End with CNTL/Z.
(config)#interface fa0/0
(config-if)#ip address 172.16.4.1 255.255.255.0
(config-if)#no shut

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

ROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state t

(config-if)#exit
(config)#interface s2/0
(config-if)#ip address 192.168.1.2 255.255.255.0
(config-if)#no shut

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

(config-if)#
```

Verificar el direccionamiento IP y las interfaces. Utilizando el comando show ip interface brief para verificar que el direccionamiento IP es correcto y que las interfaces están activas.

R1.

```
>enable
rd:
#conf t
configuration commands, one per line.  End with CNIL/Z.
(config)#exit
#
-CONFIG_I: Configured from console by console

#show ip interface brief
ace          IP-Address      OK? Method Status          Protocol

hernet0/0    172.16.1.1       YES manual up              up
hernet1/0    unassigned       YES unset  administratively down down
2/0          172.16.2.1       YES manual up              up
3/0          unassigned       YES unset  administratively down down
hernet4/0    unassigned       YES unset  administratively down down
hernet5/0    unassigned       YES unset  administratively down down
#
```

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R2.

```
ieria en TICS

r motd

>enable
ord:
#show ip interface brief
face          IP-Address      OK? Method Status          Protocol

thernet0/0    172.16.3.1       YES manual up              up
thernet1/0    unassigned       YES unset  administratively down down
12/0          172.16.2.2       YES manual up              up
13/0          192.168.1.1      YES manual up              up
thernet4/0    unassigned       YES unset  administratively down down
thernet5/0    unassigned       YES unset  administratively down down
#
```

Copy

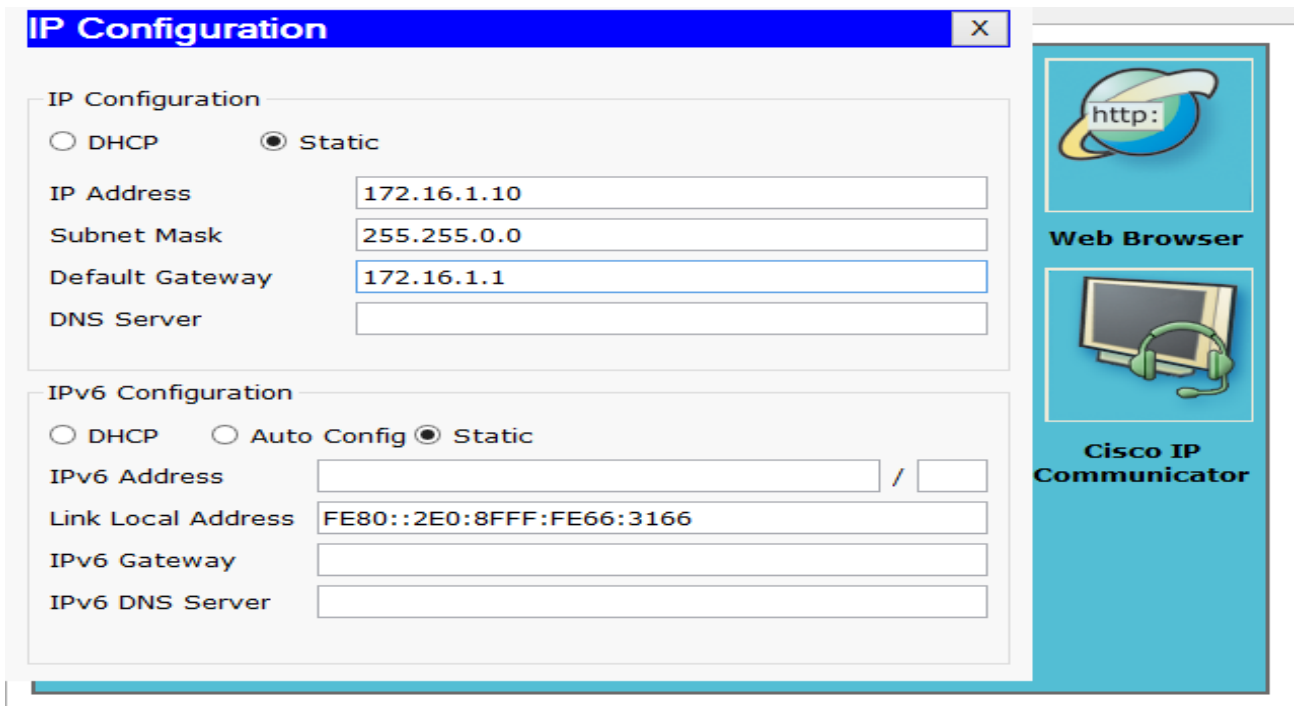
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R3.

```
enable
#
R3#show ip interface brief
Interface                IP-Address      OK? Method Status  Protocol
Ethernet0/0              172.16.4.1      YES manual  up      up
Ethernet1/0              unassigned      YES unset   administratively down down
Ethernet2/0              192.168.1.2    YES manual  up      up
Ethernet3/0              unassigned      YES unset   administratively down down
Ethernet4/0              unassigned      YES unset   administratively down down
Ethernet5/0              unassigned      YES unset   administratively down down
```

Configurar las interfaces Ethernet de las PC1, PC2 y PC3.

PC1.



IP Configuration X

IP Configuration

DHCP Static

IP Address: 172.16.1.10

Subnet Mask: 255.255.0.0

Default Gateway: 172.16.1.1

DNS Server:

IPv6 Configuration

DHCP Auto Config Static

IPv6 Address: /

Link Local Address: FE80::2E0:8FFF:FE66:3166

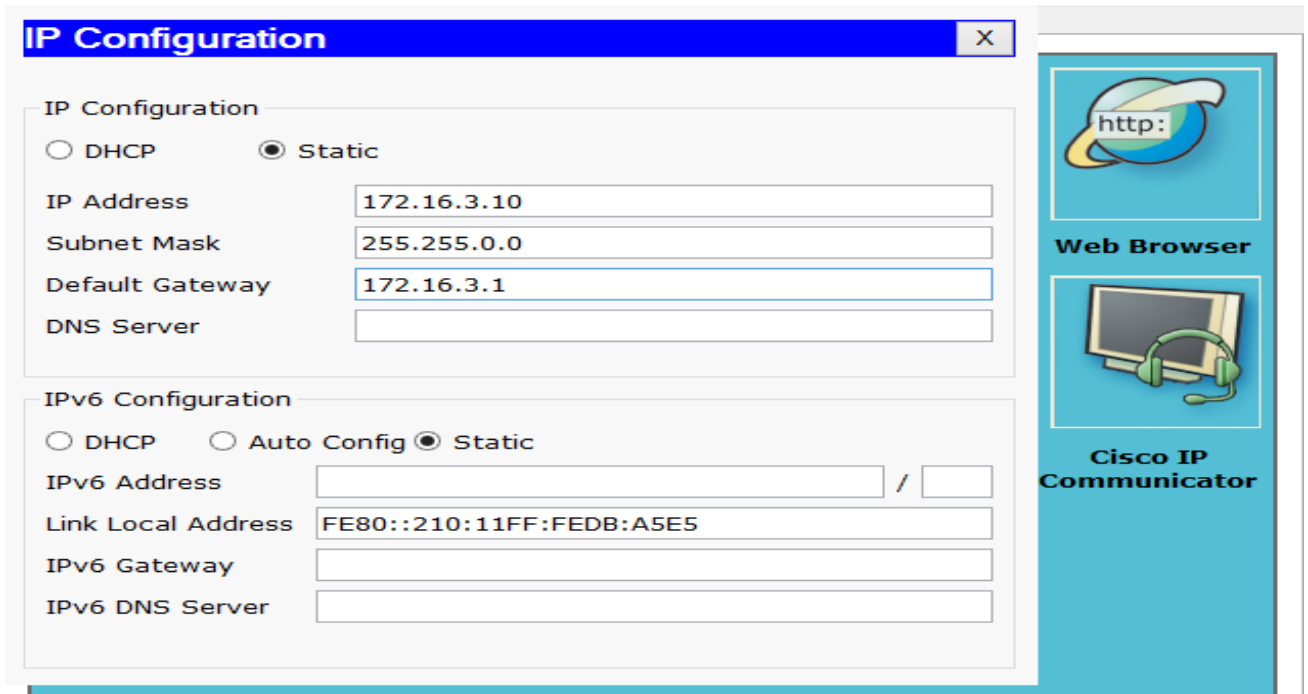
IPv6 Gateway:

IPv6 DNS Server:

Web Browser

Cisco IP Communicator

PC2.



The screenshot shows the IP Configuration window for PC2. The window title is "IP Configuration" with a close button (X). It is divided into two sections: "IP Configuration" and "IPv6 Configuration".

IP Configuration:

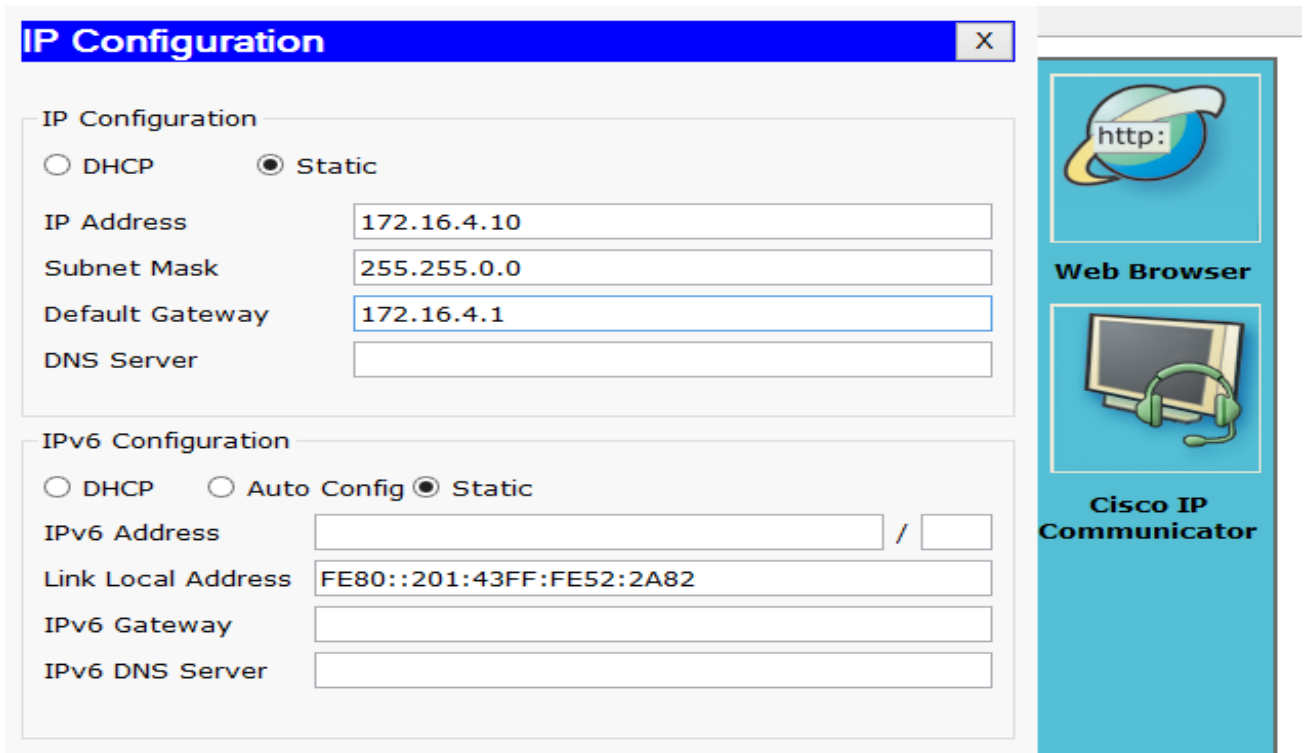
- Radio buttons: DHCP, Static
- IP Address: 172.16.3.10
- Subnet Mask: 255.255.0.0
- Default Gateway: 172.16.3.1
- DNS Server: (empty)

IPv6 Configuration:

- Radio buttons: DHCP, Auto Config, Static
- IPv6 Address: (empty) / (empty)
- Link Local Address: FE80::210:11FF:FEDB:A5E5
- IPv6 Gateway: (empty)
- 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 headset icon).

PC3.



The screenshot shows the IP Configuration window for PC3. The window title is "IP Configuration" with a close button (X). It is divided into two sections: "IP Configuration" and "IPv6 Configuration".

IP Configuration:

- Radio buttons: DHCP, Static
- IP Address: 172.16.4.10
- Subnet Mask: 255.255.0.0
- Default Gateway: 172.16.4.1
- DNS Server: (empty)

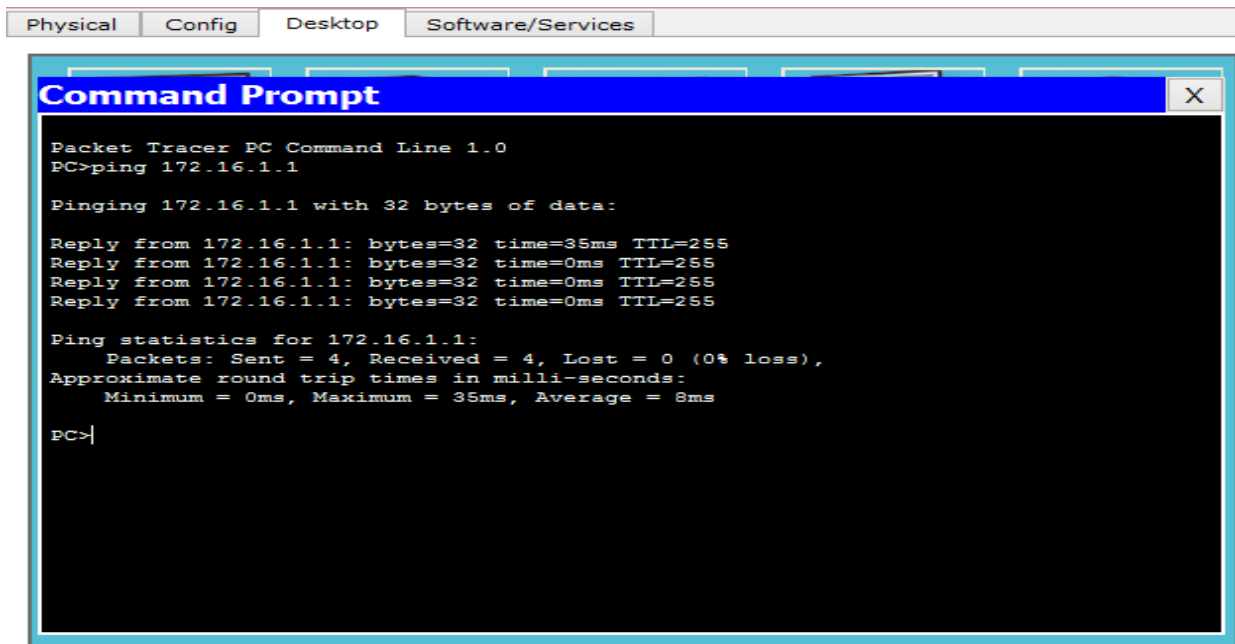
IPv6 Configuration:

- Radio buttons: DHCP, Auto Config, Static
- IPv6 Address: (empty) / (empty)
- Link Local Address: FE80::201:43FF:FE52:2A82
- IPv6 Gateway: (empty)
- 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 headset icon).

Probar la configuración de la PC ejecutando un ping desde la PC al gateway por defecto.

Ping de PC1.



The screenshot shows a Packet Tracer PC Command Line window with the following text:

```
Packet Tracer PC Command Line 1.0
PC>ping 172.16.1.1

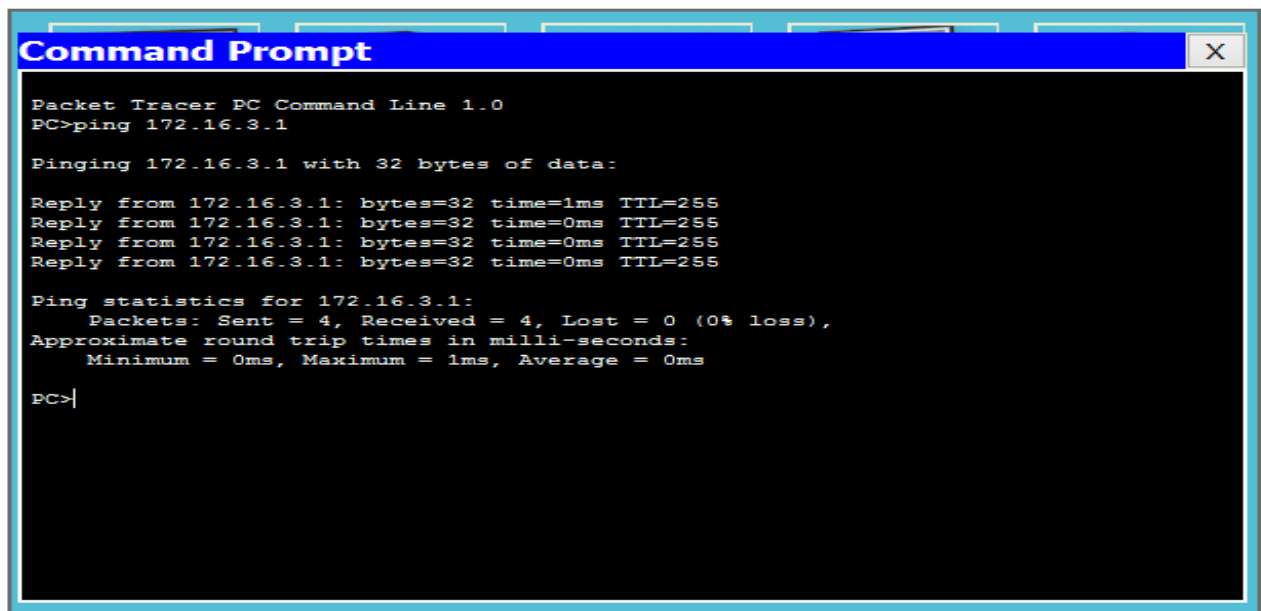
Pinging 172.16.1.1 with 32 bytes of data:

Reply from 172.16.1.1: bytes=32 time=35ms TTL=255
Reply from 172.16.1.1: bytes=32 time=0ms TTL=255
Reply from 172.16.1.1: bytes=32 time=0ms TTL=255
Reply from 172.16.1.1: bytes=32 time=0ms TTL=255

Ping statistics for 172.16.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 35ms, Average = 8ms

PC>|
```

Ping de PC2.



The screenshot shows a Packet Tracer PC Command Line window with the following text:

```
Packet Tracer PC Command Line 1.0
PC>ping 172.16.3.1

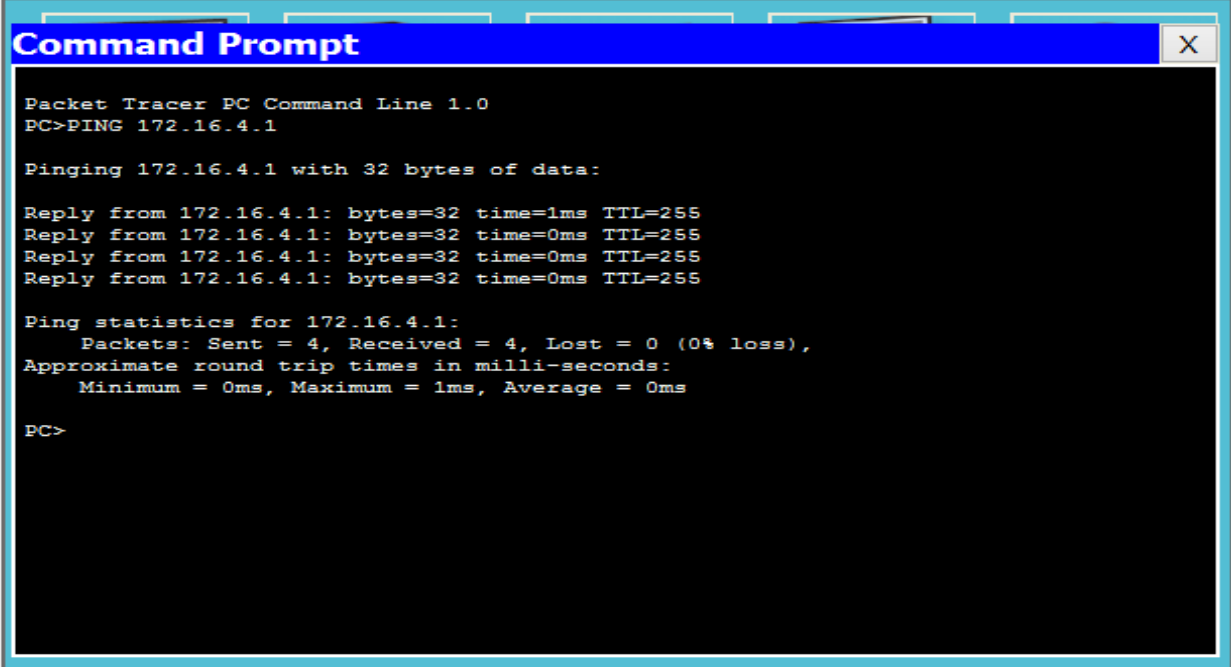
Pinging 172.16.3.1 with 32 bytes of data:

Reply from 172.16.3.1: bytes=32 time=1ms TTL=255
Reply from 172.16.3.1: bytes=32 time=0ms TTL=255
Reply from 172.16.3.1: bytes=32 time=0ms TTL=255
Reply from 172.16.3.1: bytes=32 time=0ms TTL=255

Ping statistics for 172.16.3.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC>|
```

Ping de PC3.



```
Command Prompt
Packet Tracer PC Command Line 1.0
PC>PING 172.16.4.1

Pinging 172.16.4.1 with 32 bytes of data:

Reply from 172.16.4.1: bytes=32 time=1ms TTL=255
Reply from 172.16.4.1: bytes=32 time=0ms TTL=255
Reply from 172.16.4.1: bytes=32 time=0ms TTL=255
Reply from 172.16.4.1: bytes=32 time=0ms TTL=255

Ping statistics for 172.16.4.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC>
```

Configure el enrutamiento RIP, versión 1, en cada uno de los routers. Incluya los extractos network para cada una de las redes conectadas directamente.

R1

```
>enable
cd:
#conf t
configuration commands, one per line. End with CNTL/Z.
(config)#router rip
(config-router)#network 172.16.1.0
(config-router)#network 172.16.2.0
(config-router)#end
#
-CONFIG_I: Configured from console by console
#
```

R2.

```
>enable
rd:
#conf t
configuration commands, one per line. End with CNTL/Z.
(config)#router rip
(config-router)#network 172.16.3.0
(config-router)#network 172.16.2.0
(config-router)#network 192.168.1.0
(config-router)#end
#
5-CONFIG_I: Configured from console by console
#
```

Copy

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R3.

```
>enable
rd:
#conf t
configuration commands, one per line. End with CNTL/Z.
(config)#router rip
(config-router)#172.16.4.0
^
lid input detected at '^' marker.

(config-router)#network 172.16.4.0
(config-router)#network 192.168.1.0
(config-router)#end
#
-CONFIG_I: Configured from console by console
#
```

Visualice la tabla de enrutamiento en el router R1.

```
>enable
rd:
#show ip route
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

y of last resort is not set

72.16.0.0/24 is subnetted, 3 subnets
 172.16.1.0 is directly connected, FastEthernet0/0
 172.16.2.0 is directly connected, Serial2/0
 172.16.3.0 [120/1] via 172.16.2.2, 00:00:01, Serial2/0
92.168.1.0/24 [120/1] via 172.16.2.2, 00:00:01, Serial2/0
#
```

Visualice la tabla de enrutamiento en el router R2.

```
>enable
ord:
#show ip route
: 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

ay of last resort is not set

172.16.0.0/24 is subnetted, 3 subnets
  172.16.1.0 [120/1] via 172.16.2.1, 00:00:01, Serial2/0
  172.16.2.0 is directly connected, Serial2/0
  172.16.3.0 is directly connected, FastEthernet0/0
192.168.1.0/24 is directly connected, Serial3/0
#
```

Copy Paste

Visualice la tabla de enrutamiento en el router R3.

```
>enable
rd:
#show ip route
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

y of last resort is not set

72.16.0.0/24 is subnetted, 2 subnets
  172.16.1.0 is possibly down, routing via 192.168.1.1, Serial2/0
  172.16.4.0 is directly connected, FastEthernet0/0
92.168.1.0/24 is directly connected, Serial2/0
#
```

Copy Paste

Utilice el comando debug ip routing para observar los cambios en la tabla de enrutamiento cuando se producen en el router R1.

```
>enable
rd:
#debug ip routing
ting debugging is on
#
```

Copy Paste

Apague la interfaz Serial0/0/0 y observe el resultado de debug.

```
%LINK-S-CHANGED: Interface Serial2/0, changed state to administratively down
%LINEPROTO-S-UPDOWN: Line protocol on Interface Serial2/0, changed state to down

RT: interface Serial2/0 removed from routing table
RT: del 172.16.2.0 via 0.0.0.0, connected metric [0/0]
RT: delete network route to 172.16.2.0
RT: NET-RED 172.16.2.0/24
RT: del 172.16.3.0 via 172.16.2.2, rip metric [120/1]
RT: delete network route to 172.16.3.0
RT: NET-RED 172.16.3.0/24
RT: del 192.168.1.0 via 172.16.2.2, rip metric [120/1]
RT: delete network route to 192.168.1.0
RT: NET-RED 192.168.1.0/24
```

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Visualice la tabla de enrutamiento del router R1 y observe los cambios que se produjeron cuando se desactivó la interfaz Serial0/0/0.

```
-CONFIG_I: Configured from console by console

#show ip route
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

y of last resort is not set

72.16.0.0/24 is subnetted, 1 subnets
 172.16.1.0 is directly connected, FastEthernet0/0
```

Habilite la interfaz Serial2/0 y observe el resultado de debug.

```
Interface Serial2/0 added to routing table
I_LAST_RDB for 172.16.2.0/24

# rdb: is directly connected

i 172.16.2.0/24 via 0.0.0.0, connected metric [0/0]
I-RED 172.16.2.0/24
I_LAST_RDB for 172.16.3.0/24

# rdb: via 172.16.2.2

i 172.16.3.0/24 via 172.16.2.2, rip metric [120/1]
I-RED 172.16.3.0/24
I_LAST_RDB for 192.168.1.0/24

# rdb: via 172.16.2.2

i 192.168.1.0/24 via 172.16.2.2, rip metric [120/1]
I-RED 192.168.1.0/24

(config-if)#
```

Examine la tabla de enrutamiento de R1.

```
config-if)#exit
config)#exit
:CONFIG_I: Configured from console by console

:debug ip routing
:ing debugging is on
:
:debug ip routing
:ing debugging is on
:show ip rpute
^
:did input detected at '^' marker.

:show ip route
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

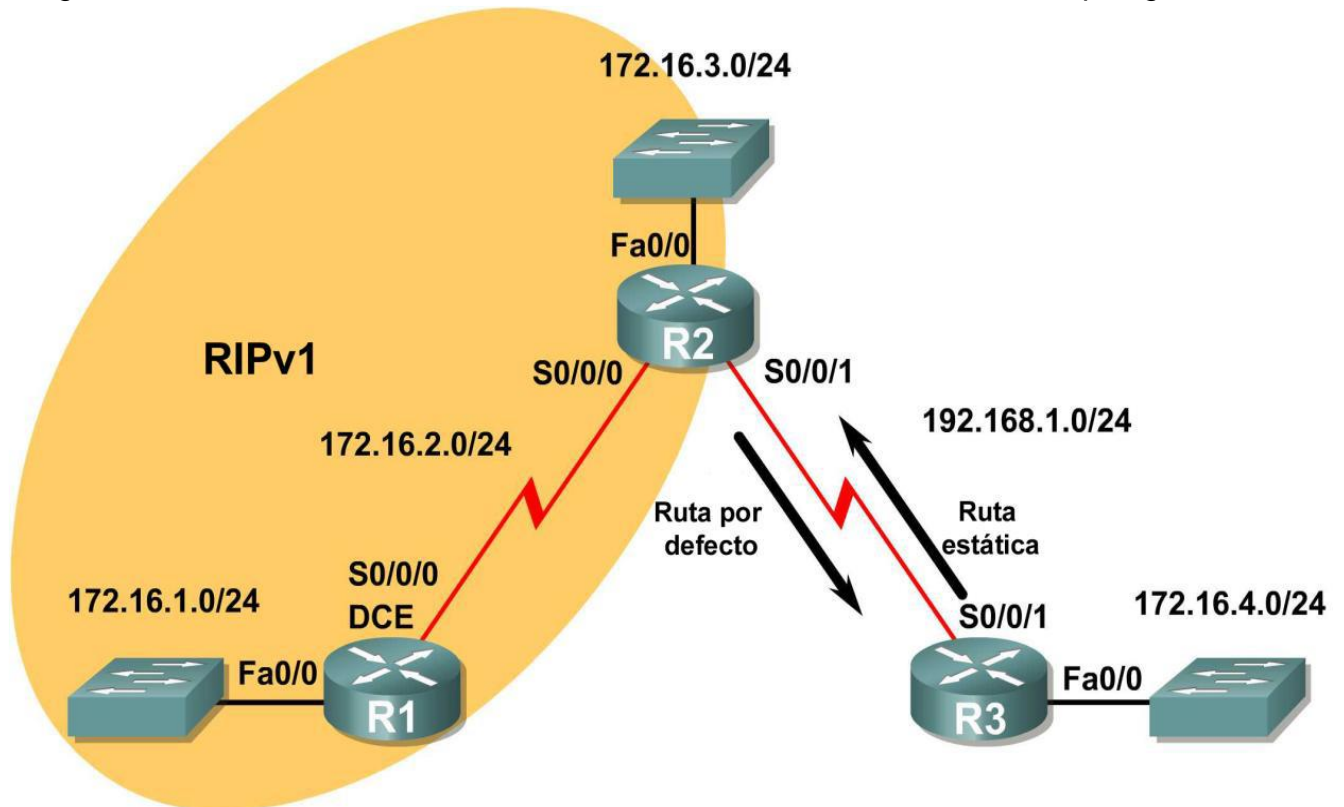
r of last resort is not set

2.16.0.0/24 is subnetted, 3 subnets
 172.16.1.0 is directly connected, FastEthernet0/0
 172.16.2.0 is directly connected, Serial2/0
 172.16.3.0 [120/1] via 172.16.2.2, 00:00:19, Serial2/0
2.168.1.0/24 [120/1] via 172.16.2.2, 00:00:19, Serial2/0
```

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Escenario B: Comportamiento del enrutamiento con clase y sin clase

Diagrama de topología



Tarea 1: Realizar cambios entre el Escenario A y el Escenario B.

Paso 1: Elimine la configuración RIP de R3 y configure una ruta estática a 172.16.0.0/16.

```
>enable
ating "enable"...domain server (255.255.255.255)
own command or computer name, or unable to find computer address

>enable
rd:
#conf t
configuration commands, one per line. End with CNTL/Z.
(config)#no router rip
(config)#ip route 172.16.0.0 255.255.0.0 serial2/0
(config)#
```

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Paso 2: Elimine la red 192.168.1.0 de la configuración RIP de R2.

Paso 3: Agregue una ruta estática por defecto a R3 en el router R2.

Incluya el comando default-information originate en la configuración para que la ruta estática por defecto se incluya en las actualizaciones de RIP.

```
>enable
>rd:
#conf t
configuration commands, one per line. End with CNTL/Z.
(config)#router rip
(config-router)#no network 192.168.1.0
(config-router)#exit
(config)#ip route 0.0.0.0 0.0.0.0 serial2/0
~
alid input detected at '^' marker.

(config)#ip route 192.168.0.0 255.255.255.0 serial2/0
(config)#router rip
(config-router)#default-information originate
(config-router)#
```

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Tarea 2: Habilitar el comportamiento del enrutamiento con clase en los routers

Paso 1: Utilice el comando no ip classless para configurar el proceso de búsqueda de rutas para utilizar las búsquedas de rutas con clase.

R1

R1 (config)#no ip classless

R2

R2 (config)#no ip classless

R3

R3 (config)#no ip classless

