

# **Práctica: Enrutamiento Estático Básico con 3 Routers y 3 Redes Privadas**

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# 1. Preguntas para reflexionar:

## 1.1 ¿Por qué no hace falta configurar puerta de enlace en los routers?

- Los routers encaminan paquetes entre todas sus interfaces de forma nativa, utilizando su tabla de enrutamiento interna.
- No requieren una puerta de salida predeterminada porque ellos mismos son el punto de salto.

## 1.2 ¿Qué sucede si no configuras una ruta estática hacia una red remota?

- Al recibir un paquete cuyo destino no está en la tabla, el router descarta el paquete. (ICMP "destination unreachable").

## 1.3 ¿Cómo puedes verificar la tabla de enrutamiento?

- show ip route: Muestra redes directamente conectadas, rutas estáticas y rutas aprendidas por protocolos.

## 1.4 ¿Qué diferencia hay entre una red directamente conectada y una alcanzada por ruta estática?

- **Directamente conectada:** aparece con prefijo "C" en la tabla (C 172.16.3.0/24 is directly connected, GigabitEthernet0/0).
- **Ruta estática:** aparece con prefijo "S" y next-hop definido (S 192.168.2.0/24 [1/0] via 172.16.2.2).
- Las rutas conectadas se aprenden automáticamente; las estáticas requieren configuración manual y tienen mayor prioridad que rutas dinámicas.

## 2. Capturas a entregar:

### 2.1. Tabla de enrutamiento de cada router:

#### 2.1.0 Anotaciones sobre las capturas:

- El router que mencionas en el ejercicio (2901) solo posee 2 conexiones Gi, así que se tuvo que añadir el módulo HWIC-1GE-SFP para añadir 1 slot extra, igualmente con esto lo tendríamos solo lógico y no físico, así que se tuvo que añadir el módulo GLC-LH-SMD para hacerlo funcional.

#### 2.1.1. Tabla de enrutamiento (R1):

```
Summary of IP Addressing for R1
172.16.0.0/16 is variably subnetted, 5 subnets, 2 masks
S    172.16.1.0/24 [1/0] via 172.16.2.2
C    172.16.2.0/24 is directly connected, GigabitEthernet0/1
L    172.16.2.1/32 is directly connected, GigabitEthernet0/1
C    172.16.3.0/24 is directly connected, GigabitEthernet0/0
L    172.16.3.1/32 is directly connected, GigabitEthernet0/0
S    192.168.2.0/24 [1/0] via 172.16.2.2
```

Router#

#### 2.1.2. Tabla de enrutamiento (R2):

```
Summary of IP Addressing for R2
172.16.0.0/16 is variably subnetted, 5 subnets, 2 masks
C    172.16.1.0/24 is directly connected, GigabitEthernet0/0
L    172.16.1.1/32 is directly connected, GigabitEthernet0/0
C    172.16.2.0/24 is directly connected, GigabitEthernet0/1
L    172.16.2.2/32 is directly connected, GigabitEthernet0/1
S    172.16.3.0/24 [1/0] via 172.16.2.1
192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.168.1.0/24 is directly connected, GigabitEthernet0/0/0
L    192.168.1.2/32 is directly connected, GigabitEthernet0/0/0
S    192.168.2.0/24 [1/0] via 192.168.1.1
```

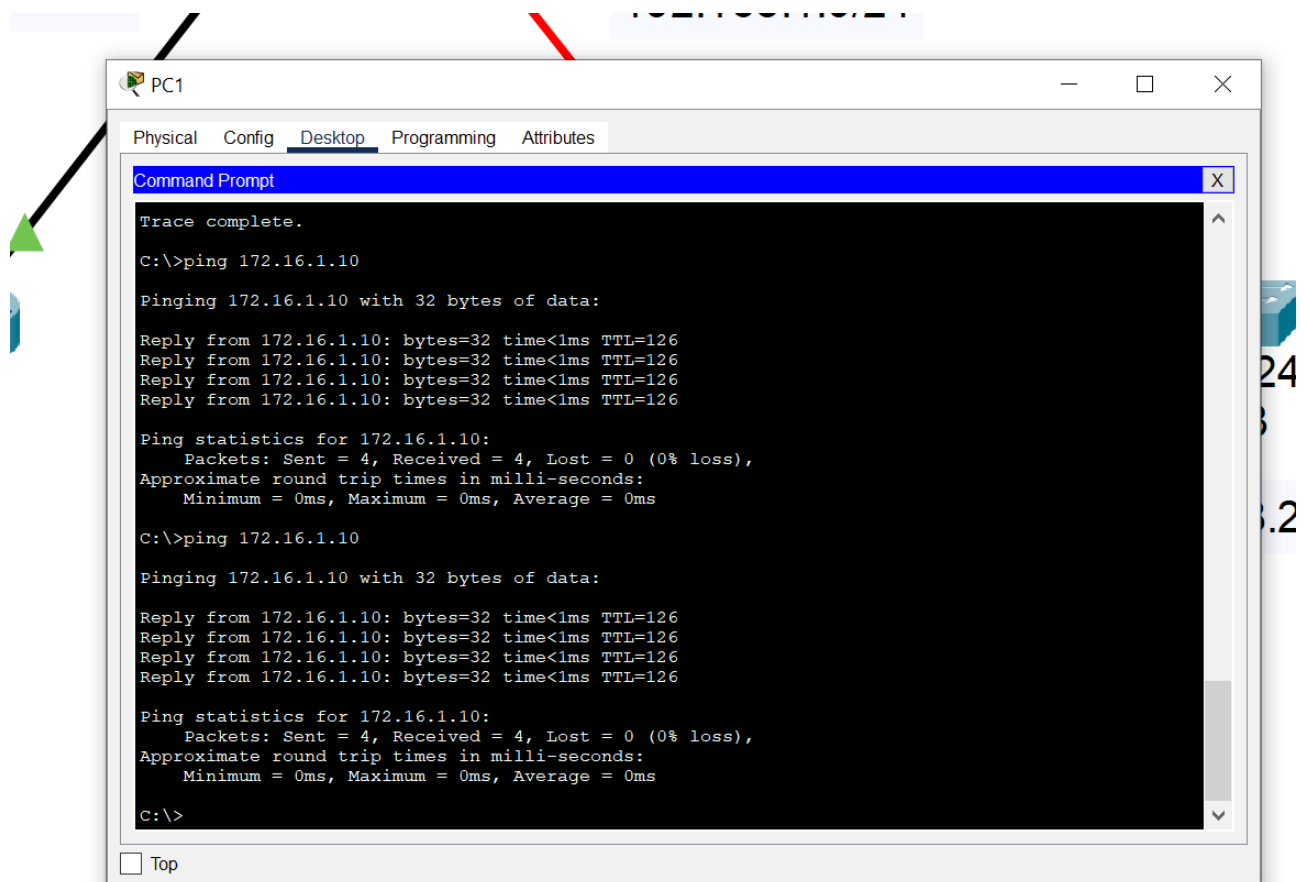
Router#

### 2.1.3 Tabla de enrutamiento (R3):

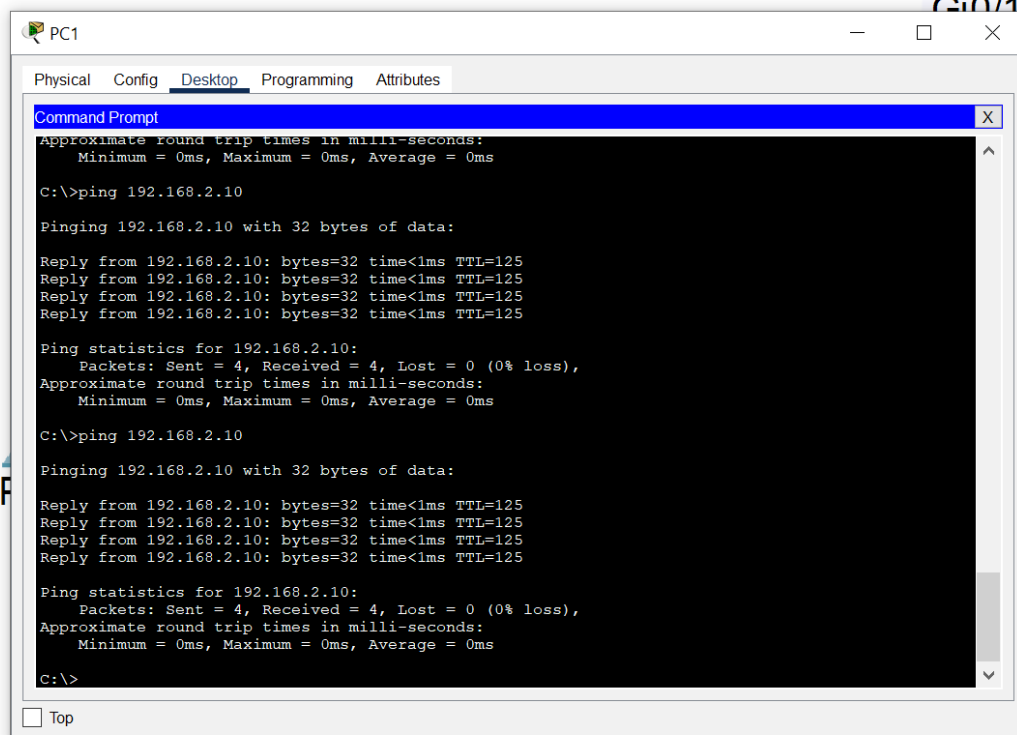
```
-
172.16.0.0/24 is subnetted, 2 subnets
S    172.16.1.0/24 [1/0] via 192.168.1.2
S    172.16.3.0/24 [1/0] via 192.168.1.2
192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.168.1.0/24 is directly connected, GigabitEthernet0/0/0
L    192.168.1.1/32 is directly connected, GigabitEthernet0/0/0
192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.168.2.0/24 is directly connected, GigabitEthernet0/0
L    192.168.2.1/32 is directly connected, GigabitEthernet0/0
Router#
```

## 2.2 Ping exitoso entre los tres PCs.

### 2.2.1 Ping PC1 a PC2.



## 2.2.2 Ping PC1 a PC3.



The screenshot shows a Packet Tracer window for PC1. The 'Desktop' tab is active, displaying a 'Command Prompt' window. The prompt shows the execution of two 'ping 192.168.2.10' commands. Each command results in four successful replies with 32 bytes of data, a time of less than 1ms, and a TTL of 125. The statistics for both pings show 4 packets sent, 4 received, and 0% loss, with round trip times of 0ms.

```
PC1
Physical Config Desktop Programming Attributes
Command Prompt
Approximate round trip times in milli-seconds:
  Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.2.10

Pinging 192.168.2.10 with 32 bytes of data:

Reply from 192.168.2.10: bytes=32 time<1ms TTL=125
Reply from 192.168.2.10: bytes=32 time<1ms TTL=125
Reply from 192.168.2.10: bytes=32 time<1ms TTL=125
Reply from 192.168.2.10: bytes=32 time<1ms TTL=125

Ping statistics for 192.168.2.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.2.10

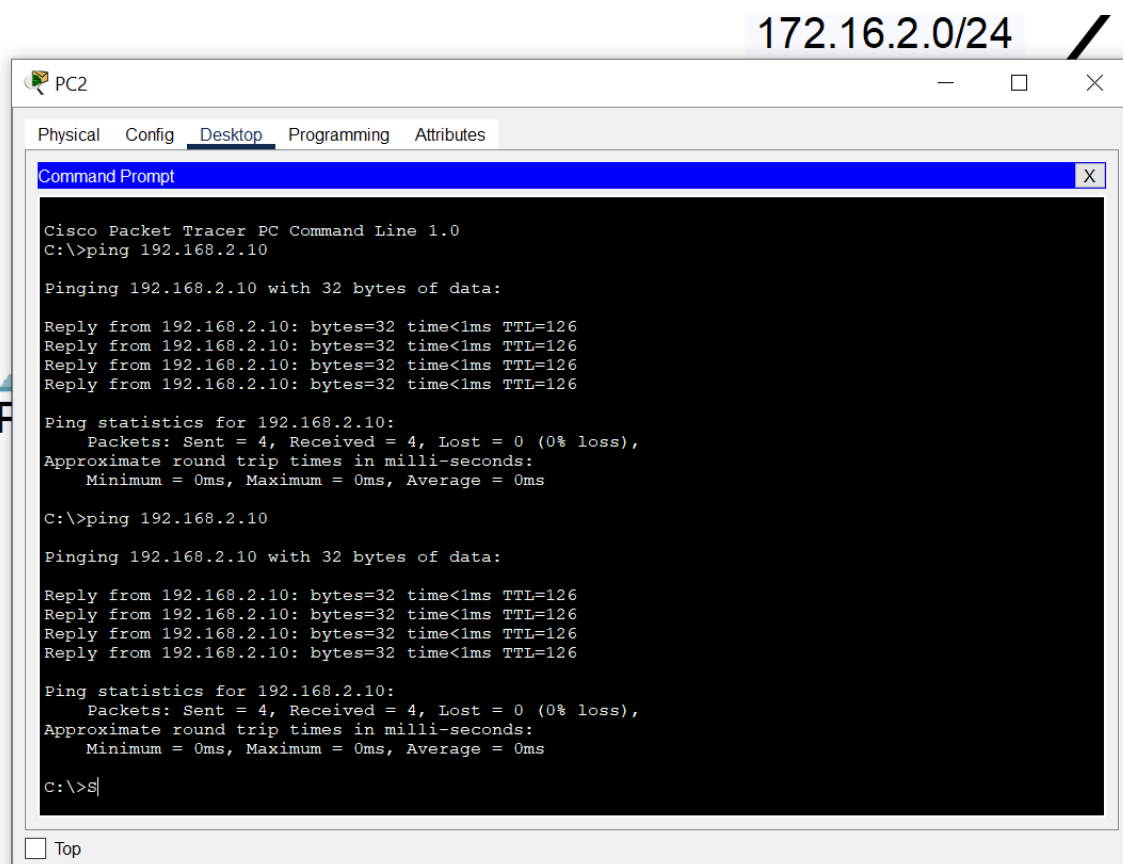
Pinging 192.168.2.10 with 32 bytes of data:

Reply from 192.168.2.10: bytes=32 time<1ms TTL=125
Reply from 192.168.2.10: bytes=32 time<1ms TTL=125
Reply from 192.168.2.10: bytes=32 time<1ms TTL=125
Reply from 192.168.2.10: bytes=32 time<1ms TTL=125

Ping statistics for 192.168.2.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

## 2.2.3 Ping PC2 a PC3.



The screenshot shows a Packet Tracer window for PC2. The 'Desktop' tab is active, displaying a 'Command Prompt' window. The prompt shows the execution of two 'ping 192.168.2.10' commands. Each command results in four successful replies with 32 bytes of data, a time of less than 1ms, and a TTL of 126. The statistics for both pings show 4 packets sent, 4 received, and 0% loss, with round trip times of 0ms. The prompt ends with 'c:\>|'.

```
PC2
Physical Config Desktop Programming Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.2.10

Pinging 192.168.2.10 with 32 bytes of data:

Reply from 192.168.2.10: bytes=32 time<1ms TTL=126
Reply from 192.168.2.10: bytes=32 time<1ms TTL=126
Reply from 192.168.2.10: bytes=32 time<1ms TTL=126
Reply from 192.168.2.10: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.2.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.2.10

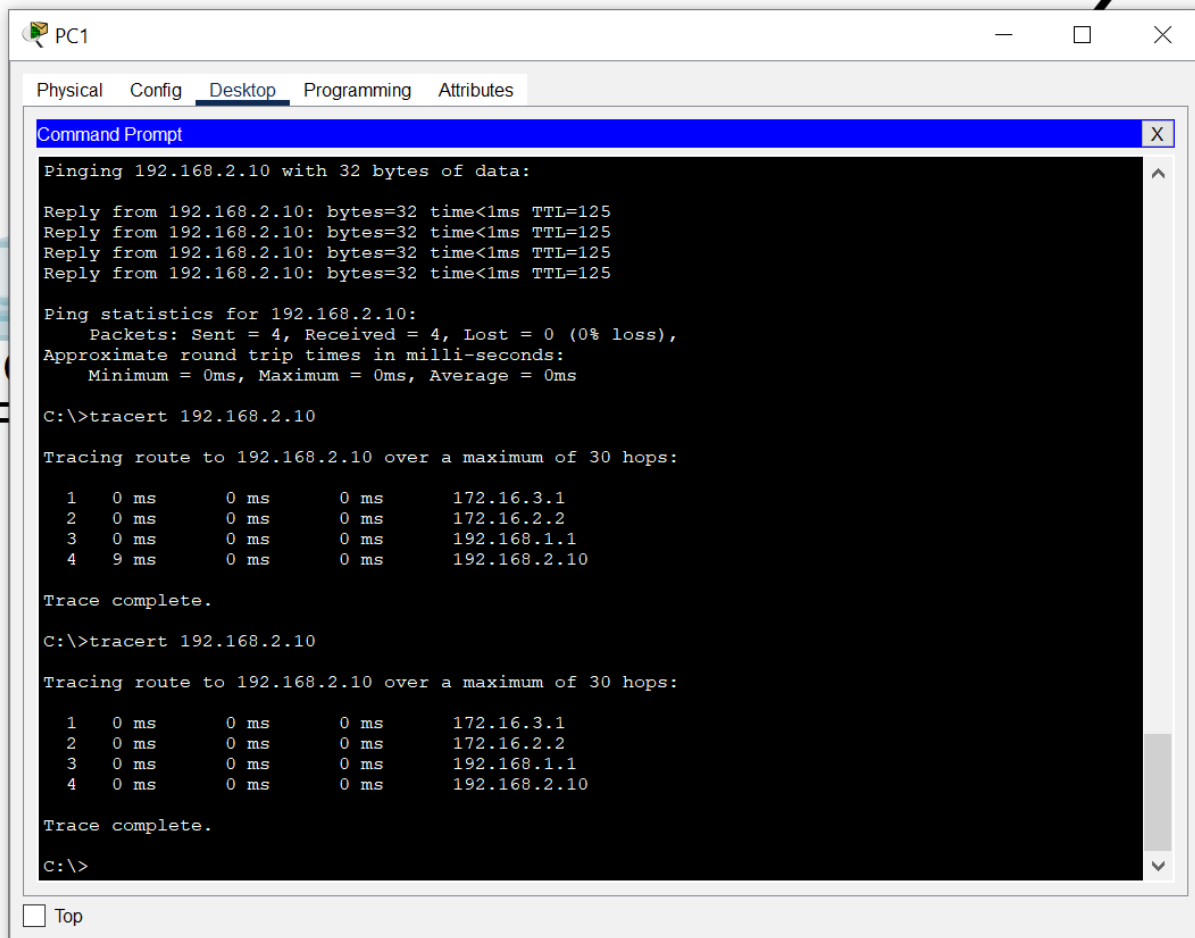
Pinging 192.168.2.10 with 32 bytes of data:

Reply from 192.168.2.10: bytes=32 time<1ms TTL=126
Reply from 192.168.2.10: bytes=32 time<1ms TTL=126
Reply from 192.168.2.10: bytes=32 time<1ms TTL=126
Reply from 192.168.2.10: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.2.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

c:\>|
```

## 2.3 Resultado del comando tracert de PC1 a PC3.



The screenshot shows a window titled "PC1" with tabs for "Physical", "Config", "Desktop", "Programming", and "Attributes". The "Desktop" tab is active, displaying a "Command Prompt" window. The Command Prompt shows the results of a ping and a tracert command.

```
Pinging 192.168.2.10 with 32 bytes of data:
Reply from 192.168.2.10: bytes=32 time<1ms TTL=125
Reply from 192.168.2.10: bytes=32 time<1ms TTL=125
Reply from 192.168.2.10: bytes=32 time<1ms TTL=125
Reply from 192.168.2.10: bytes=32 time<1ms TTL=125

Ping statistics for 192.168.2.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>tracert 192.168.2.10

Tracing route to 192.168.2.10 over a maximum of 30 hops:

  1  0 ms    0 ms    0 ms    172.16.3.1
  2  0 ms    0 ms    0 ms    172.16.2.2
  3  0 ms    0 ms    0 ms    192.168.1.1
  4  9 ms    0 ms    0 ms    192.168.2.10

Trace complete.

C:\>tracert 192.168.2.10

Tracing route to 192.168.2.10 over a maximum of 30 hops:

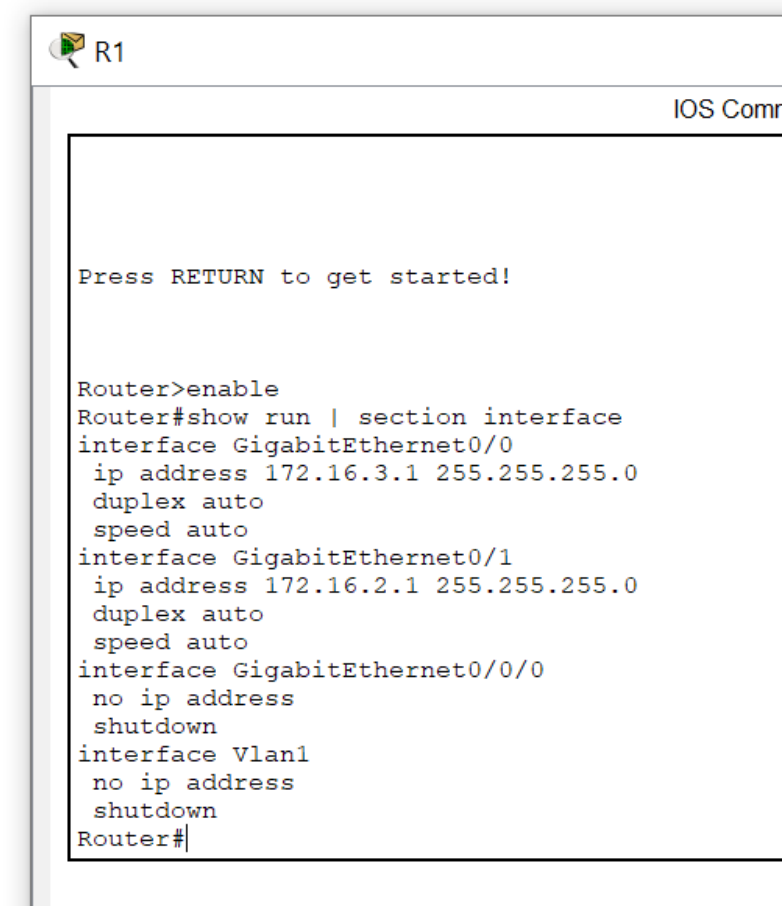
  1  0 ms    0 ms    0 ms    172.16.3.1
  2  0 ms    0 ms    0 ms    172.16.2.2
  3  0 ms    0 ms    0 ms    192.168.1.1
  4  0 ms    0 ms    0 ms    192.168.2.10

Trace complete.

C:\>
```

At the bottom left of the Command Prompt window, there is a checkbox labeled "Top" which is currently unchecked.

## 2.4 Configuración de una interfaz de router (show run | section interface):



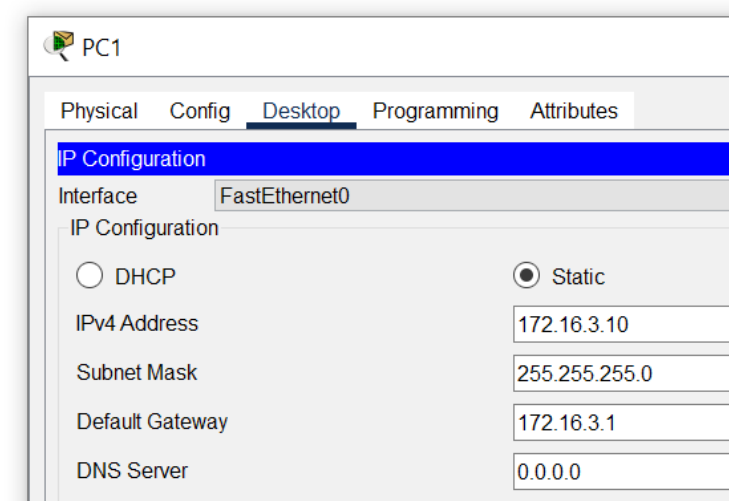
```
R1
IOS Comr

Press RETURN to get started!

Router>enable
Router#show run | section interface
interface GigabitEthernet0/0
  ip address 172.16.3.1 255.255.255.0
  duplex auto
  speed auto
interface GigabitEthernet0/1
  ip address 172.16.2.1 255.255.255.0
  duplex auto
  speed auto
interface GigabitEthernet0/0/0
  no ip address
  shutdown
interface Vlan1
  no ip address
  shutdown
Router#
```

## 2.5 IP configuration de cada PC:

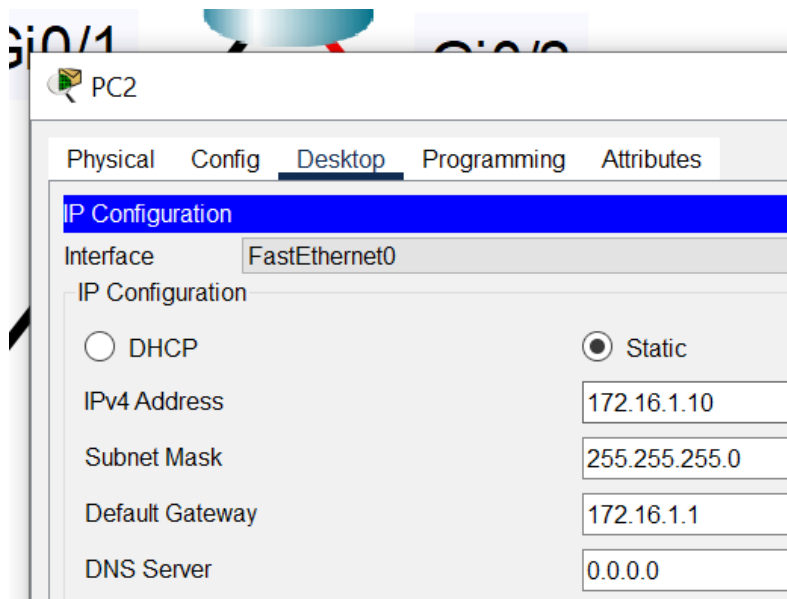
### 2.5.1 PC1:



IP Configuration	
Interface	FastEthernet0
IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	172.16.3.10
Subnet Mask	255.255.255.0
Default Gateway	172.16.3.1
DNS Server	0.0.0.0



### 2.5.2 PC2:



### 2.5.3 PC3:

