

INSTITUTO TÉCNICO DE SALINA CRUZ
REDES DE COMPUTADORA

SEMESTRE FEBRERO-AGOSTO 2015

REPORTE DE PRÁCTICAS

PRACTICA N°: 5

UNIDAD: 2

FECHA: 27 DE MARZO DE 2015

NOMBRE: EDUARDO SALAZAR IRRIZARI

Objetivo:

Identificar el enrutamiento estático y dinámico, además de aplicar el enrutamiento estático a una red WAN.

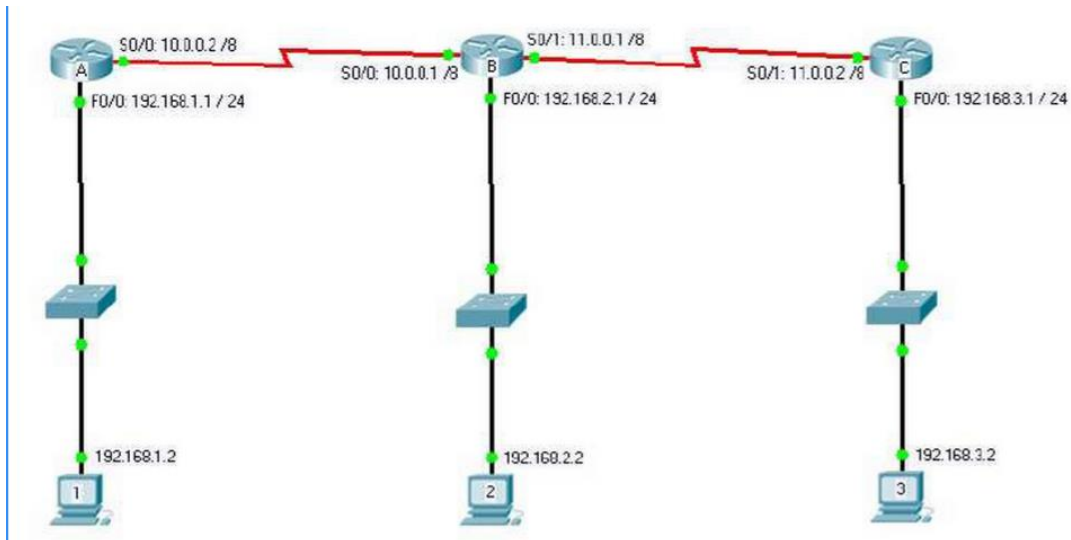
Instrucciones:

- 1.- Cambiar de nombre a los dispositivos.
- 2.- configurar banner a ambos router's.
- 3.- levantar los puertos fa0 a ambos routers.
- 4.- levantar los seriales de ambos routers.
6. Comprobar conexiones por medio de ping.

Materiales:

- 1.- computadora.
- 2.- Packet tracet.

INSTITUTO TECNOLÓGICO DE SALINA CRUZ
REDES DE COMPUTADORAS
PRACTICAS UNIDAD 2



PASO 1

Construir la tabla de direccionamiento

Dispositivo	Interfaz	Dirección IP	Mascara de subred	Gateway
R1	Fa0/0	192.168.1.1	255.255.255.0	No aplicable
	S2/0	10.0.0.2	255.0.0.0	No aplicable
R2	Fa0/0	192.168.2.1	255.255.255.0	No aplicable
	S2/0	10.0.0.1	255.0.0.0	No aplicable
R3	Fa0/0	192.168.3.1	255.255.255.0	No aplicable
	S2/0	11.0.0.2	255.0.0.0	No aplicable
PC1	No aplicable	192.168.1.2	255.255.255.0	192.168.1.1
PC2	No aplicable	192.168.2.2	255.255.255.0	192.168.1.2
PC3	No aplicable	192.168.3.2	255.255.255.0	192.168.1.3

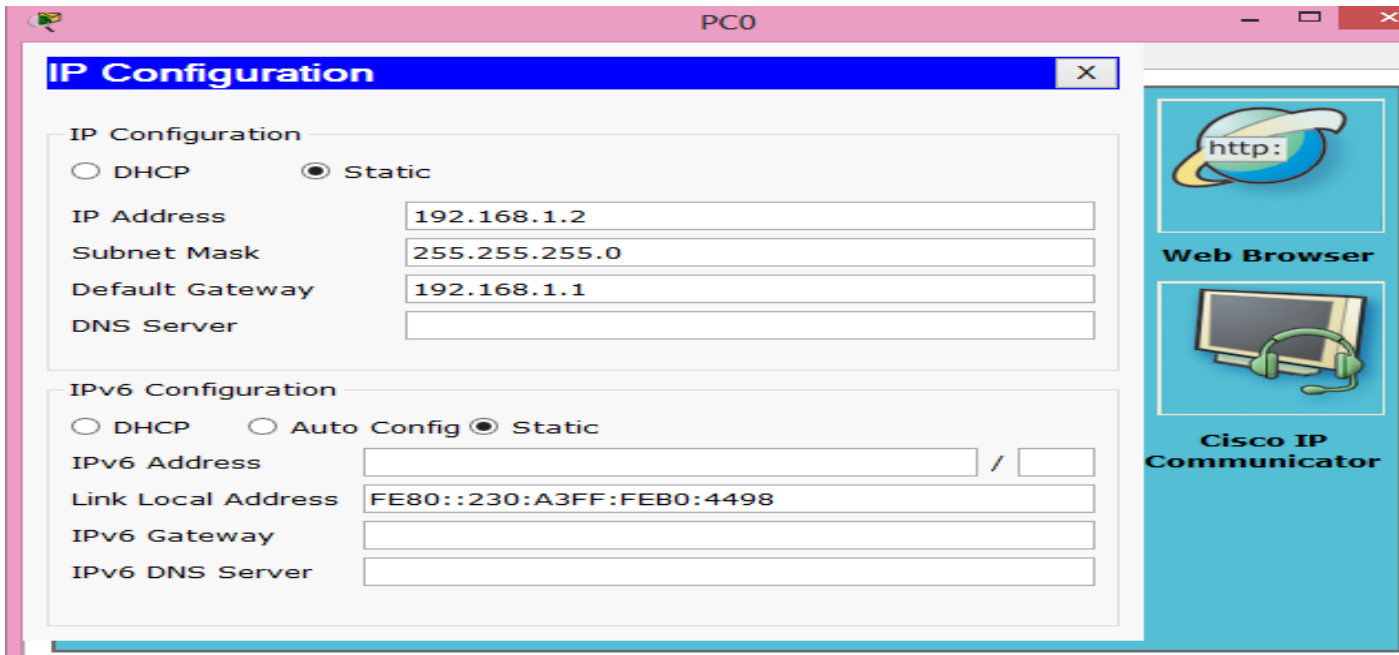
PASO 2

CONFIGURACIÓN INICIAL

A) HOST

*Agregar puerta de enlace

PC1



The screenshot shows a window titled "PC0" with a blue header bar. Inside, there is a window titled "IP Configuration" with a close button (X). The window is divided into two sections: "IP Configuration" and "IPv6 Configuration".

IP Configuration

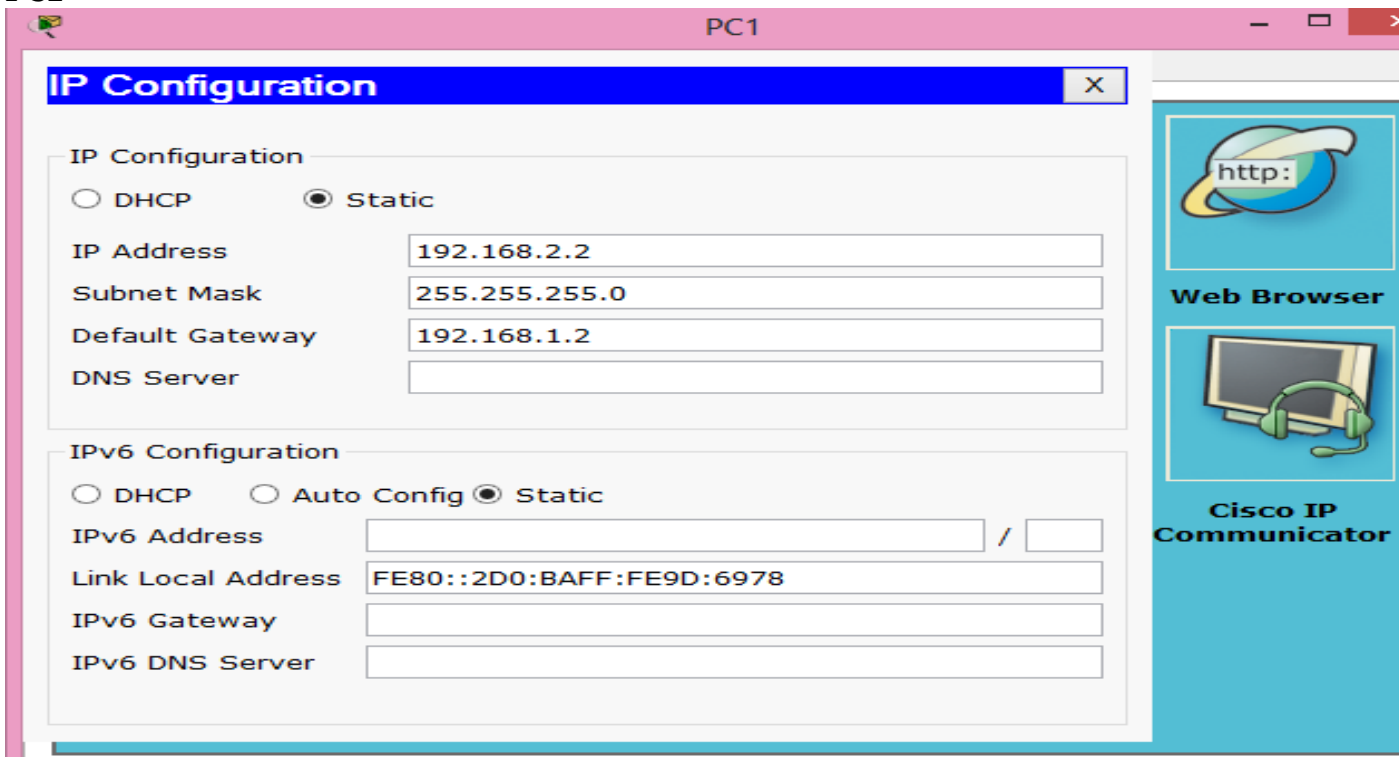
- DHCP
- Static
- IP Address: 192.168.1.2
- Subnet Mask: 255.255.255.0
- Default Gateway: 192.168.1.1
- DNS Server: (empty)

IPv6 Configuration

- DHCP
- Auto Config
- Static
- IPv6 Address: (empty) / (empty)
- Link Local Address: FE80::230:A3FF:FEB0:4498
- IPv6 Gateway: (empty)
- IPv6 DNS Server: (empty)

On the right side of the PC0 desktop, there are two application icons: "Web Browser" (with an "http:" icon) and "Cisco IP Communicator" (with a headset icon).

PC2



The screenshot shows a window titled "PC1" with a blue header bar. Inside, there is a window titled "IP Configuration" with a close button (X). The window is divided into two sections: "IP Configuration" and "IPv6 Configuration".

IP Configuration

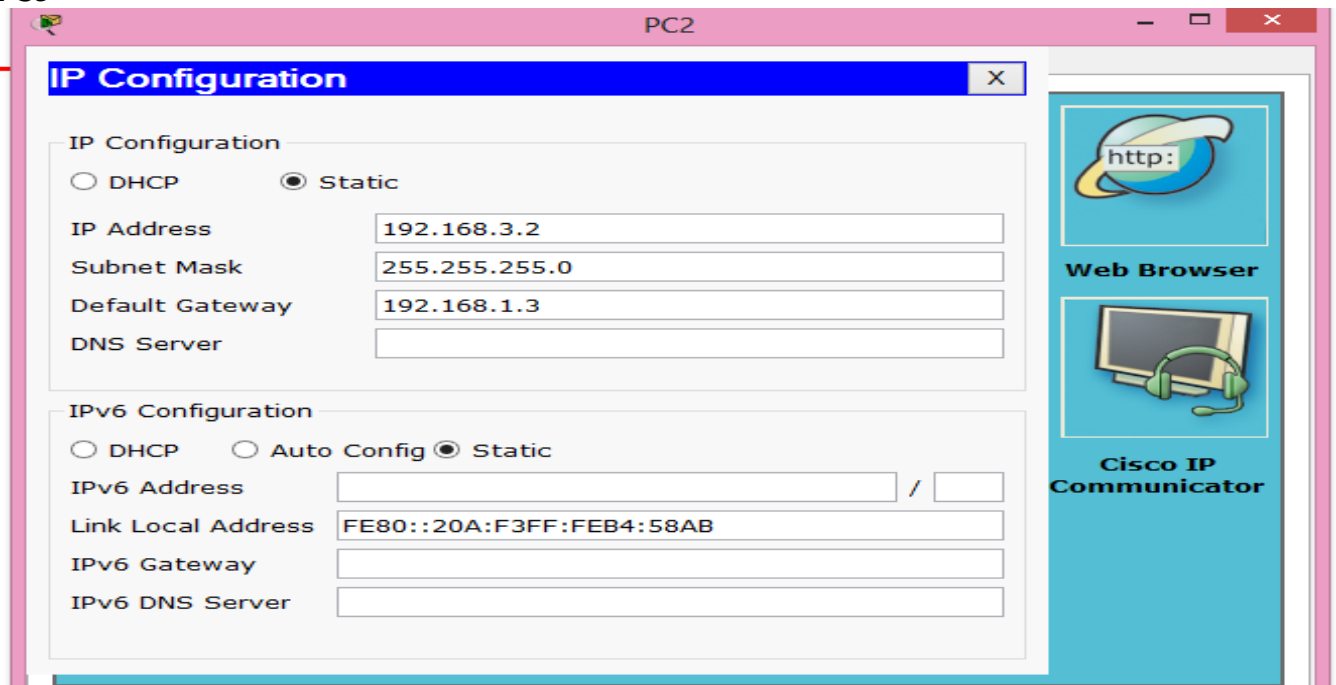
- DHCP
- Static
- IP Address: 192.168.2.2
- Subnet Mask: 255.255.255.0
- Default Gateway: 192.168.1.2
- DNS Server: (empty)

IPv6 Configuration

- DHCP
- Auto Config
- Static
- IPv6 Address: (empty) / (empty)
- Link Local Address: FE80::2D0:BAFF:FE9D:6978
- IPv6 Gateway: (empty)
- IPv6 DNS Server: (empty)

On the right side of the PC1 desktop, there are two application icons: "Web Browser" (with an "http:" icon) and "Cisco IP Communicator" (with a headset icon).

PC3



B) RUTEADORES

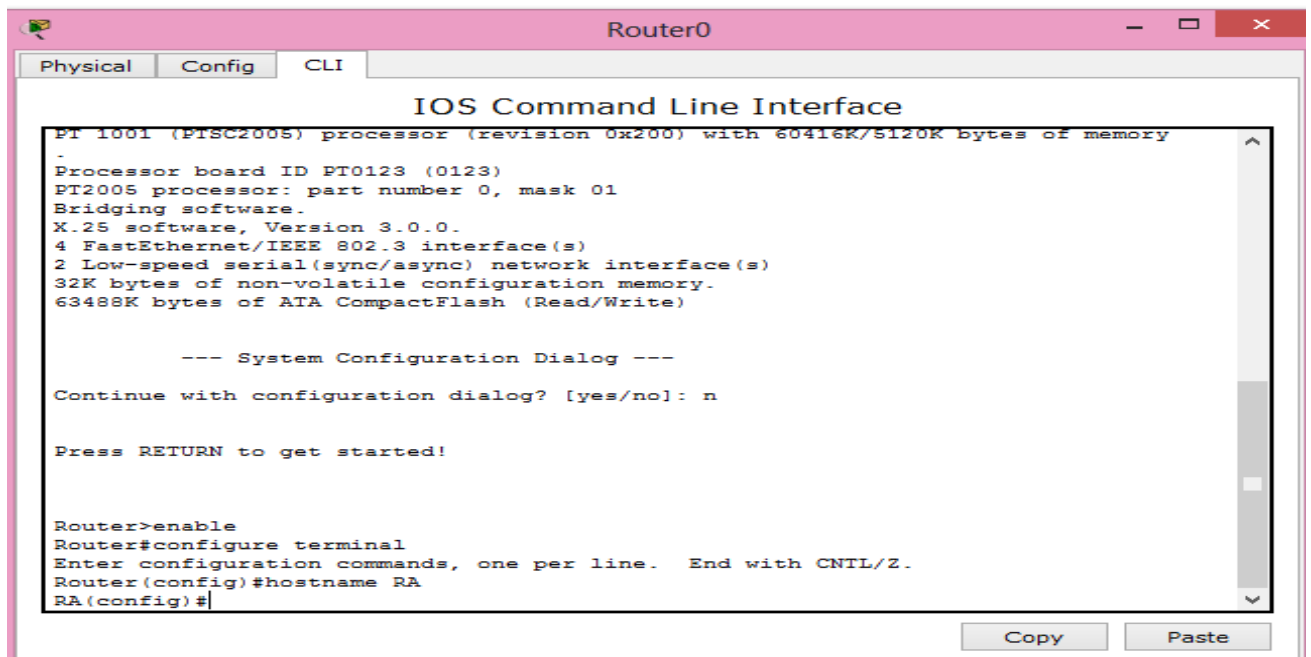
- Todo lo indicado en las prácticas iniciales.

Nombres: RA, RB y RC

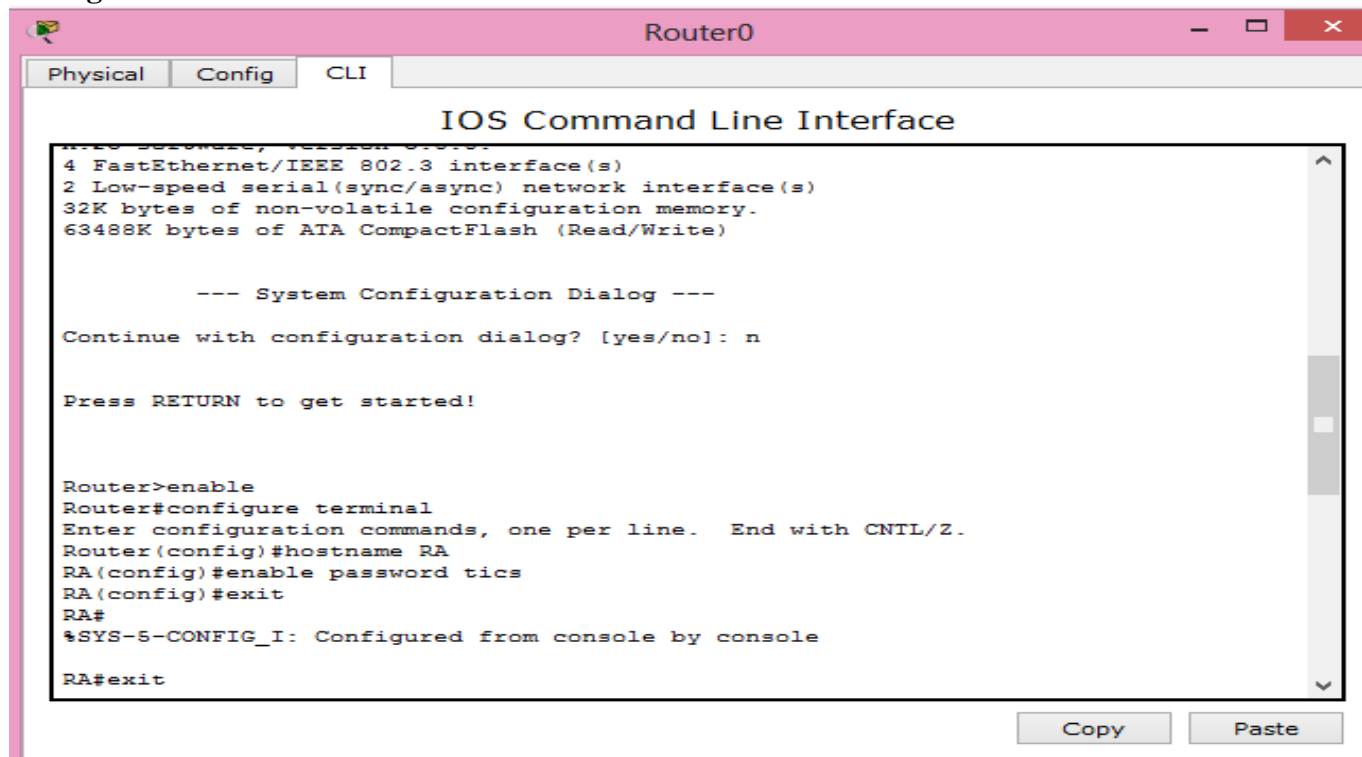
Password diferente para cada ruteador

Router1 (RA)

Cambio de nombre.



Configuración de la contraseña.



The screenshot shows the Router0 CLI interface with the following text:

```
Router0
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)

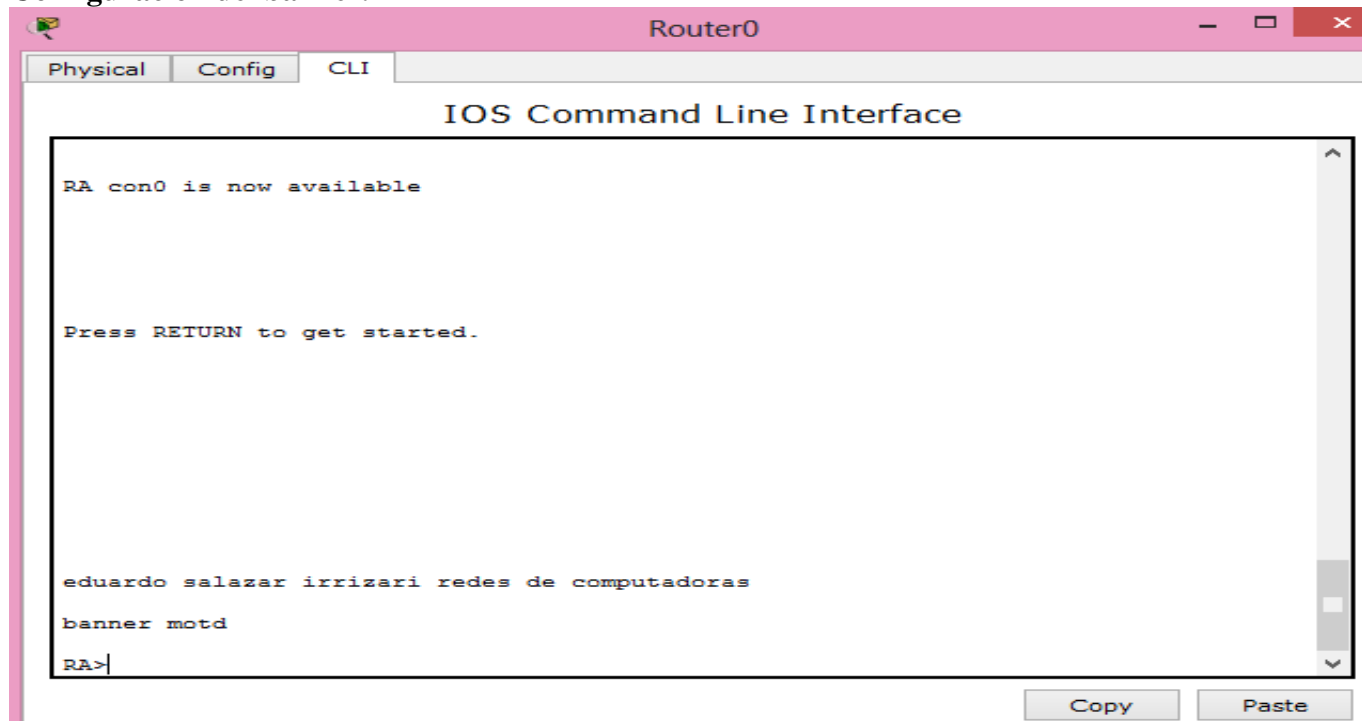
--- System Configuration Dialog ---
Continue with configuration dialog? [yes/no]: n

Press RETURN to get started!

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname RA
RA(config)#enable password tics
RA(config)#exit
RA#
%SYS-5-CONFIG_I: Configured from console by console
RA#exit
```

Copy Paste

Configuración del banner.



The screenshot shows the Router0 CLI interface with the following text:

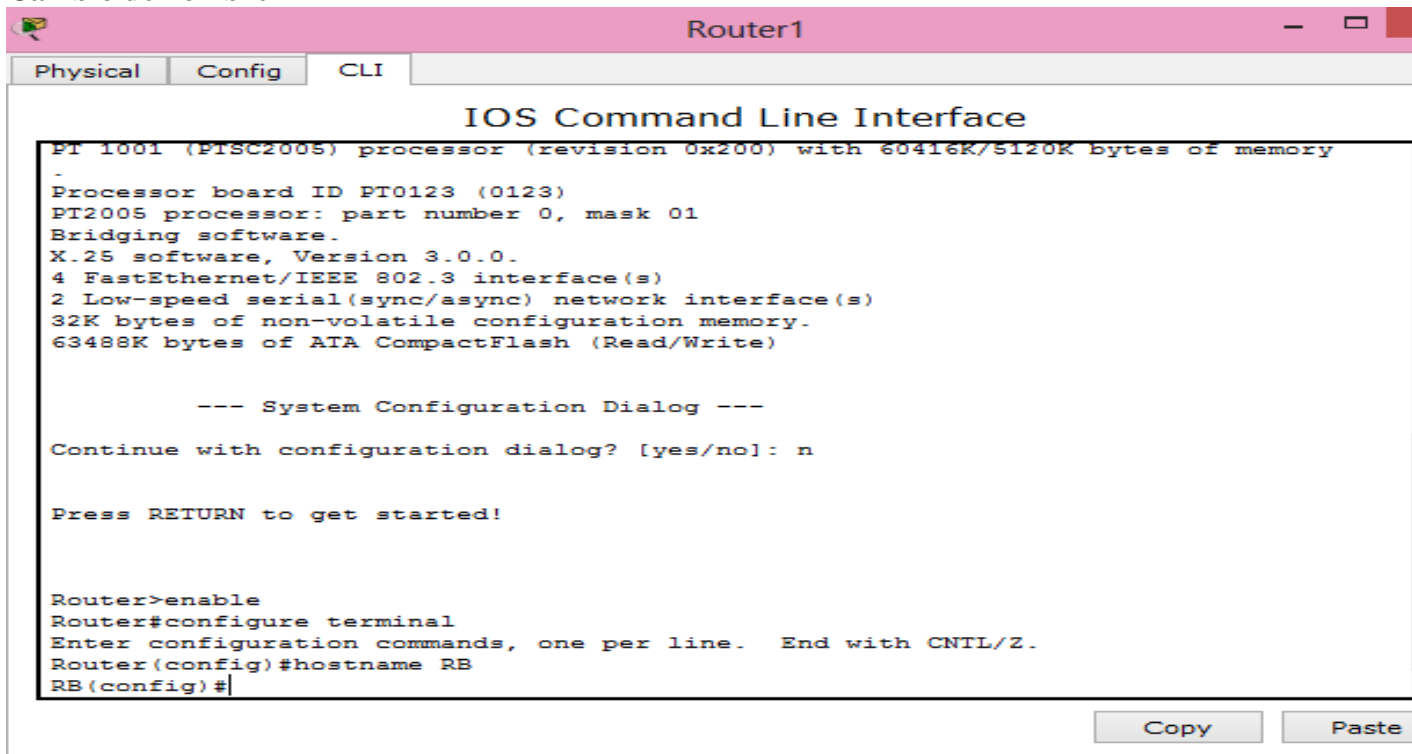
```
Router0
Physical Config CLI
IOS Command Line Interface
RA con0 is now available

Press RETURN to get started.

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banner motd
RA>
```

Copy Paste

Router2 (RB) Cambio de nombre



```
Router1
Physical Config CLI
IOS Command Line Interface
PT 1001 (PTSC2005) processor (revision 0x200) with 60416K/5120K bytes of memory
-
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)

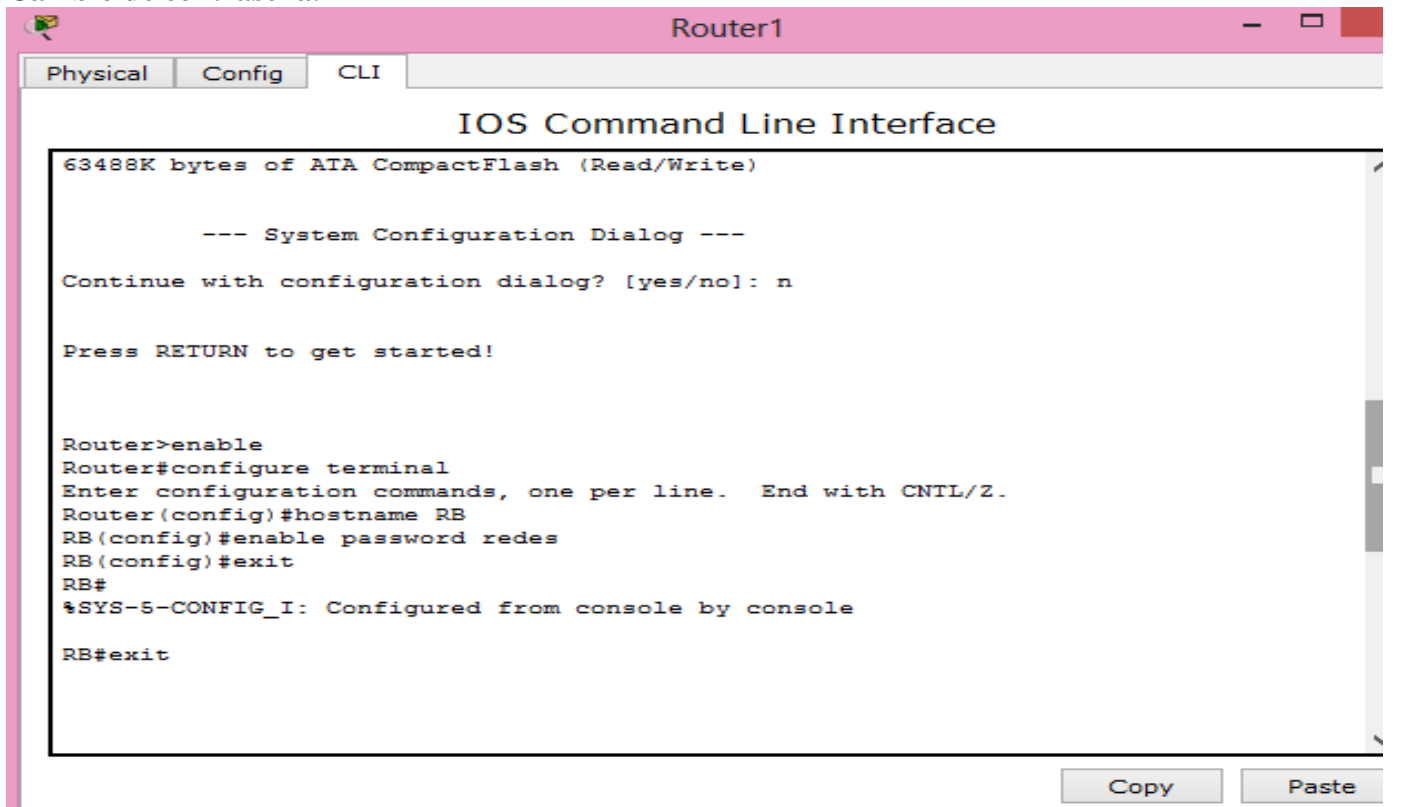
--- System Configuration Dialog ---
Continue with configuration dialog? [yes/no]: n

Press RETURN to get started!

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname RB
RB(config)#
```

Copy Paste

Cambio de contraseña.



```
Router1
Physical Config CLI
IOS Command Line Interface
63488K bytes of ATA CompactFlash (Read/Write)

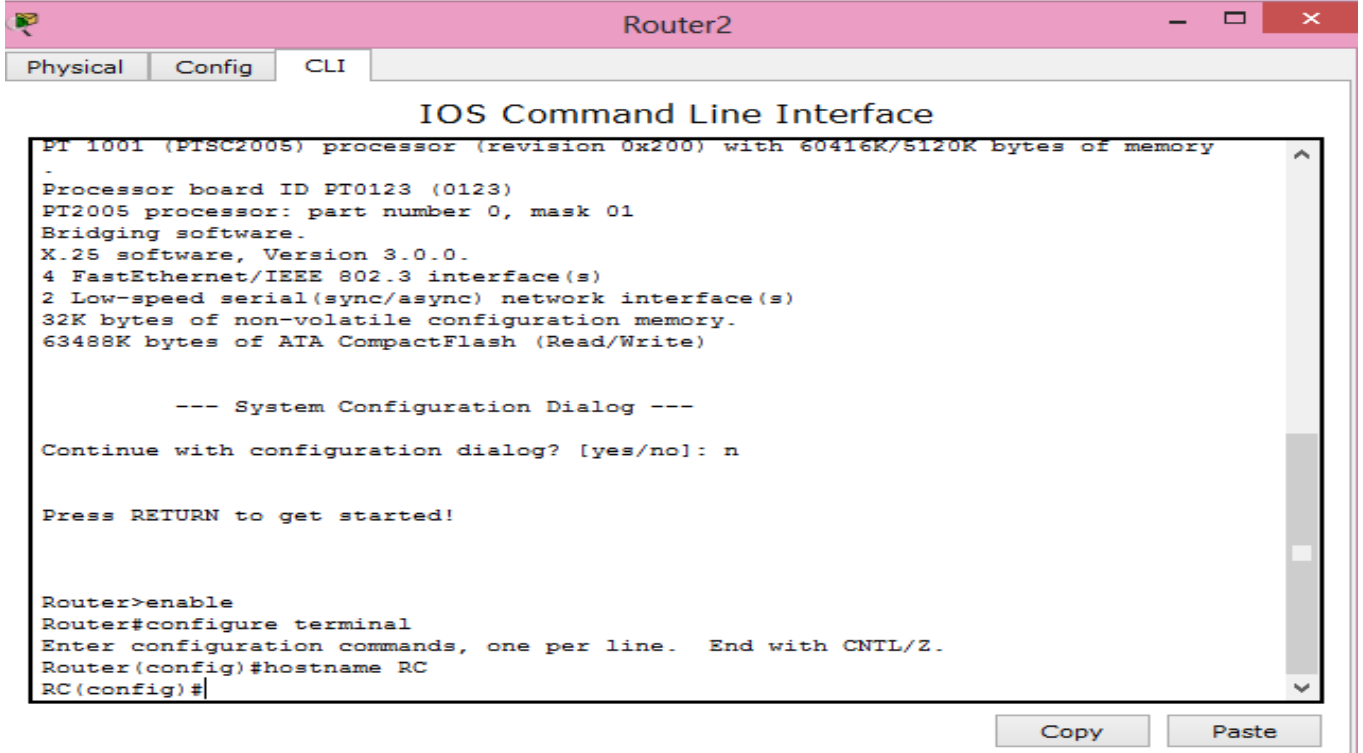
--- System Configuration Dialog ---
Continue with configuration dialog? [yes/no]: n

Press RETURN to get started!

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname RB
RB(config)#enable password redes
RB(config)#exit
RB#
%SYS-5-CONFIG_I: Configured from console by console
RB#exit
```

Copy Paste

Router3 (RC). Cambio de nombre.



The screenshot shows a terminal window titled "Router2" with tabs for "Physical", "Config", and "CLI". The main content is the "IOS Command Line Interface". It displays system information for a PT 1001 processor, including board ID, processor details, software version (3.0.0), and hardware specifications. A "System Configuration Dialog" is shown, asking to continue with configuration (answered 'n'). The user enters 'enable' to reach the configuration mode, then 'configure terminal'. The hostname is changed to 'RC' using the 'hostname RC' command. The prompt changes from 'Router#' to 'RC(config)#'.

```
PT 1001 (PTSC2005) processor (revision 0x200) with 60416K/5120K bytes of memory
-
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 ---

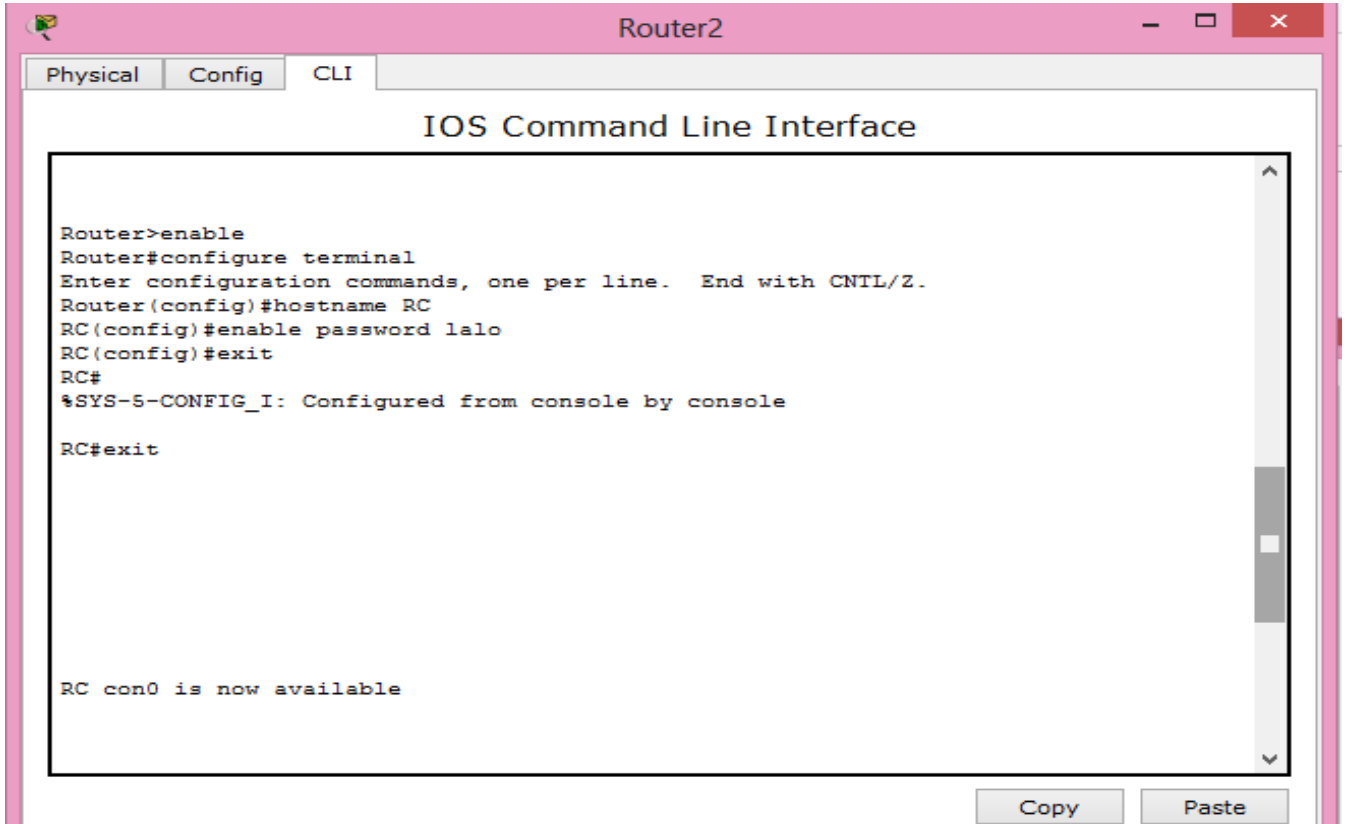
Continue with configuration dialog? [yes/no]: n

Press RETURN to get started!

Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname RC
RC(config)#
```

Copy Paste

Cambio de contraseña



The screenshot shows the same "Router2" terminal window. The user has entered 'enable' and 'configure terminal'. The hostname is 'RC'. The user enters 'enable password lalo' to set a console password. After exiting configuration mode with 'exit', a system message appears: "%SYS-5-CONFIG_I: Configured from console by console". The user exits the terminal with another 'exit' command. The prompt returns to 'RC#'. A message at the bottom of the terminal indicates "RC con0 is now available".

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname RC
RC(config)#enable password lalo
RC(config)#exit
RC#
%SYS-5-CONFIG_I: Configured from console by console

RC#exit

RC con0 is now available
```

Copy Paste

PASO 3

- a) Desde cada ruteador usar el comando “show cdp neighbors” para verificar que todas las interfaces estén activas.

RA.

```
IOS Command Line Interface

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

RA(config-if)#interface s2/0
RA(config-if)#ip address 10.0.0.2 255.0.0.0
RA(config-if)#no shut

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

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

RA(config-if)#EXIT
RA(config)#EXIT
RA#
%SYS-5-CONFIG_I: Configured from console by console

RA#show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone
Device ID        Local Intrfce   Holdtme    Capability   Platform    Port ID
Switch           Fas 0/0         158        S            2950        Fas 0/1
RB               Ser 2/0         149        R            PT1000      Ser 2/0
RA#
```

Copy Paste

RB

```
Router1
Physical Config CLI
IOS Command Line Interface

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up
3/0
RB(config-if)#interface s3/0
RB(config-if)#ip address 11.0.0.1 255.0.0.0
RB(config-if)#no shut

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

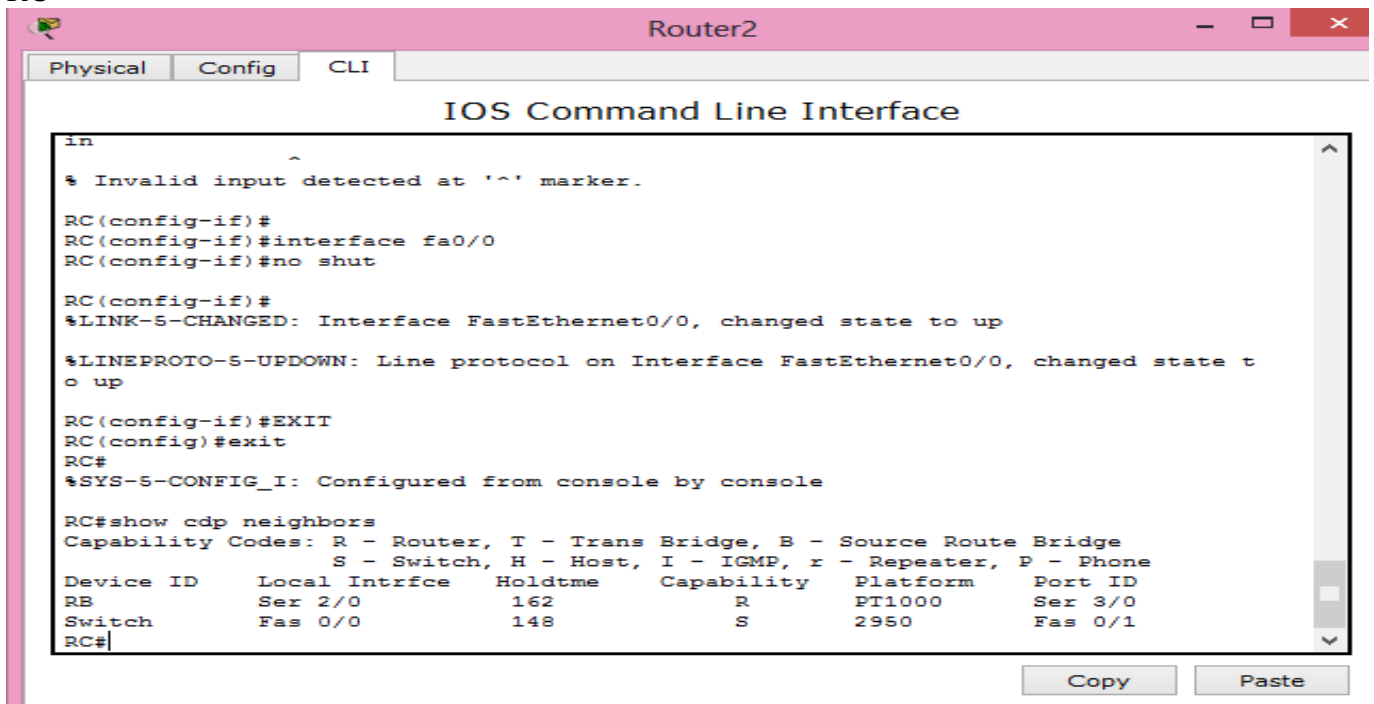
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0, changed state to up

RB(config-if)#exit
RB(config)#exit
RB#
%SYS-5-CONFIG_I: Configured from console by console

RB#show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone
Device ID        Local Intrfce   Holdtme    Capability   Platform    Port ID
Switch           Fas 0/0         175        S            2950        Fas 0/1
RA               Ser 2/0         152        R            PT1000      Ser 2/0
RC               Ser 3/0         160        R            PT1000      Ser 2/0
RB#
```

Copy Paste

RC

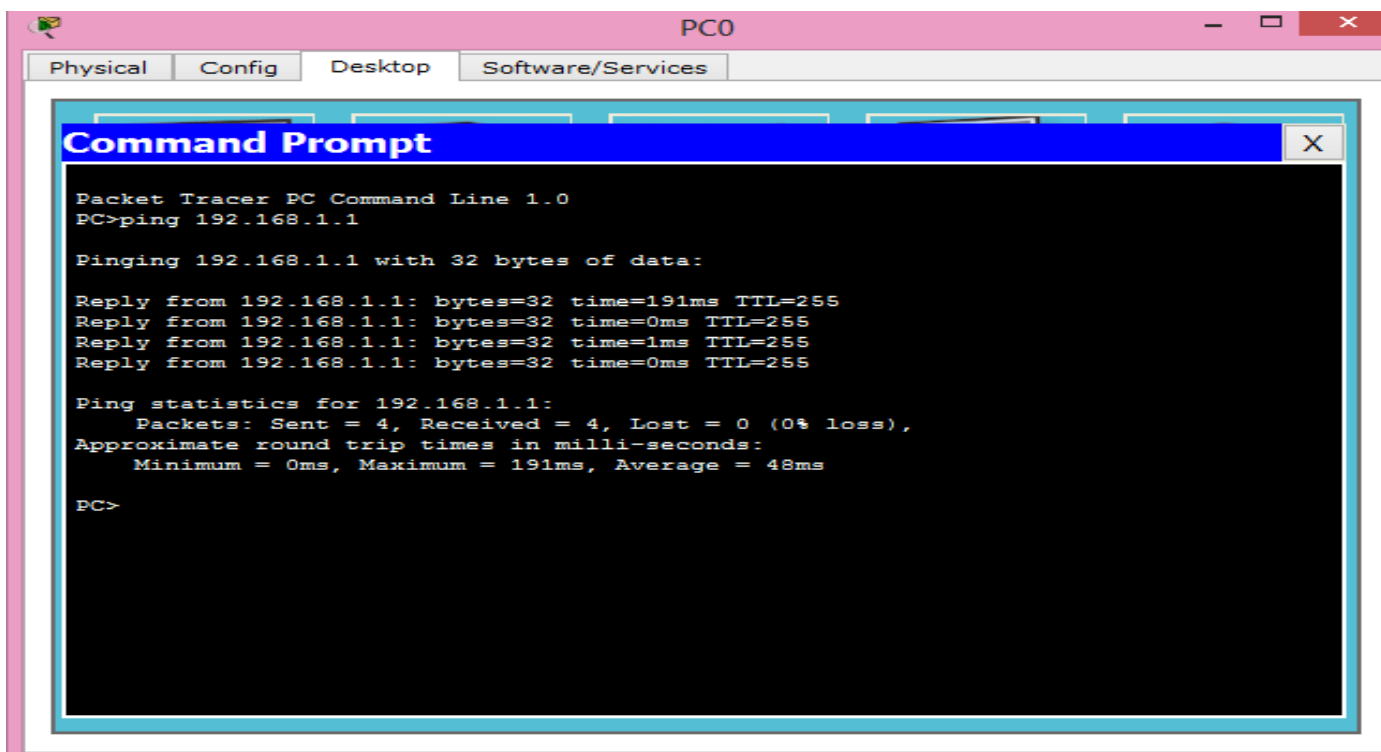


The screenshot shows the Router2 CLI interface. The user has entered the following commands and received the following output:

```
in
% Invalid input detected at '^' marker.
RC(config-if)#
RC(config-if)#interface fa0/0
RC(config-if)#no shut
RC(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
RC(config-if)#EXIT
RC(config)#exit
RC#
%SYS-5-CONFIG_I: Configured from console by console

RC#show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone
Device ID        Local Intrfce   Holdtme    Capability   Platform   Port ID
RB                Ser 2/0         162        R            PT1000     Ser 3/0
Switch           Fas 0/0         148        S            2950       Fas 0/1
RC#
```

b) Verificar la puerta de enlace del red “default gateway”, haciendo un ping desde un host a la IP de la interfaz del router conectada a la red a la que pertenece el host. PC1 a RA



The screenshot shows the PC0 Command Prompt window. The user has entered the following commands and received the following output:

```
Packet Tracer PC Command Line 1.0
PC>ping 192.168.1.1

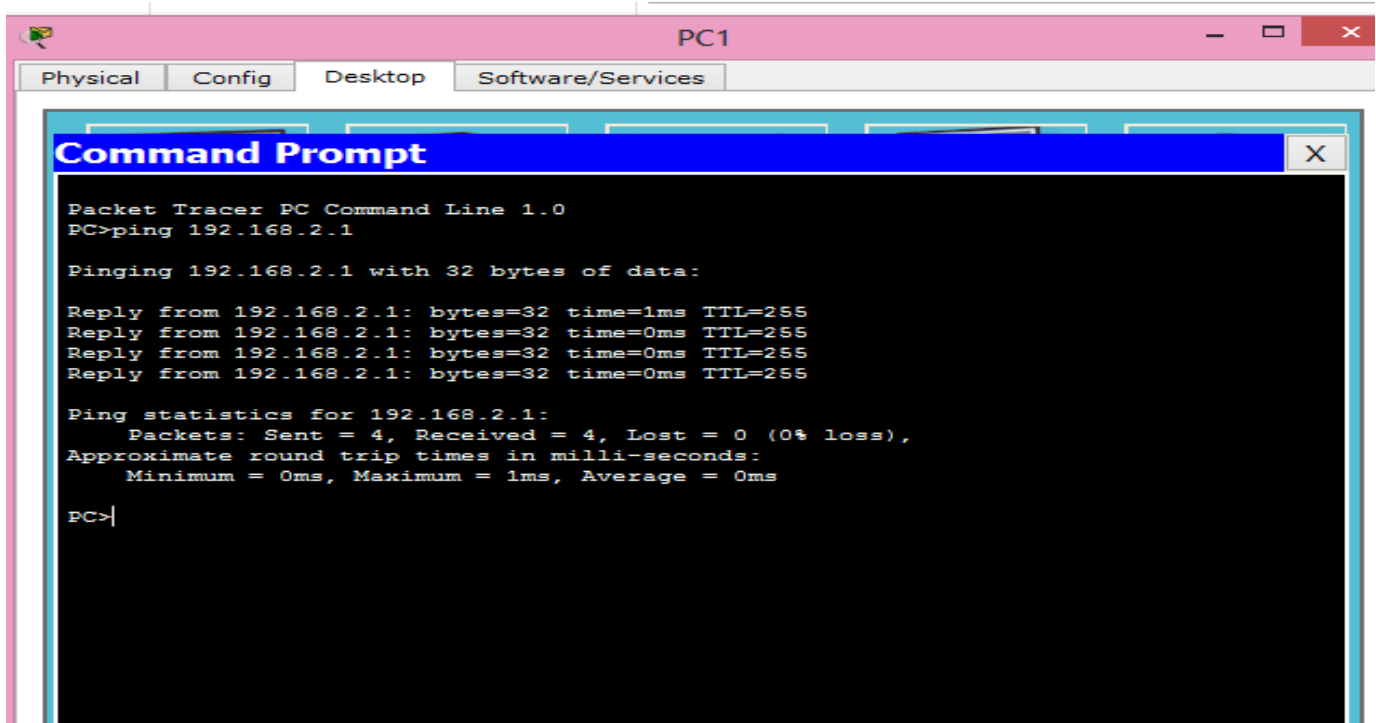
Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time=191ms TTL=255
Reply from 192.168.1.1: bytes=32 time=0ms TTL=255
Reply from 192.168.1.1: bytes=32 time=1ms TTL=255
Reply from 192.168.1.1: bytes=32 time=0ms TTL=255

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 191ms, Average = 48ms

PC>
```

PC2 a RB



The screenshot shows a Packet Tracer PC window for PC1. The window has tabs for Physical, Config, Desktop, and Software/Services. A Command Prompt window is open, displaying the output of a ping command to 192.168.2.1. The output shows four successful replies with 32 bytes of data, a time of 1ms for the first and 0ms for the others, and a TTL of 255. Ping statistics indicate 4 packets sent, 4 received, and 0% loss, with a minimum round trip time of 0ms, a maximum of 1ms, and an average of 0ms.

```
Packet Tracer PC Command Line 1.0
PC>ping 192.168.2.1

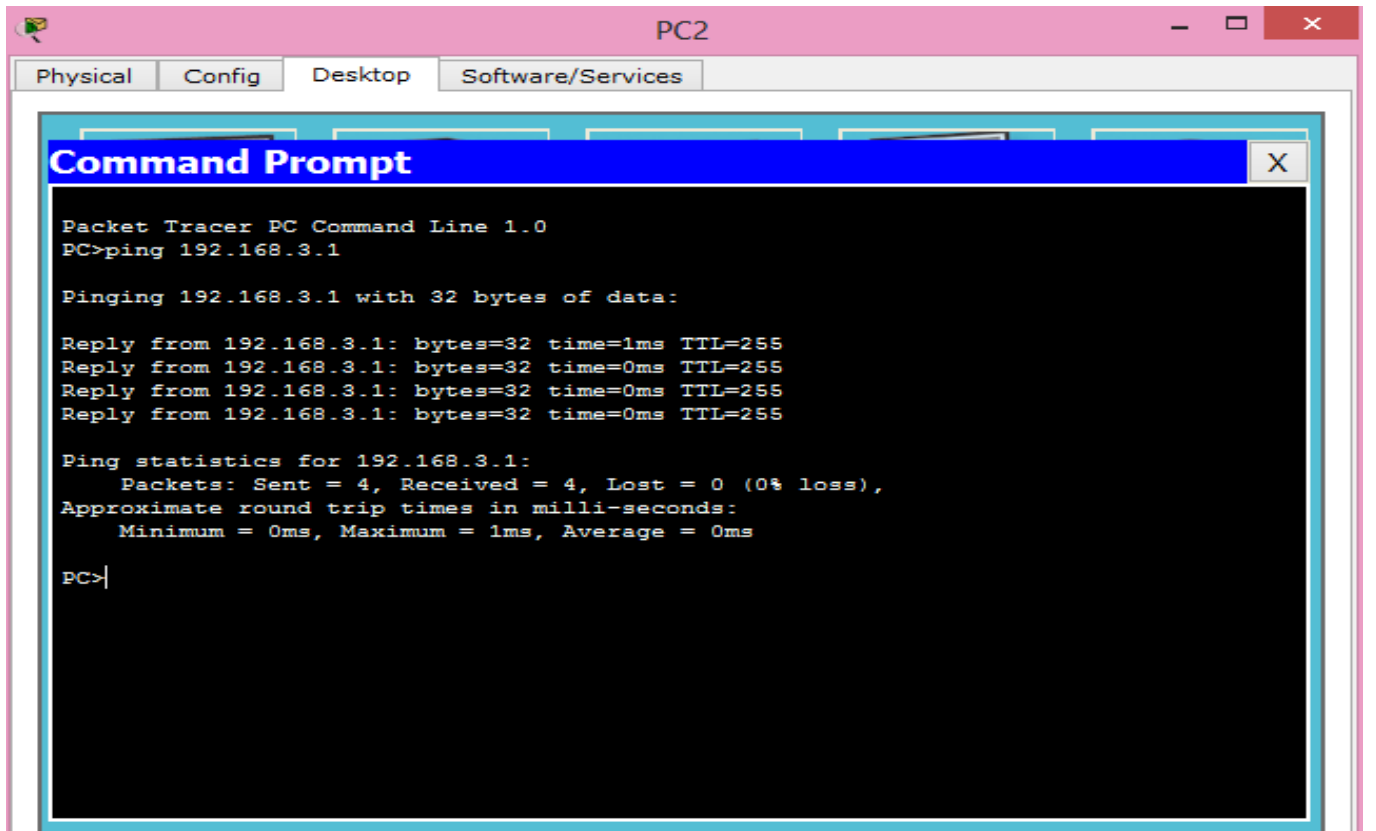
Pinging 192.168.2.1 with 32 bytes of data:

Reply from 192.168.2.1: bytes=32 time=1ms TTL=255
Reply from 192.168.2.1: bytes=32 time=0ms TTL=255
Reply from 192.168.2.1: bytes=32 time=0ms TTL=255
Reply from 192.168.2.1: bytes=32 time=0ms TTL=255

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC>|
```

PC3 a RC



The screenshot shows a Packet Tracer PC window for PC2. The window has tabs for Physical, Config, Desktop, and Software/Services. A Command Prompt window is open, displaying the output of a ping command to 192.168.3.1. The output shows four successful replies with 32 bytes of data, a time of 1ms for the first and 0ms for the others, and a TTL of 255. Ping statistics indicate 4 packets sent, 4 received, and 0% loss, with a minimum round trip time of 0ms, a maximum of 1ms, and an average of 0ms.

```
Packet Tracer PC Command Line 1.0
PC>ping 192.168.3.1

Pinging 192.168.3.1 with 32 bytes of data:

Reply from 192.168.3.1: bytes=32 time=1ms TTL=255
Reply from 192.168.3.1: bytes=32 time=0ms TTL=255
Reply from 192.168.3.1: bytes=32 time=0ms TTL=255
Reply from 192.168.3.1: bytes=32 time=0ms TTL=255

Ping statistics for 192.168.3.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

PC>|
```

PASO 3

Configurar Rutas Estáticas

- a) IP del siguiente salto
- b) Interfaz desalida

NOTA: Normalmente se usa la “IP del siguiente salto” que es la IP de la interfaz del router directamente conectado, pero si entre los datos no se tiene, se puede usar la “interfaz de salida” que es la interfaz del router local. No hay forma de hacer rutas estáticas sin conocer la dirección de red destino, para ese caso se usan “rutas por defecto” o un “default gateway” en el router.

A) Configurar Rutas Estáticas Utilizando la “IP del Siguiente Salto”

Router A

```
RouterA>enable
```

```
RouterA#config terminal
```

```
RouterA(config)#ip route 192.168.2.0 255.255.255.0 10.0.0.1
```

```
RouterA(config)#ip route 192.168.3.0 255.255.255.0 10.0.0.1
```

```
Router0
Physical Config CLI
IOS Command Line Interface

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banner motd

RA>enable
Password:
RA#conf t
Enter configuration commands, one per line. End with CNTL/Z.
RA(config)#ip route 192.168.2.0 255.255.255.0 10.0.0.1
^
% Invalid input detected at '^' marker.

RA(config)#ip route 192.168.2.0 255.255.255.0
^
% Invalid input detected at '^' marker.

RA(config)#ip route 192.168.2.0 255.255.255.0
% Incomplete command.
RA(config)#ip route 192.168.2.0 255.255.255.0
% Incomplete command.
RA(config)#ip route 192.168.2.0 255.255.255.0 10.0.0.1
RA(config)#
```

Con las rutas estáticas le estamos diciendo al RouterA que todo tráfico hacia la red 192.168.2.0 y 192.168.3.0 se debe enviar hacia la interfaz con la IP 10.0.0.1 para que lo resuelva.

RouterB

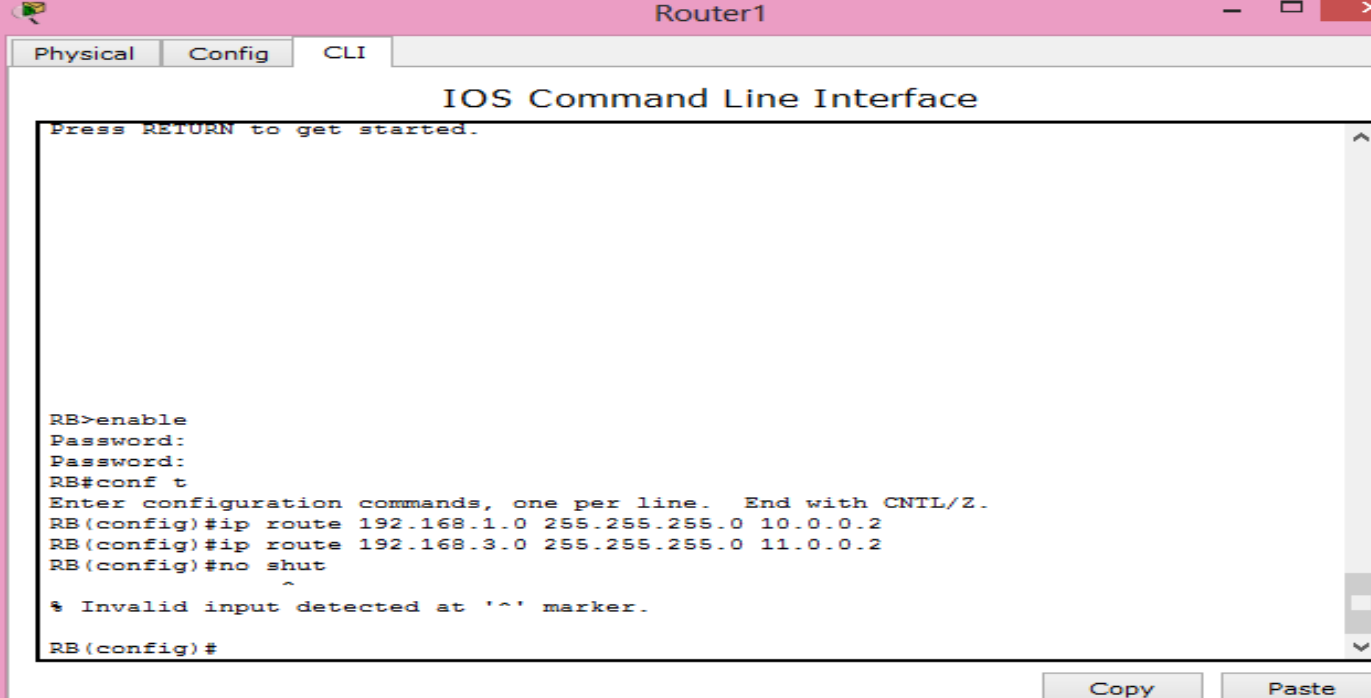
```
RouterB>enable
```

```
RouterB#config terminal
```

```
RouterB(config)#ip route 192.168.1.0 255.255.255.0 10.0.0.2
```

```
RouterB(config)#ip route 192.168.3.0 255.255.255.0 11.0.0.2
```

Con la primer ruta estática le estamos diciendo al RouterB que todo tráfico hacia la red 192.168.1.0 se debe enviar hacia la interfaz con la IP 10.0.0.2 para que lo resuelva. Con la segunda ruta estática le estamos diciendo al RouterB que todo tráfico hacia la red 192.168.3.0 se debe enviar hacia la interfaz con la IP 11.0.0.2 para que lo resuelva.



```
Router1
Physical Config CLI
IOS Command Line Interface
Press RETURN to get started.

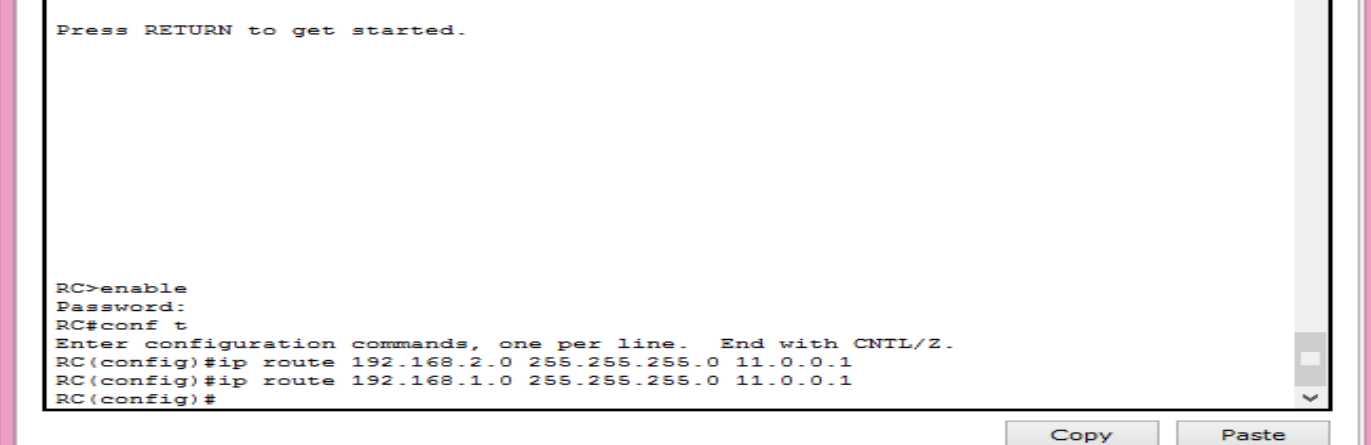
RB>enable
Password:
Password:
RB#conf t
Enter configuration commands, one per line. End with CNTL/Z.
RB(config)#ip route 192.168.1.0 255.255.255.0 10.0.0.2
RB(config)#ip route 192.168.3.0 255.255.255.0 11.0.0.2
RB(config)#no shut
^
% Invalid input detected at '^' marker.
RB(config)#
```

Copy Paste

RouterC

```
RouterC>enable
RouterC#config terminal
RouterC(config)#ip route 192.168.2.0 255.255.255.0 11.0.0.1
RouterC(config)#ip route 192.168.1.0 255.255.255.0 11.0.0.1
```

Con la primer ruta estática le estamos diciendo al RouterC que todo tráfico hacia la red 192.168.2.0 se debe enviar hacia la interfaz con la IP 11.0.0.1 para que lo resuelva. Con la segunda ruta estática le estamos diciendo al RouterC que todo tráfico hacia la red 192.168.1.0 se debe enviar hacia la interfaz con la IP 11.0.0.1 para que lo resuelva.



```
Press RETURN to get started.

RC>enable
Password:
Password:
RC#conf t
Enter configuration commands, one per line. End with CNTL/Z.
RC(config)#ip route 192.168.2.0 255.255.255.0 11.0.0.1
RC(config)#ip route 192.168.1.0 255.255.255.0 11.0.0.1
RC(config)#
```

Copy Paste

B) Configurar Rutas Estáticas Utilizando la “Interfaz de Salida”Router A

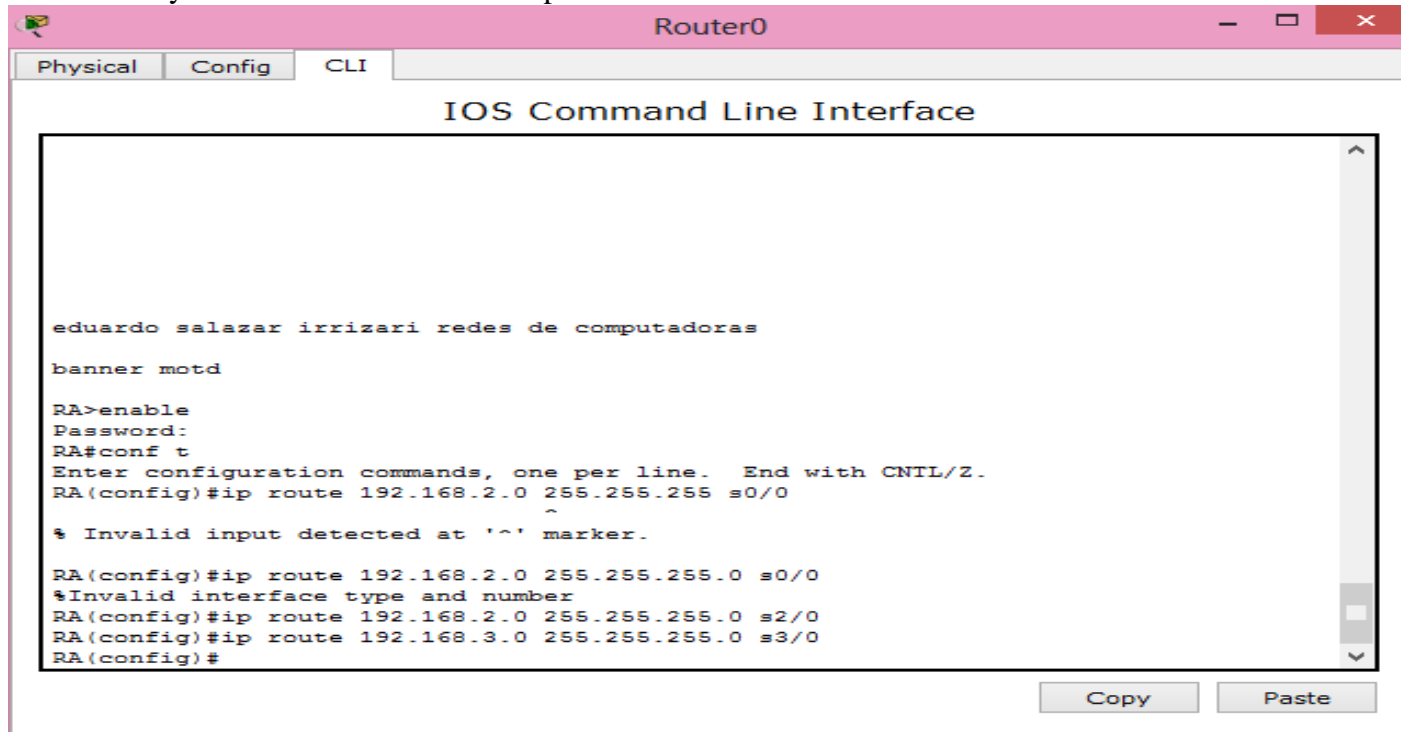
```
RouterA>enable
```

```
RouterA#config terminal
```

```
RouterA(config)#ip route 192.168.2.0 255.255.255.0 s0/0
```

```
RouterA(config)#ip route 192.168.3.0 255.255.255.0 s0/0
```

Con estas rutas estáticas le estamos diciendo al RouterA que todo tráfico hacia la red 192.168.2.0 y 192.168.3.0 se debe enviar por la interfaz local s0/0.



The screenshot shows a window titled "Router0" with tabs for "Physical", "Config", and "CLI". The main area is labeled "IOS Command Line Interface" and contains the following text:

```
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banner motd  
RA>enable  
Password:  
RA#conf t  
Enter configuration commands, one per line. End with CNTL/Z.  
RA(config)#ip route 192.168.2.0 255.255.255 s0/0  
^  
% Invalid input detected at '^' marker.  
RA(config)#ip route 192.168.2.0 255.255.255.0 s0/0  
%Invalid interface type and number  
RA(config)#ip route 192.168.2.0 255.255.255.0 s2/0  
RA(config)#ip route 192.168.3.0 255.255.255.0 s3/0  
RA(config)#
```

At the bottom right of the window, there are "Copy" and "Paste" buttons.

RouterB

```
RouterB>enable
```

```
RouterB#config terminal
```

```
RouterB(config)#ip route 192.168.1.0 255.255.255.0 s0/0
```

```
RouterB(config)#ip route 192.168.3.0 255.255.255.0 s0/1
```

Con la primer ruta estática le estamos diciendo al RouterB que todo tráfico hacia la red 192.168.1.0 se debe enviar por la interfaz local s0/0. Con la segunda ruta estática le estamos diciendo al RouterB que todo tráfico hacia la red 192.168.3.0 se debe enviar por la interfaz local s0/1.

```
Press RETURN to get started.
```

```
RB>enable  
Password:  
RB#conf t  
Enter configuration commands, one per line. End with CNTL/Z.  
RB(config)#ip route 192.168.1.0 255.255.255.0 s2/0  
RB(config)#ip route 192.168.3.0 255.255.255.0 s3/0  
RB(config)#
```

Copy

Paste

RouterC

```
RouterC>enable
```

```
RouterC#config terminal
```

```
RouterC(config)#ip route 192.168.2.0 255.255.255.0 s0/1
```

```
RouterC(config)#ip route 192.168.1.0 255.255.255.0 s0/1
```

Con la primer ruta estática le estamos diciendo al RouterC que todo tráfico hacia la red 192.168.2.0 se debe enviar por la interfaz local s0/1. Con la segunda ruta estática le estamos diciendo al RouterC que todo tráfico hacia la red 192.168.1.0 se debe enviar por la interfaz local s0/1.

The screenshot shows a window titled "Router2" with tabs for "Physical", "Config", and "CLI". The main area displays the "IOS Command Line Interface" with the following text:

```
Press RETURN to get started.
```

```
RC>enable  
Password:  
RC#conf t  
Enter configuration commands, one per line. End with CNTL/Z.  
RC(config)#ip route 192.168.2.0 255.255.255.0 s2/0  
RC(config)#ip route 192.168.1.0 255.255.255.0 s3/0  
RC(config)#
```

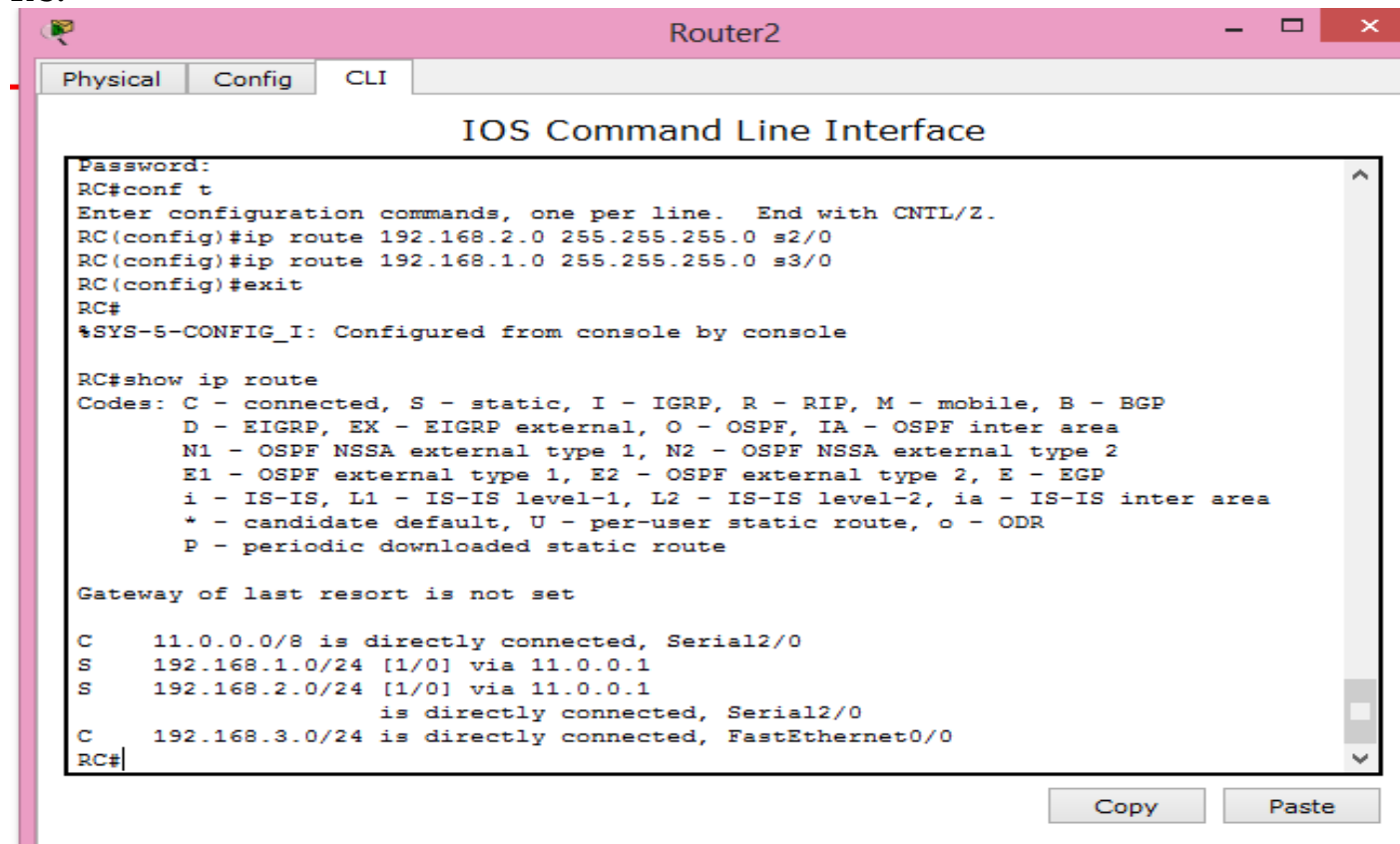
At the bottom right, there are "Copy" and "Paste" buttons.

PASO 5

Comprobación de Rutas Estáticas usando la IP del Siguiete Salto

El comando "show ip route" muestra la tabla de enrutamiento del dispositivo.

RC.



The screenshot shows a window titled "Router2" with three tabs: "Physical", "Config", and "CLI". The "CLI" tab is active, displaying the "IOS Command Line Interface". The terminal output shows the following sequence of commands and responses:

```
Password:
RC#conf t
Enter configuration commands, one per line. End with CNTL/Z.
RC(config)#ip route 192.168.2.0 255.255.255.0 s2/0
RC(config)#ip route 192.168.1.0 255.255.255.0 s3/0
RC(config)#exit
RC#
%SYS-5-CONFIG_I: Configured from console by console

RC#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    11.0.0.0/8 is directly connected, Serial2/0
S    192.168.1.0/24 [1/0] via 11.0.0.1
S    192.168.2.0/24 [1/0] via 11.0.0.1
                                     is directly connected, Serial2/0
C    192.168.3.0/24 is directly connected, FastEthernet0/0
RC#
```

At the bottom right of the window, there are two buttons: "Copy" and "Paste".

CONCLUSIÓN

Durante esta práctica pude apreciar más acerca de lo que veníamos viendo, ya que es algo consistente, como es el levantamiento de los puertos fa y los seriales para llevar a cabo la conexión de los dispositivos de trabajo, más que nada pude apreciar que los ip route es una forma de establecerle la ruta que debe utilizar.