02 - Enrutamento Estático
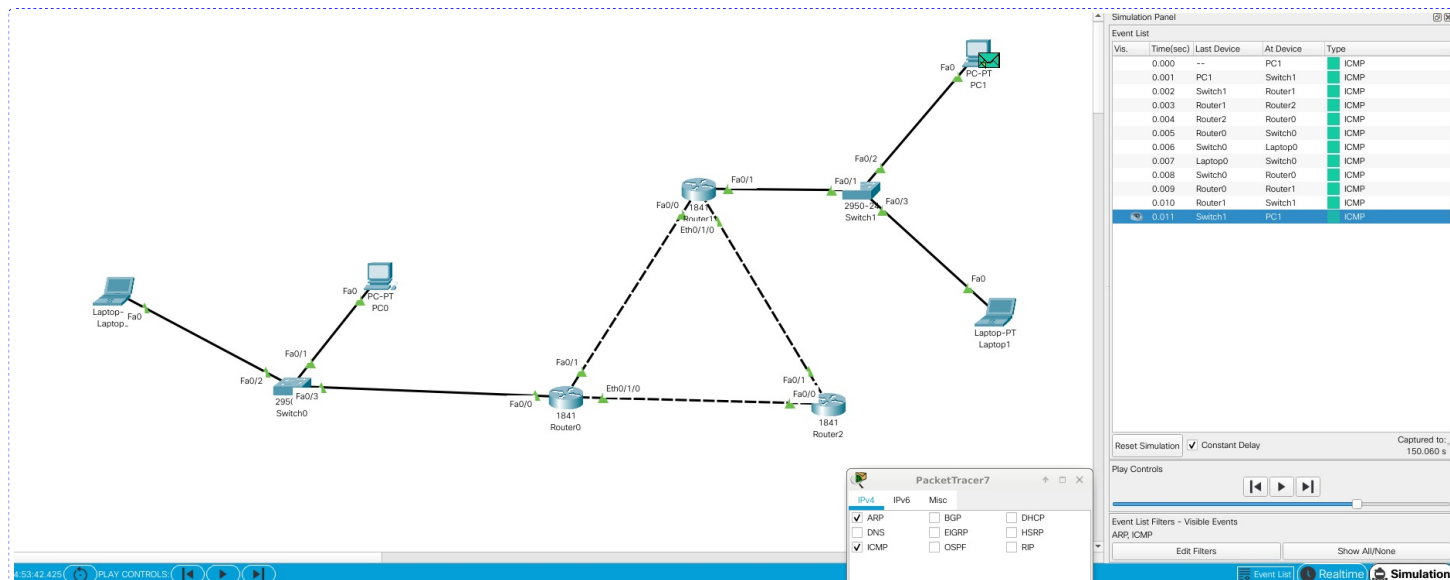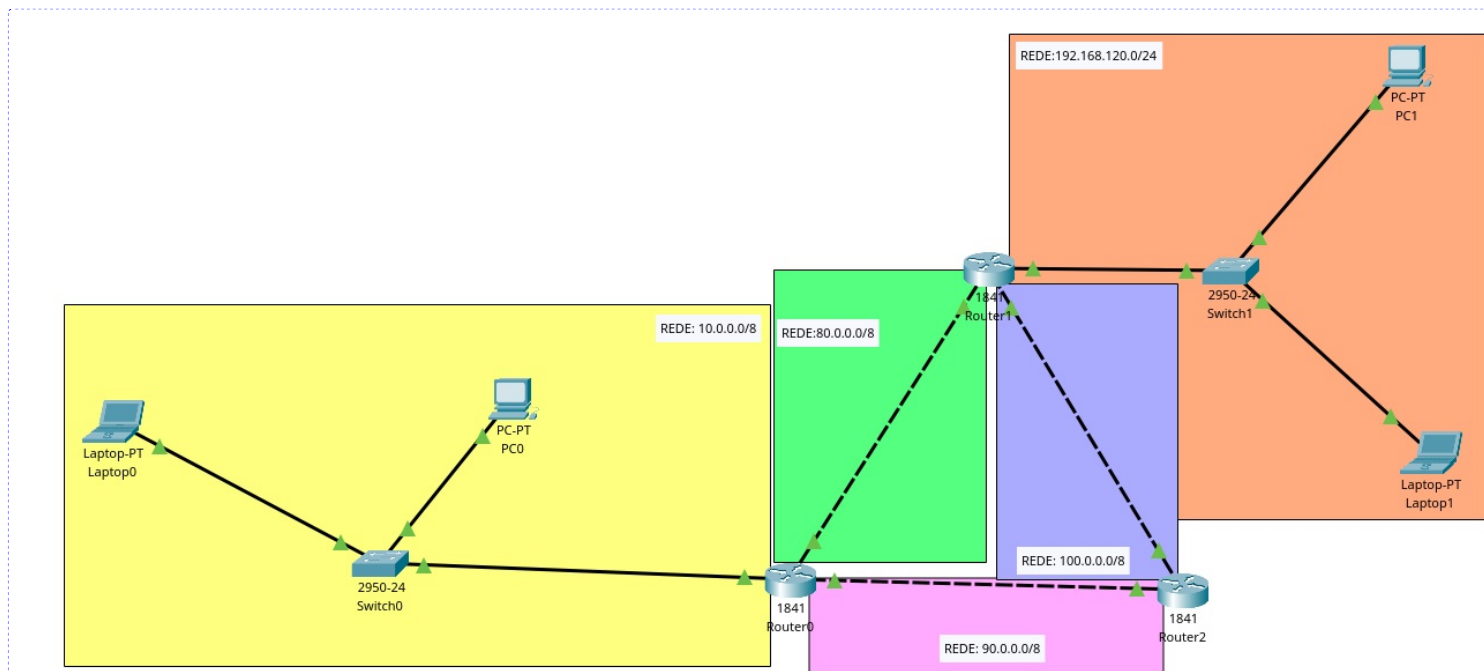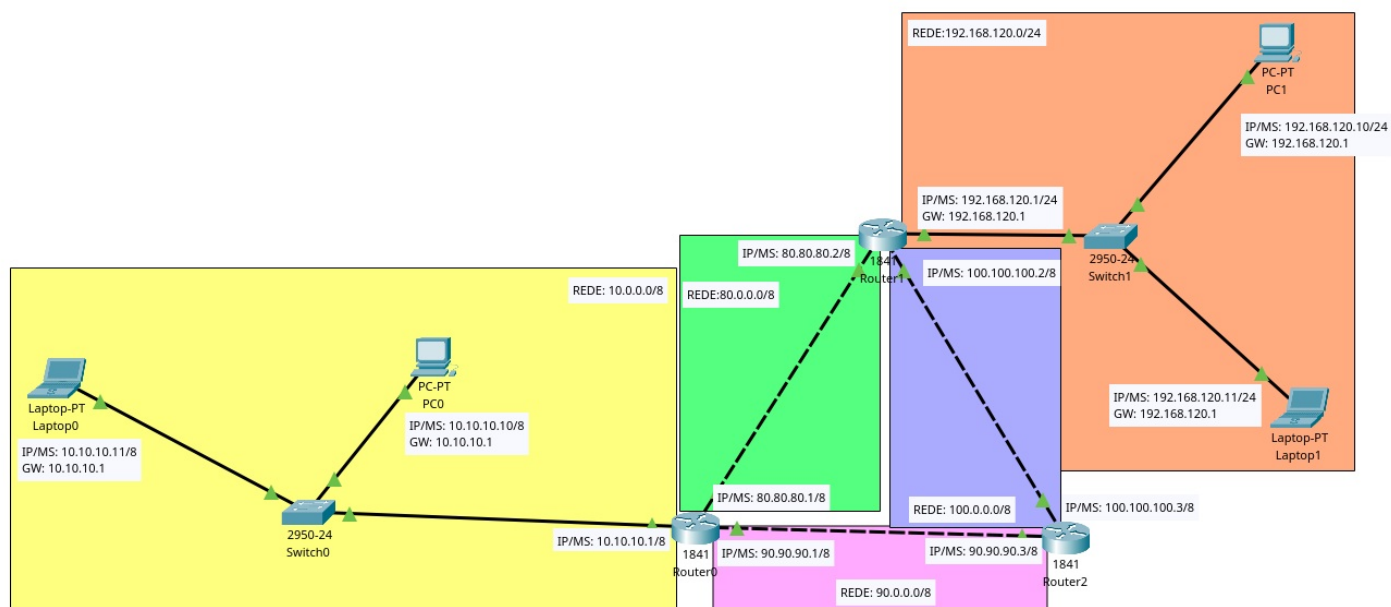

Fig.1 - Enrutamento Estático

NOTAS:

(1) Arquivo a descargar e abrir en Cisco Packet Tracer: **Enrutamento-Estatico-2-BRS.pkt**

(2) O diagrama representa 2 oficinas dunha empresa.

(3) IP=IPv4, MS=Máscara de Subrede, GW=Gateway, DR=Dirección de Rede.

Cisco Packet Tracer

1. Carga o diagrama da Fig.1 no Cisco Packet Tracer, é dicir, abre o arquivo descargado (ver NOTAS) no Cisco Packet Tracer.
2. Identifica mediante rectángulos de cores os segmentos de redes existentes no diagrama.

3. Representa no diagrama a topoloxía lóxica (IP/MS/GW/DR).

REDE:192.168.120.0/24

PC-PT
PC1

IP/MS: 192.168.120.10/24
GW: 192.168.120.1

IP/MS: 192.168.120.1/24
GW: 192.168.120.1

IP/MS: 80.80.80.2/8

1841
Router1

IP/MS: 100.100.100.2/8

2950-24
Switch1

REDE: 10.0.0.0/8   REDE:80.0.0.0/8

Laptop-PT
Laptop0

IP/MS: 10.10.10.11/8
GW: 10.10.10.1

PC-PT
PC0

IP/MS: 10.10.10.10/8
GW: 10.10.10.1

IP/MS: 192.168.120.11/24
GW: 192.168.120.1

Laptop-PT
Laptop1

IP/MS: 80.80.80.1/8

REDE: 100.0.0.0/8   IP/MS: 100.100.100.3/8

2950-24
Switch0

IP/MS: 10.10.10.1/8

1841
Router0

IP/MS: 90.90.90.1/8   IP/MS: 90.90.90.3/8   1841
Router2

REDE: 90.0.0.0/8

4. A continuación, por cada apartado realiza mediante comandos un ping de 10 paquetes ICMP indicando que é o que acontece (Razoa a resposta):
   a. Do PC1 á IP 127.0.0.1 → ping -n 10 127.0.0.1 → Existe conectividade debido a que a dirección 127.0.0.1 pertence ao rango de direccións de loopback, que se empregan para probar e verificar a pila de rede do propio dispositivo local. A dirección 127.0.0.1, especificamente, sempre apunta á máquina local na que se executa o comando.

b. Do PC1 á IP 127.127.127.127 → ping -n 10 127.127.127.127 → Existe conectividade xa que todos os enderezos do intervalo 127.0.0.0/8 (de 127.0.0.1 a 127.255.255.254) están reservados para a funcionalidade de loopback. Isto significa que, como ocorre con 127.0.0.1, os paquetes enviados a 127.127.127.127 non abandonarán o dispositivo e procesaranse localmente.

```
                                    PC1                              ^ _ □ ✕

C:\>ping -n 10 127.127.127.127

Pinging 127.127.127.127 with 32 bytes of data:

Reply from 127.127.127.127: bytes=32 time=13ms TTL=128
Reply from 127.127.127.127: bytes=32 time=6ms TTL=128
Reply from 127.127.127.127: bytes=32 time=6ms TTL=128
Reply from 127.127.127.127: bytes=32 time=8ms TTL=128
Reply from 127.127.127.127: bytes=32 time<1ms TTL=128
Reply from 127.127.127.127: bytes=32 time=7ms TTL=128
Reply from 127.127.127.127: bytes=32 time=6ms TTL=128
Reply from 127.127.127.127: bytes=32 time<1ms TTL=128
Reply from 127.127.127.127: bytes=32 time=7ms TTL=128
Reply from 127.127.127.127: bytes=32 time<1ms TTL=128

Ping statistics for 127.127.127.127:
    Packets: Sent = 10, Received = 10, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 13ms, Average = 5ms

C:\>
```
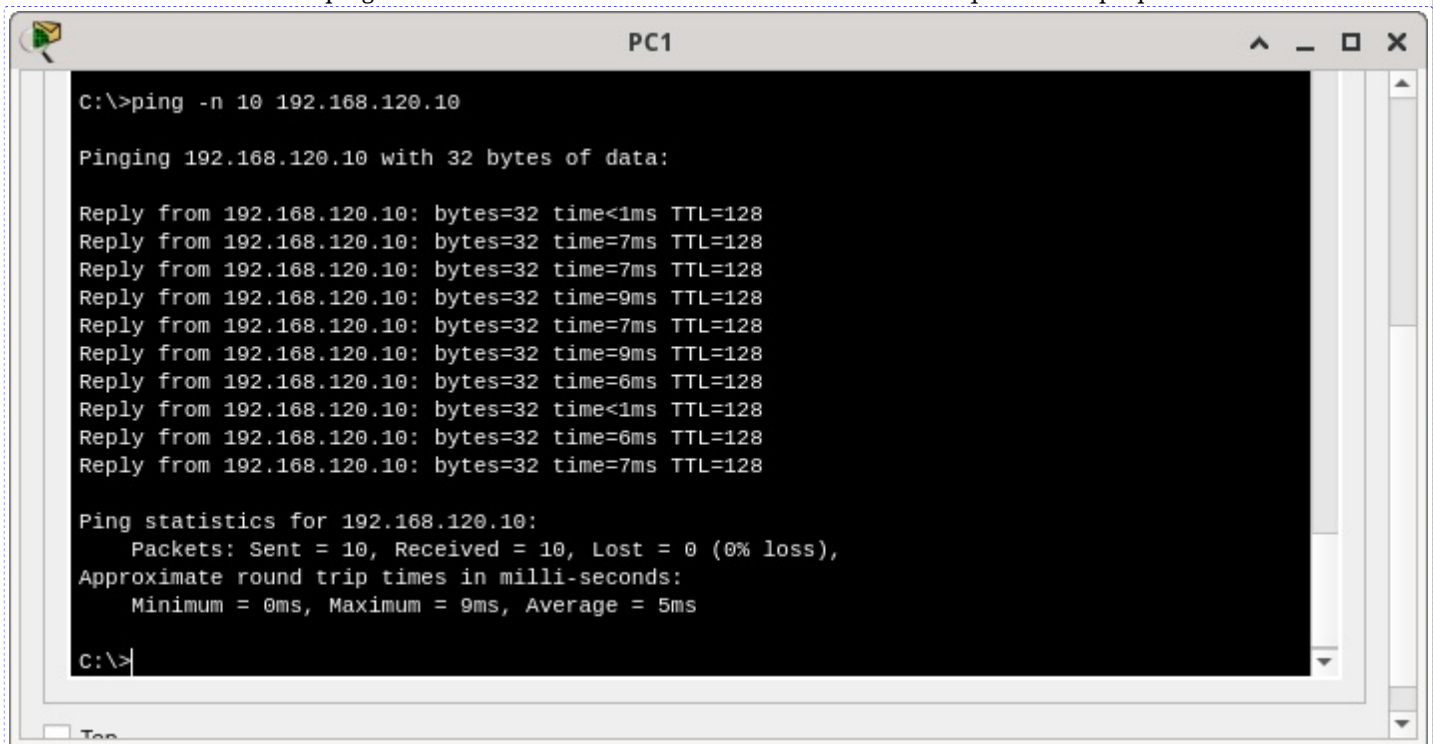
c. Do PC1 á IP 192.168.120.10 → ping -n 10 192.168.120.10 → Existe conectividade debido a que esta é a propia dirección IP de PC1.

```
                                    PC1                              ^ _ □ ✕

C:\>ping -n 10 192.168.120.10

Pinging 192.168.120.10 with 32 bytes of data:

Reply from 192.168.120.10: bytes=32 time<1ms TTL=128
Reply from 192.168.120.10: bytes=32 time=7ms TTL=128
Reply from 192.168.120.10: bytes=32 time=7ms TTL=128
Reply from 192.168.120.10: bytes=32 time=9ms TTL=128
Reply from 192.168.120.10: bytes=32 time=7ms TTL=128
Reply from 192.168.120.10: bytes=32 time=9ms TTL=128
Reply from 192.168.120.10: bytes=32 time=6ms TTL=128
Reply from 192.168.120.10: bytes=32 time<1ms TTL=128
Reply from 192.168.120.10: bytes=32 time=6ms TTL=128
Reply from 192.168.120.10: bytes=32 time=7ms TTL=128

Ping statistics for 192.168.120.10:
    Packets: Sent = 10, Received = 10, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 9ms, Average = 5ms

C:\>
```
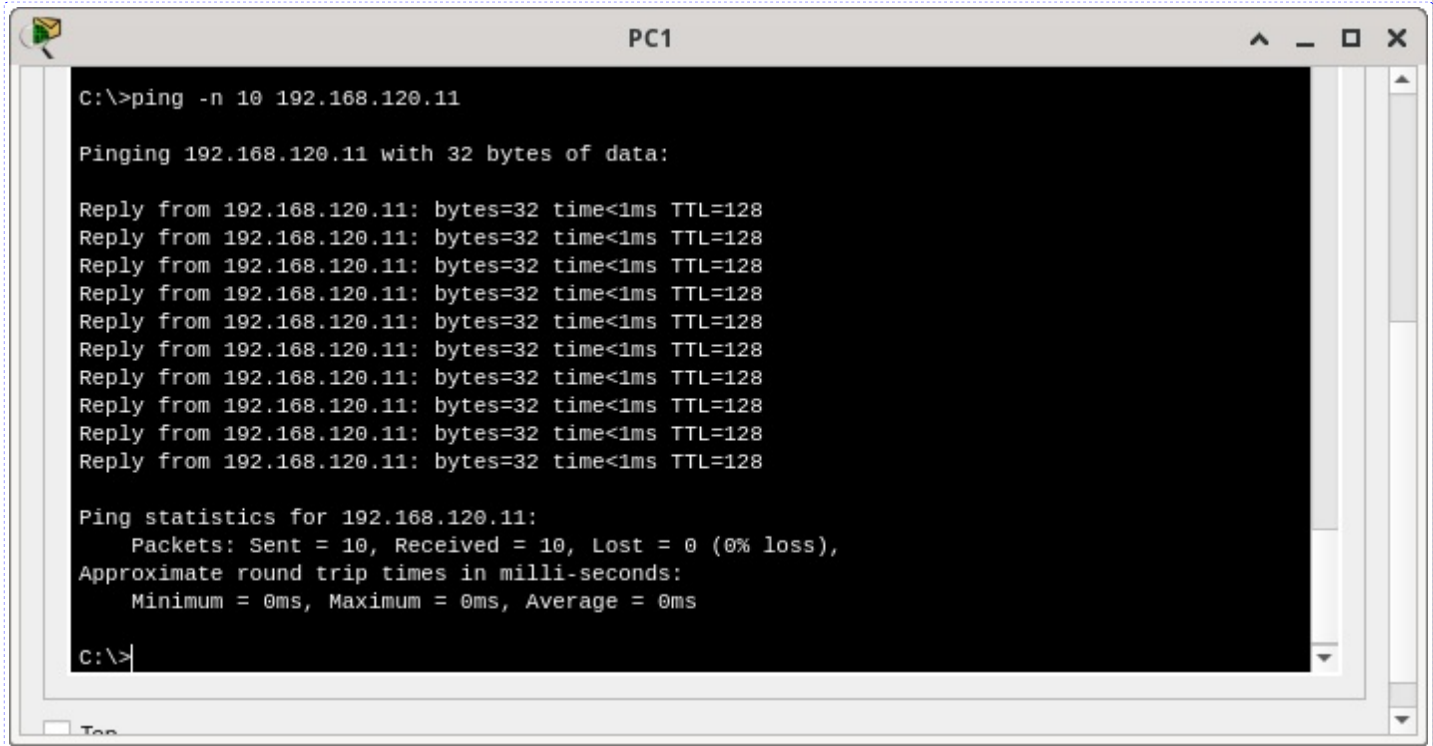
d. Do PC1 á IP 192.168.120.11 → ping -n 10 192.168.120.11 → Existe conectividade debido a que os 2 equipos pertencen á mesma rede e o cableado e a electrónica de rede así o permite.

```
                                    PC1                          ^  _  □  ×

    C:\>ping -n 10 192.168.120.11

    Pinging 192.168.120.11 with 32 bytes of data:

    Reply from 192.168.120.11: bytes=32 time<1ms TTL=128
    Reply from 192.168.120.11: bytes=32 time<1ms TTL=128
    Reply from 192.168.120.11: bytes=32 time<1ms TTL=128
    Reply from 192.168.120.11: bytes=32 time<1ms TTL=128
    Reply from 192.168.120.11: bytes=32 time<1ms TTL=128
    Reply from 192.168.120.11: bytes=32 time<1ms TTL=128
    Reply from 192.168.120.11: bytes=32 time<1ms TTL=128
    Reply from 192.168.120.11: bytes=32 time<1ms TTL=128
    Reply from 192.168.120.11: bytes=32 time<1ms TTL=128
    Reply from 192.168.120.11: bytes=32 time<1ms TTL=128

    Ping statistics for 192.168.120.11:
        Packets: Sent = 10, Received = 10, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

    C:\>
```
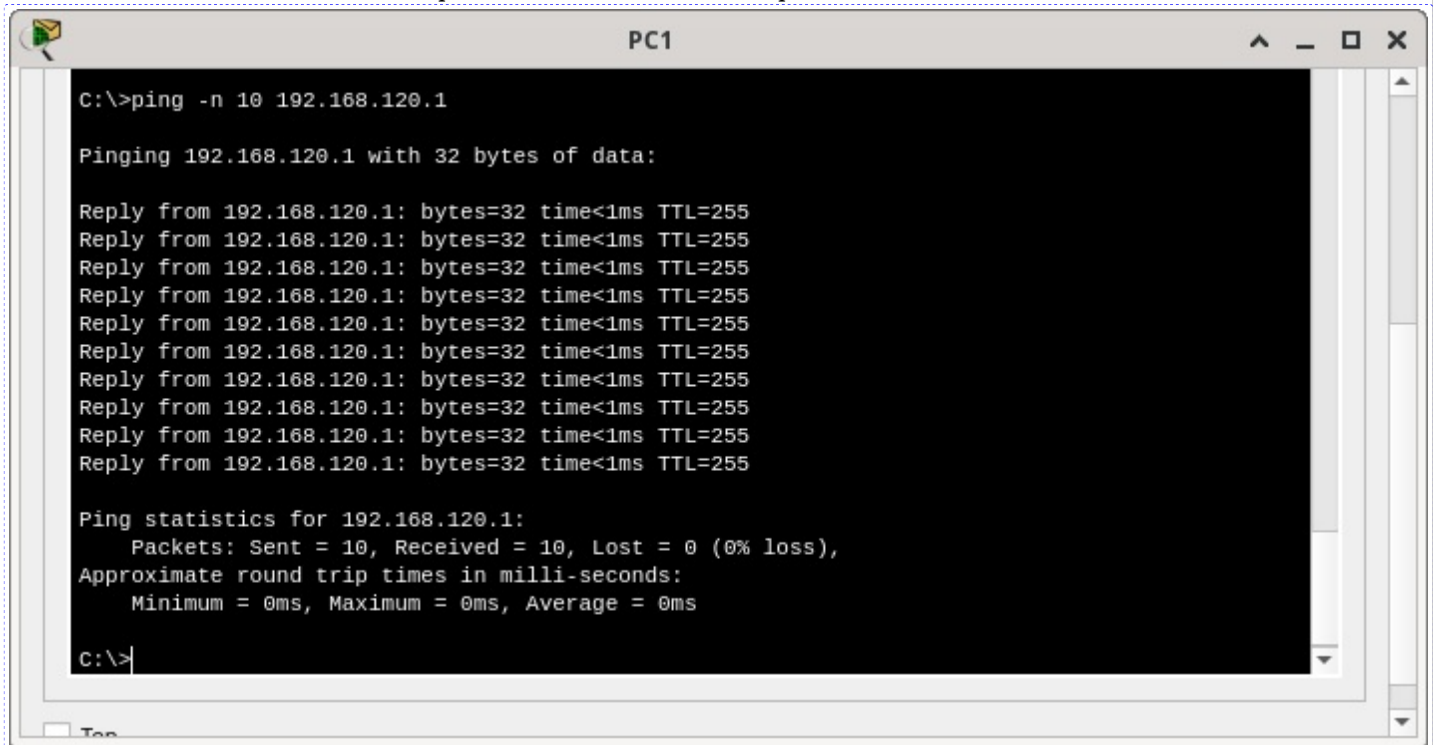
e. Do PC1 á IP 192.168.120.1 → ping -n 10 192.168.120.1 → Existe conectividade debido a que os 2 equipos pertencen á mesma rede e o cableado e a electrónica de rede así o permite. A IP 192.168.120.1 é a porta de enlace de PC1.

```
                                    PC1                          ^  _  □  ×

    C:\>ping -n 10 192.168.120.1

    Pinging 192.168.120.1 with 32 bytes of data:

    Reply from 192.168.120.1: bytes=32 time<1ms TTL=255
    Reply from 192.168.120.1: bytes=32 time<1ms TTL=255
    Reply from 192.168.120.1: bytes=32 time<1ms TTL=255
    Reply from 192.168.120.1: bytes=32 time<1ms TTL=255
    Reply from 192.168.120.1: bytes=32 time<1ms TTL=255
    Reply from 192.168.120.1: bytes=32 time<1ms TTL=255
    Reply from 192.168.120.1: bytes=32 time<1ms TTL=255
    Reply from 192.168.120.1: bytes=32 time<1ms TTL=255
    Reply from 192.168.120.1: bytes=32 time<1ms TTL=255
    Reply from 192.168.120.1: bytes=32 time<1ms TTL=255

    Ping statistics for 192.168.120.1:
        Packets: Sent = 10, Received = 10, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

    C:\>
```
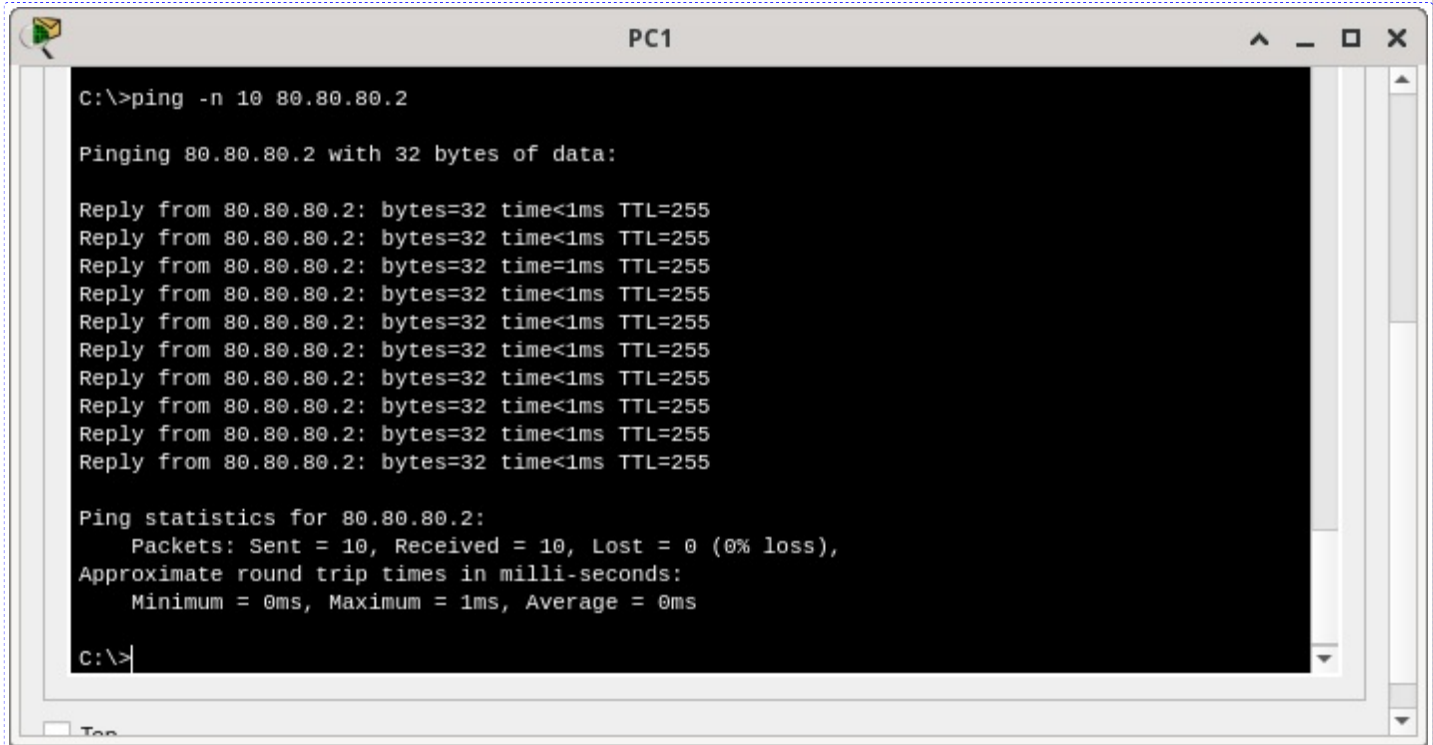
f. Do PC1 á IP 80.80.80.2 → ping -n 10 80.80.80.2 → Existe conectividade porque o PC1 ten configurado correctamente o gateway predeterminado (192.168.120.1), que corresponde á interface FastEthernet 0/1 do router. Cando o PC1 envía un ping a 80.80.80.2, o tráfico é dirixido ao gateway, que reenvía os paquetes a través da súa interface FastEthernet 0/0 coa IP 80.80.80.2. Este router actúa como un intermediario entre as dúas redes, permitindo a comunicación ao estar configurado correctamente coas súas interfaces en ambas redes (a 192.168.120.0/24 e a 80.0.0.0/8).

```
                                    PC1                          ^ _ □ ✕

    C:\>ping -n 10 80.80.80.2

    Pinging 80.80.80.2 with 32 bytes of data:

    Reply from 80.80.80.2: bytes=32 time<1ms TTL=255
    Reply from 80.80.80.2: bytes=32 time<1ms TTL=255
    Reply from 80.80.80.2: bytes=32 time=1ms TTL=255
    Reply from 80.80.80.2: bytes=32 time<1ms TTL=255
    Reply from 80.80.80.2: bytes=32 time<1ms TTL=255
    Reply from 80.80.80.2: bytes=32 time<1ms TTL=255
    Reply from 80.80.80.2: bytes=32 time<1ms TTL=255
    Reply from 80.80.80.2: bytes=32 time<1ms TTL=255
    Reply from 80.80.80.2: bytes=32 time<1ms TTL=255
    Reply from 80.80.80.2: bytes=32 time<1ms TTL=255

    Ping statistics for 80.80.80.2:
        Packets: Sent = 10, Received = 10, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

    C:\>
```
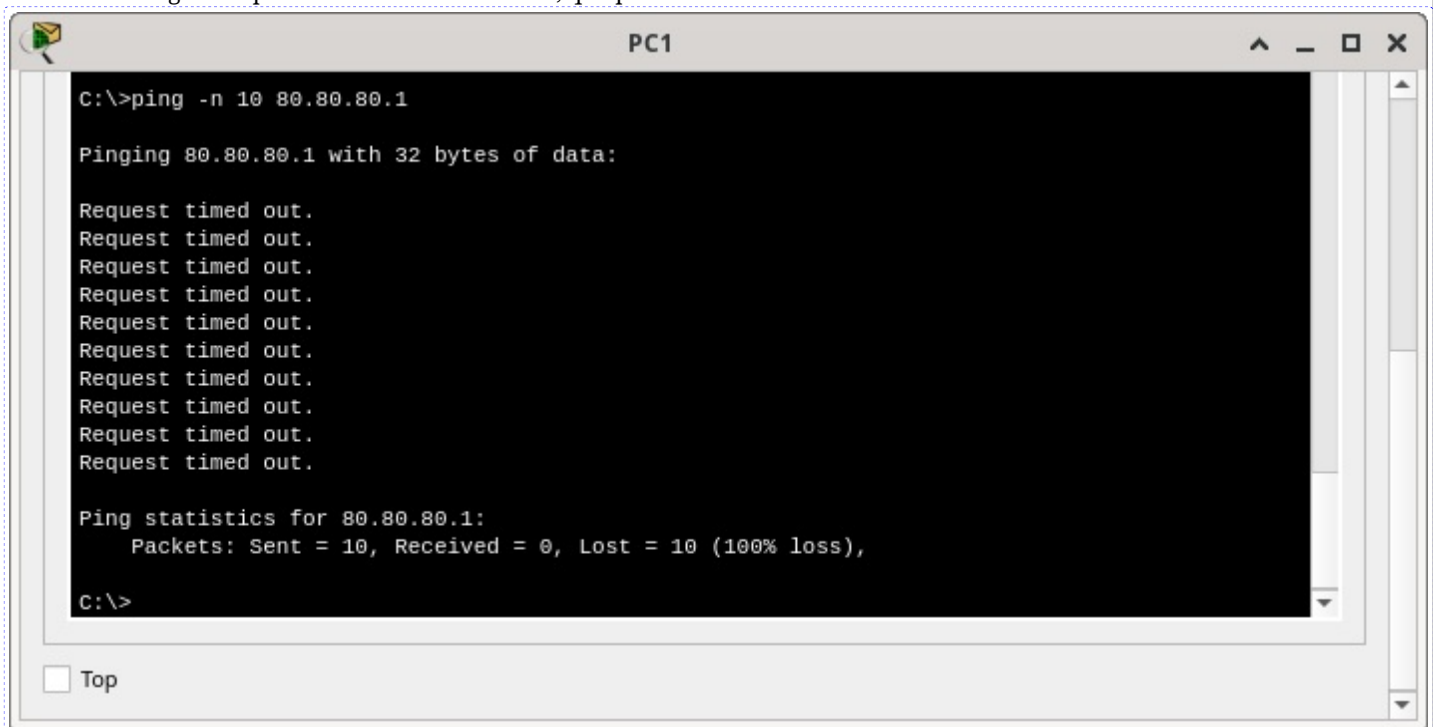
g. Do PC1 á IP 80.80.80.1 → ping -n 10 80.80.80.1 → Non existe conectividade porque o Router1 non ten unha ruta estática ou dinámica configurada para alcanzar esa dirección, que pertence ao Router0.

```
                                    PC1                          ^ _ □ ✕

    C:\>ping -n 10 80.80.80.1

    Pinging 80.80.80.1 with 32 bytes of data:

    Request timed out.
    Request timed out.
    Request timed out.
    Request timed out.
    Request timed out.
    Request timed out.
    Request timed out.
    Request timed out.
    Request timed out.
    Request timed out.

    Ping statistics for 80.80.80.1:
        Packets: Sent = 10, Received = 0, Lost = 10 (100% loss),

    C:\>

Top
```
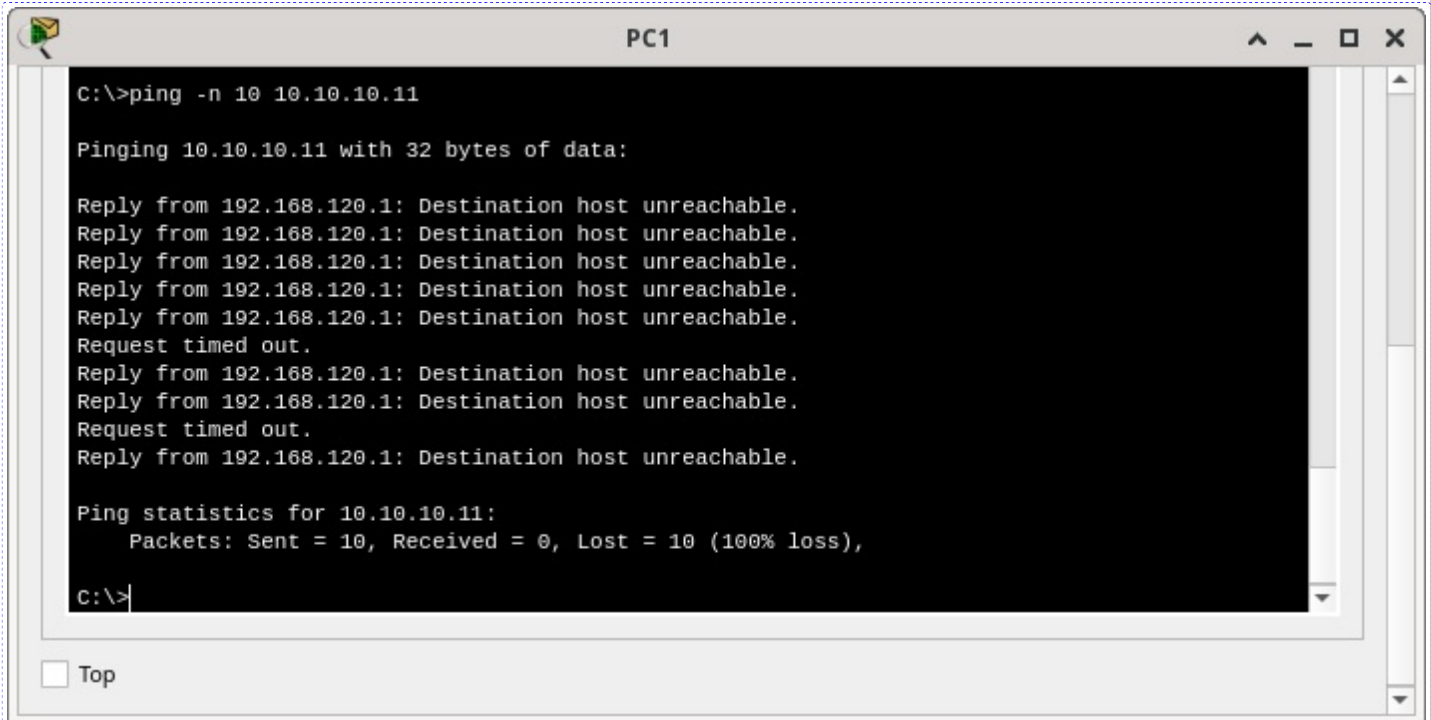
h. Do PC1 á IP 100.100.100.2 → ping -n 10 100.100.100.2 → Existe conectividade porque o PC1 ten configurado correctamente o gateway predeterminado (192.168.120.1), que corresponde á interface FastEthernet 0/1 do router. Cando o PC1 envía un ping a 100.100.100.2, o tráfico é dirixido ao gateway, que reenvía os paquetes a través da súa interface Ethernet 0/1/0 coa IP 100.100.100.2. Este router actúa como un intermediario entre as dúas redes, permitindo a comunicación ao estar configurado correctamente coas súas interfaces en ambas redes (a 192.168.120.0/24 e a 100.0.0.0/8).


```
PC1                                                      ^  _  □  ✕

C:\>ping -n 10 10.10.10.11

Pinging 10.10.10.11 with 32 bytes of data:

Reply from 192.168.120.1: Destination host unreachable.
Reply from 192.168.120.1: Destination host unreachable.
Reply from 192.168.120.1: Destination host unreachable.
Reply from 192.168.120.1: Destination host unreachable.
Reply from 192.168.120.1: Destination host unreachable.
Request timed out.
Reply from 192.168.120.1: Destination host unreachable.
Reply from 192.168.120.1: Destination host unreachable.
Request timed out.
Reply from 192.168.120.1: Destination host unreachable.

Ping statistics for 10.10.10.11:
    Packets: Sent = 10, Received = 0, Lost = 10 (100% loss),

C:\>
```
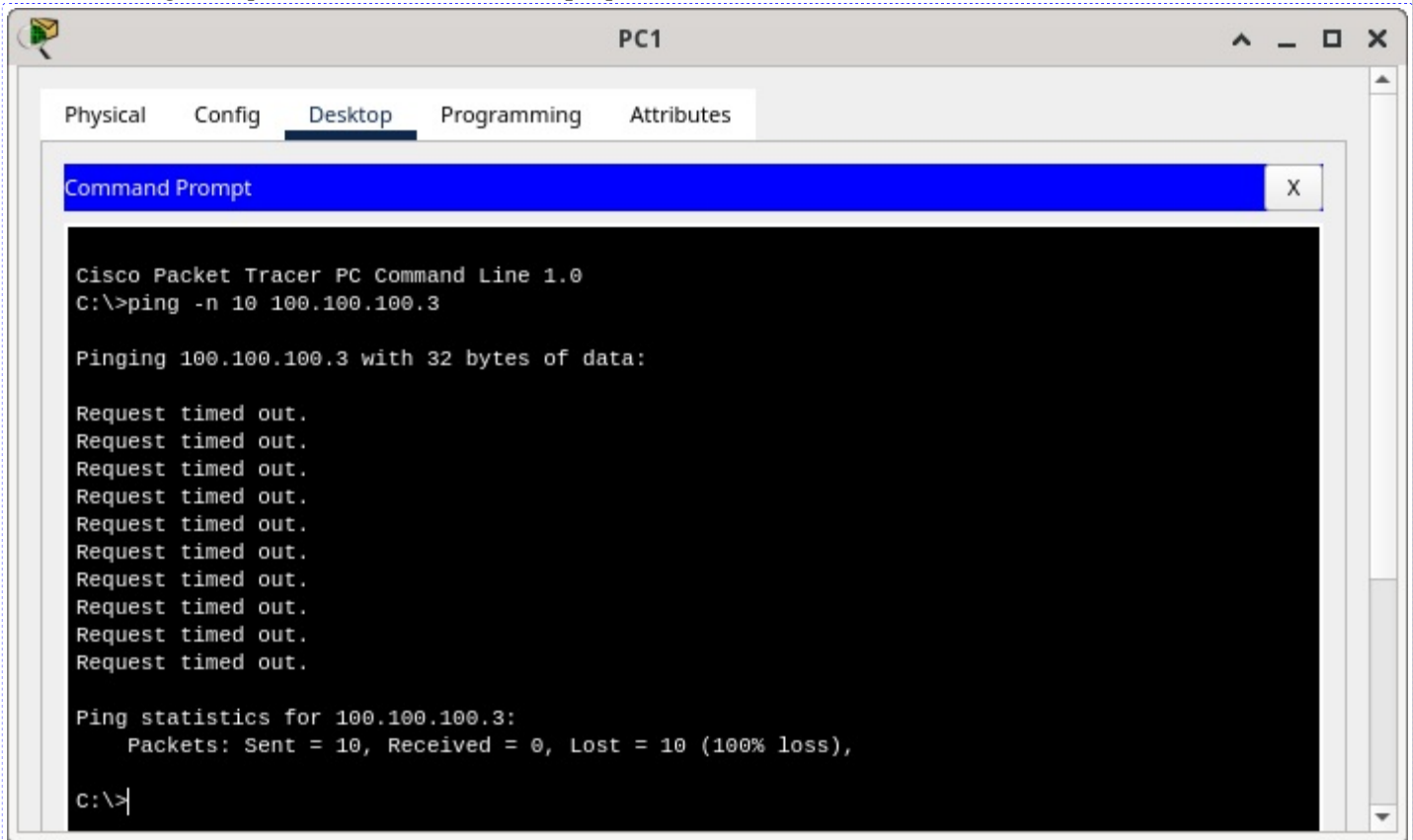
☐ Top

i. Do PC1 á IP 100.100.100.3 → ping -n 10 100.100.100.3 → Non existe conectividade porque o Router1 non ten unha ruta estática ou dinámica configurada para alcanzar esa dirección, que pertence ao Router2.


```
PC1                                                      ^  _  □  ✕

Physical    Config    Desktop    Programming    Attributes

Command Prompt                                                      X

Cisco Packet Tracer PC Command Line 1.0
C:\>ping -n 10 100.100.100.3

Pinging 100.100.100.3 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 100.100.100.3:
    Packets: Sent = 10, Received = 0, Lost = 10 (100% loss),

C:\>
```
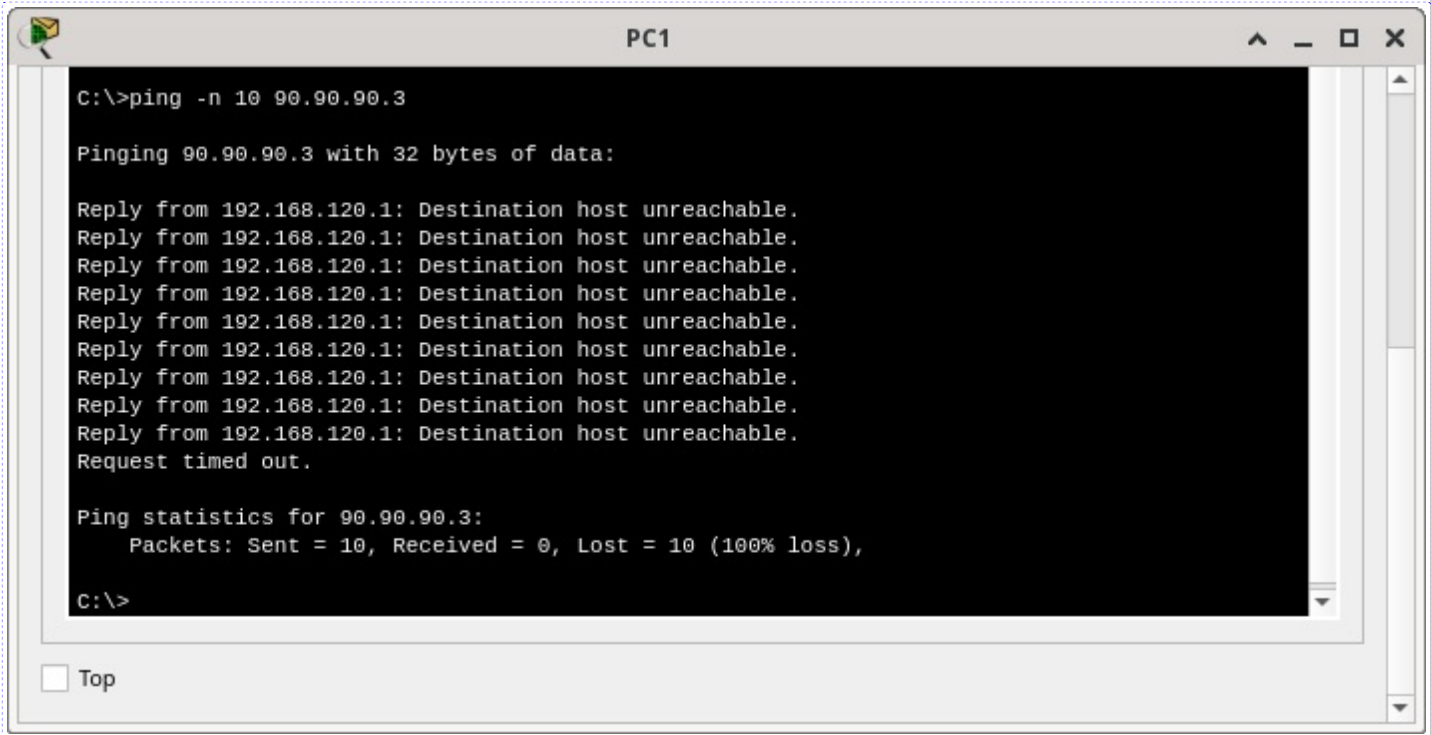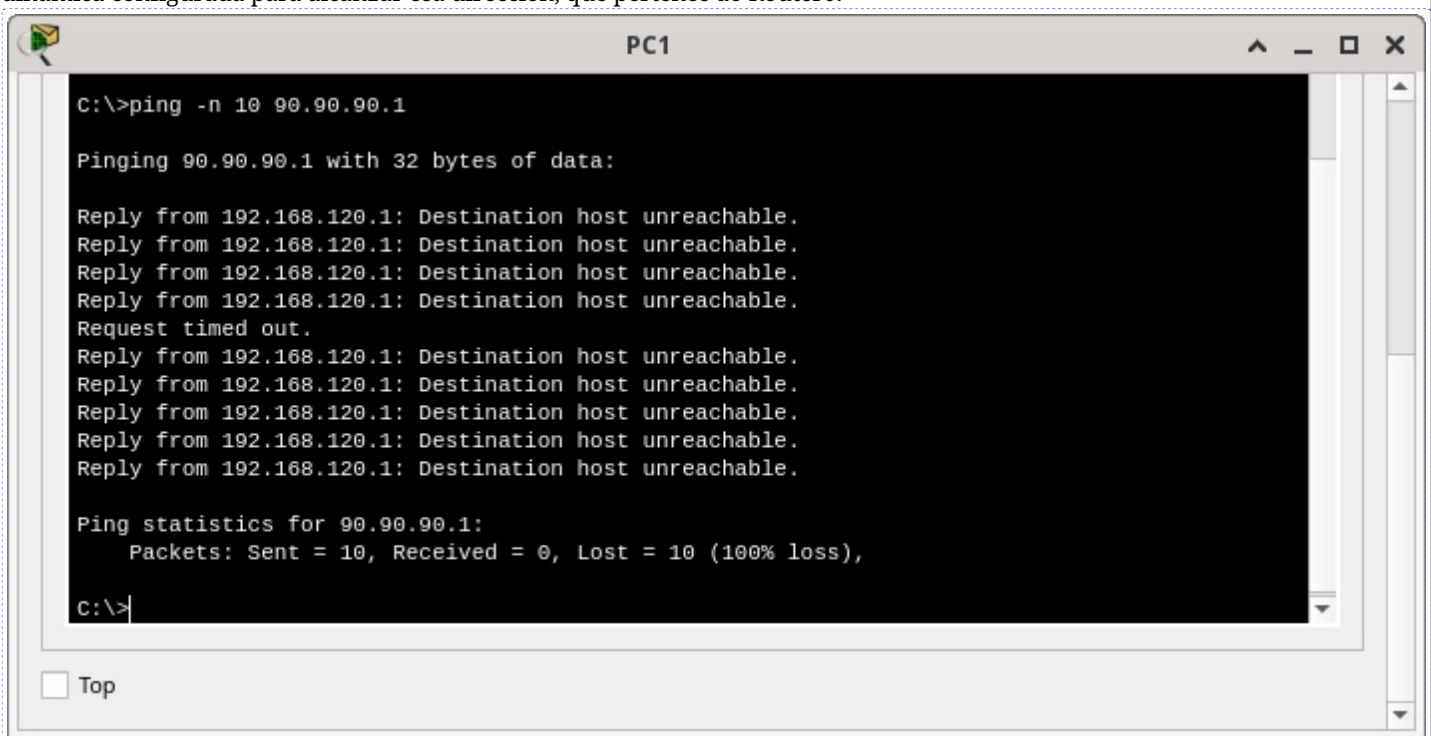
j. Do PC1 á IP 90.90.90.3 → ping -n 10 90.90.90.3 → Non existe conectividade porque o Router1 non ten unha ruta estática ou dinámica configurada para alcanzar esa dirección, que pertence ao Router2.

```
                                    PC1                              ^ _ □ ×

   C:\>ping -n 10 90.90.90.3

   Pinging 90.90.90.3 with 32 bytes of data:

   Reply from 192.168.120.1: Destination host unreachable.
   Reply from 192.168.120.1: Destination host unreachable.
   Reply from 192.168.120.1: Destination host unreachable.
   Reply from 192.168.120.1: Destination host unreachable.
   Reply from 192.168.120.1: Destination host unreachable.
   Reply from 192.168.120.1: Destination host unreachable.
   Reply from 192.168.120.1: Destination host unreachable.
   Reply from 192.168.120.1: Destination host unreachable.
   Reply from 192.168.120.1: Destination host unreachable.
   Request timed out.

   Ping statistics for 90.90.90.3:
       Packets: Sent = 10, Received = 0, Lost = 10 (100% loss),

   C:\>

   ☐ Top
```
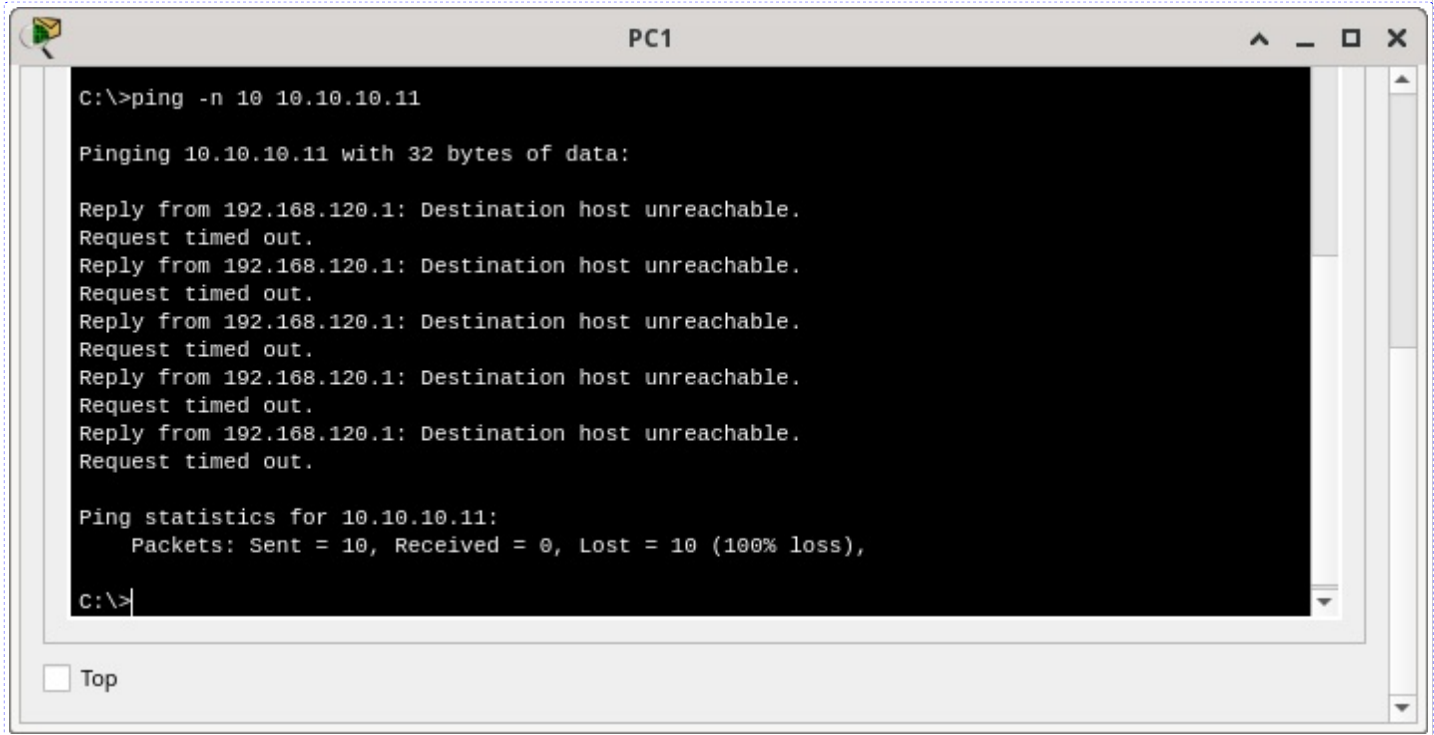
k. Do PC1 á IP 90.90.90.1 → ping -n 10 90.90.90.1 → Non existe conectividade porque o Router1 non ten unha ruta estática ou dinámica configurada para alcanzar esa dirección, que pertence ao Router0.

```
                                    PC1                              ^ _ □ ×

   C:\>ping -n 10 90.90.90.1

   Pinging 90.90.90.1 with 32 bytes of data:

   Reply from 192.168.120.1: Destination host unreachable.
   Reply from 192.168.120.1: Destination host unreachable.
   Reply from 192.168.120.1: Destination host unreachable.
   Reply from 192.168.120.1: Destination host unreachable.
   Request timed out.
   Reply from 192.168.120.1: Destination host unreachable.
   Reply from 192.168.120.1: Destination host unreachable.
   Reply from 192.168.120.1: Destination host unreachable.
   Reply from 192.168.120.1: Destination host unreachable.
   Reply from 192.168.120.1: Destination host unreachable.

   Ping statistics for 90.90.90.1:
       Packets: Sent = 10, Received = 0, Lost = 10 (100% loss),

   C:\>

   ☐ Top
```
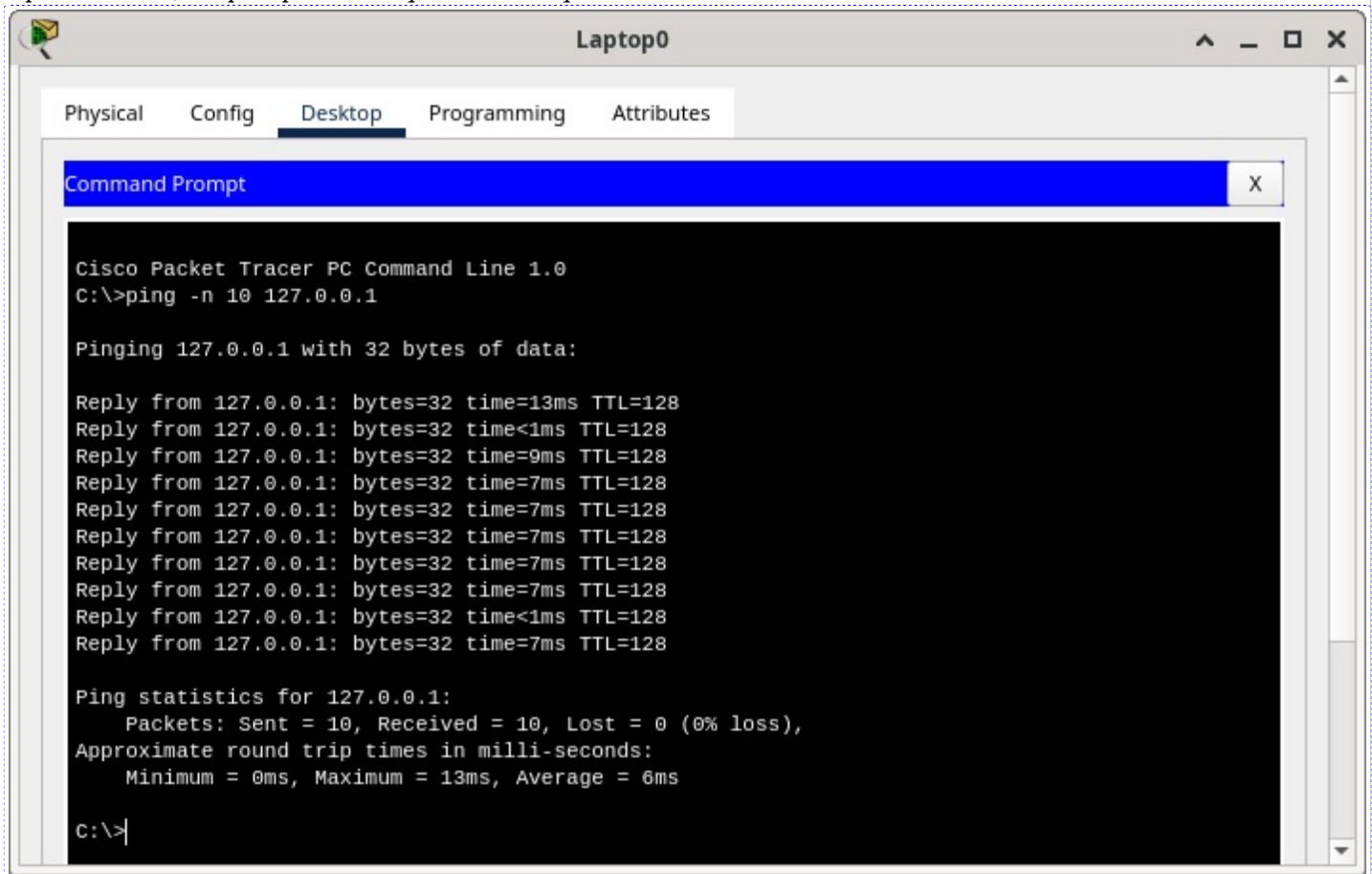
l. Do PC1 á IP 10.10.10.11 → ping -n 10 10.10.10.11 → Non existe conectividade xa que os paquetes ICMP non son quen de chegar ao Router0, polo que xa non son capaz de chegar ao Laptop0.

5. A continuación, por cada apartado realiza mediante comandos un ping de 10 paquetes ICMP indicando que é o que acontece (Razoa a resposta):
   a. Do Laptop0 á IP 127.0.0.1 → ping -n 10 127.0.0.1 → Existe conectividade debido a que a dirección 127.0.0.1 pertence ao rango de direccións de loopback, que se empregan para probar e verificar a pila de rede do propio dispositivo local. A dirección 127.0.0.1, especificamente, sempre apunta á máquina local na que se executa o comando.

b. Do Laptop0 á IP 127.127.127.127 → ping -n 10 127.127.127.127 → Existe conectividade xa que todos os enderezos do intervalo 127.0.0.0/8 (de 127.0.0.1 a 127.255.255.254) están reservados para a funcionalidade de loopback. Isto significa que, como ocorre con 127.0.0.1, os paquetes enviados a 127.127.127.127 non abandonarán o dispositivo e procesaranse localmente.

```
Laptop0                                                    ^ _ ☐ ✕

C:\>ping -n 10 127.127.127.127

Pinging 127.127.127.127 with 32 bytes of data:

Reply from 127.127.127.127: bytes=32 time=13ms TTL=128
Reply from 127.127.127.127: bytes=32 time=9ms TTL=128
Reply from 127.127.127.127: bytes=32 time=7ms TTL=128
Reply from 127.127.127.127: bytes=32 time=7ms TTL=128
Reply from 127.127.127.127: bytes=32 time=7ms TTL=128
Reply from 127.127.127.127: bytes=32 time<1ms TTL=128
Reply from 127.127.127.127: bytes=32 time=7ms TTL=128
Reply from 127.127.127.127: bytes=32 time<1ms TTL=128
Reply from 127.127.127.127: bytes=32 time=7ms TTL=128
Reply from 127.127.127.127: bytes=32 time=9ms TTL=128

Ping statistics for 127.127.127.127:
    Packets: Sent = 10, Received = 10, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 13ms, Average = 6ms

C:\>
```

c. Do Laptop0 á IP 10.10.10.10 → ping -n 10 10.10.10.10 → Existe conectividade debido a que esta é a propia dirección IP de Laptop0.

```
Laptop0                                                    ^ _ ☐ ✕

C:\>ping -n 10 10.10.10.10

Pinging 10.10.10.10 with 32 bytes of data:

Reply from 10.10.10.10: bytes=32 time<1ms TTL=128
Reply from 10.10.10.10: bytes=32 time<1ms TTL=128
Reply from 10.10.10.10: bytes=32 time<1ms TTL=128
Reply from 10.10.10.10: bytes=32 time<1ms TTL=128
Reply from 10.10.10.10: bytes=32 time<1ms TTL=128
Reply from 10.10.10.10: bytes=32 time<1ms TTL=128
Reply from 10.10.10.10: bytes=32 time=1ms TTL=128
Reply from 10.10.10.10: bytes=32 time<1ms TTL=128
Reply from 10.10.10.10: bytes=32 time<1ms TTL=128
Reply from 10.10.10.10: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.10:
    Packets: Sent = 10, Received = 10, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```
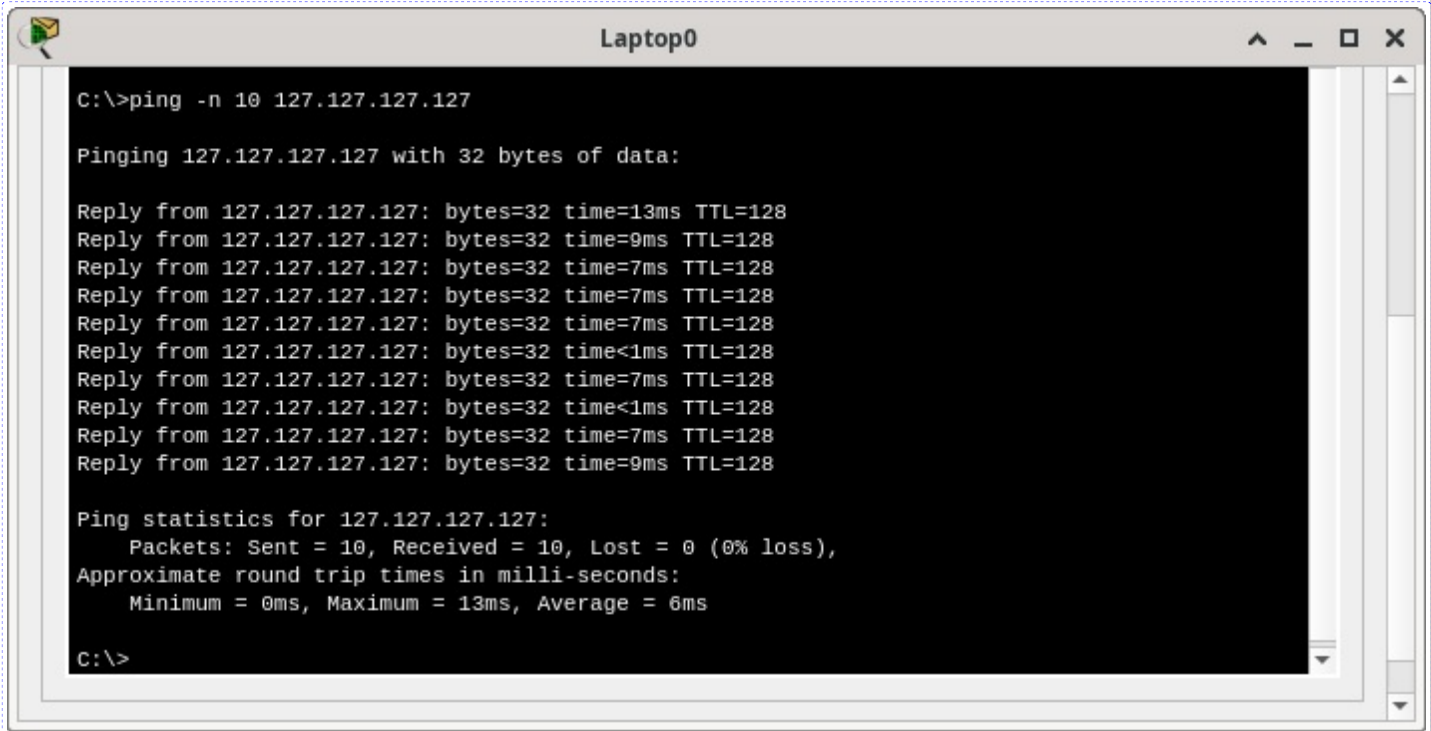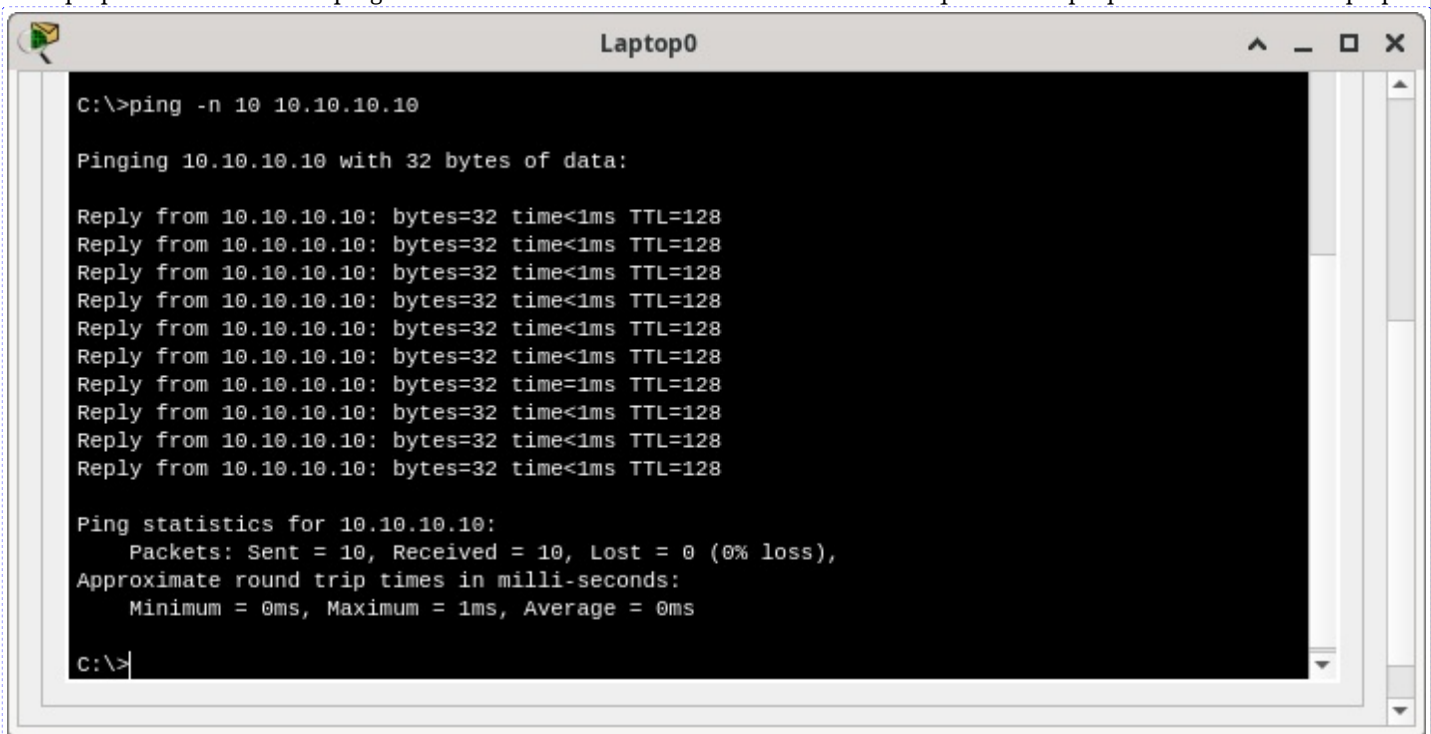
d. Do Laptop0 á IP 10.10.10.11 → ping -n 10 10.10.10.11 → Existe conectividade debido a que os 2 equipos pertencen á mesma rede e o cableado e a electrónica de rede así o permite.

```
                              Laptop0                              ^ _ ☐ ✕

 C:\>ping -n 10 10.10.10.11

 Pinging 10.10.10.11 with 32 bytes of data:

 Reply from 10.10.10.11: bytes=32 time<1ms TTL=128
 Reply from 10.10.10.11: bytes=32 time<1ms TTL=128
 Reply from 10.10.10.11: bytes=32 time<1ms TTL=128
 Reply from 10.10.10.11: bytes=32 time=8ms TTL=128
 Reply from 10.10.10.11: bytes=32 time=5ms TTL=128
 Reply from 10.10.10.11: bytes=32 time=8ms TTL=128
 Reply from 10.10.10.11: bytes=32 time=9ms TTL=128
 Reply from 10.10.10.11: bytes=32 time=7ms TTL=128
 Reply from 10.10.10.11: bytes=32 time=9ms TTL=128
 Reply from 10.10.10.11: bytes=32 time=7ms TTL=128

 Ping statistics for 10.10.10.11:
     Packets: Sent = 10, Received = 10, Lost = 0 (0% loss),
 Approximate round trip times in milli-seconds:
     Minimum = 0ms, Maximum = 9ms, Average = 5ms

 C:\>
```
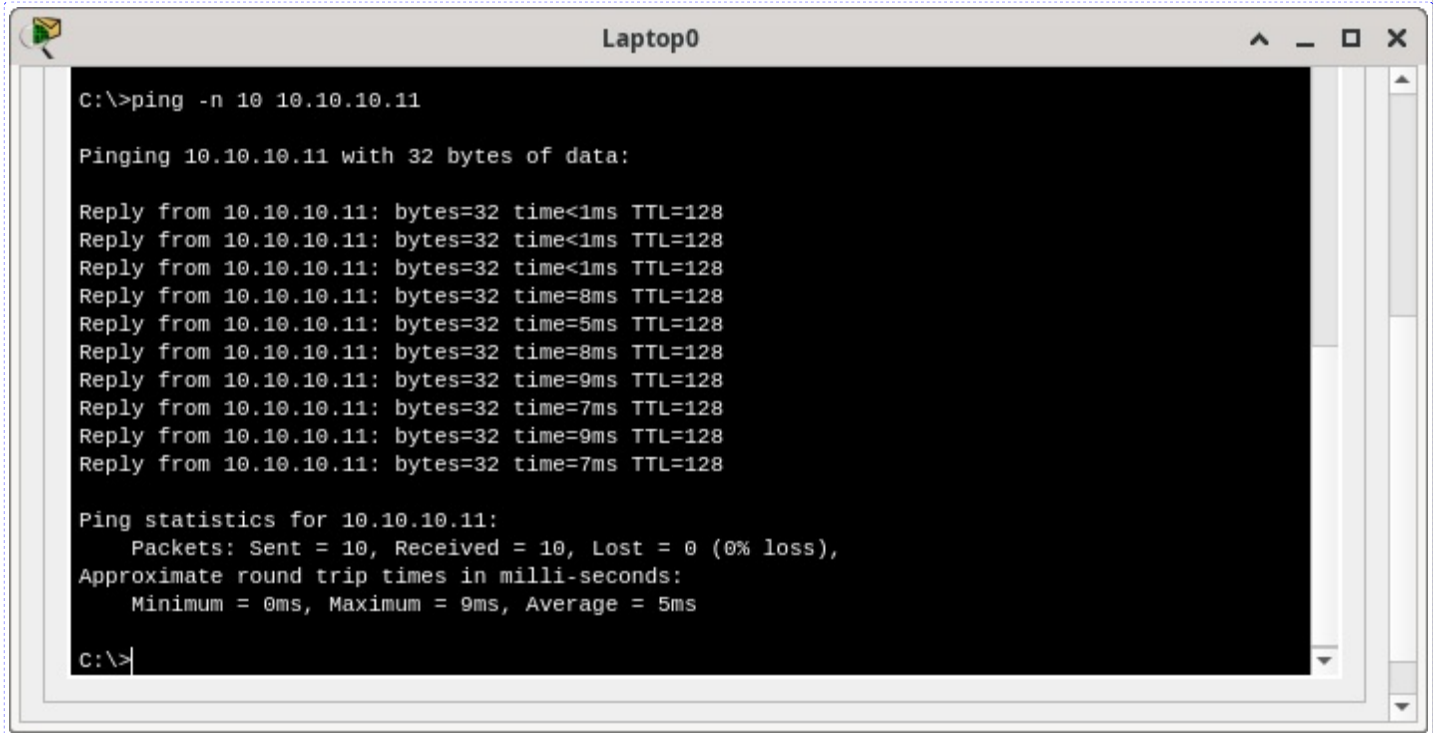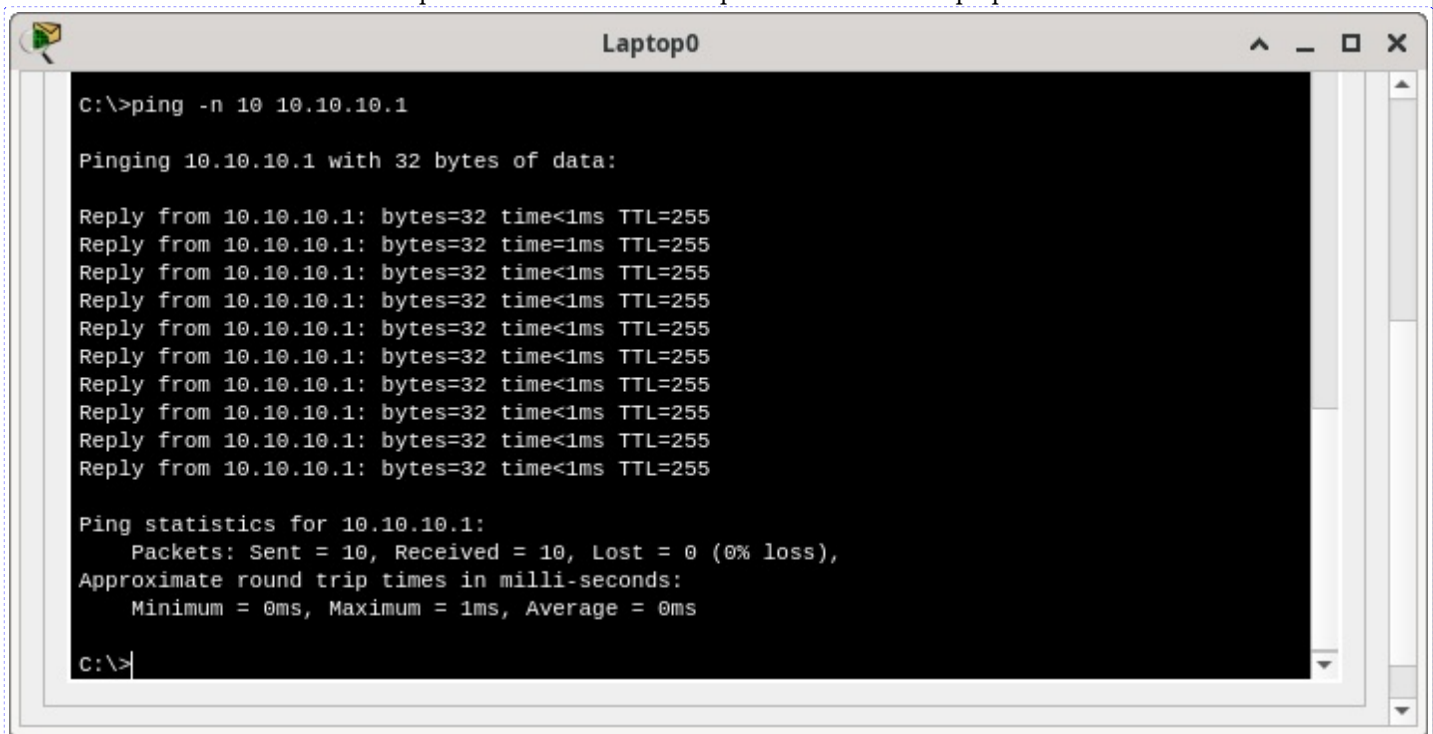
e. Do Laptop0 á IP 10.10.10.1 → ping -n 10 10.10.10.1 → Existe conectividade debido a que os 2 equipos pertencen á mesma rede e o cableado e a electrónica de rede así o permite. A IP 10.10.10.1 é a porta de enlace de Laptop0.

```
                              Laptop0                              ^ _ ☐ ✕

 C:\>ping -n 10 10.10.10.1

 Pinging 10.10.10.1 with 32 bytes of data:

 Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
 Reply from 10.10.10.1: bytes=32 time=1ms TTL=255
 Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
 Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
 Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
 Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
 Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
 Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
 Reply from 10.10.10.1: bytes=32 time<1ms TTL=255
 Reply from 10.10.10.1: bytes=32 time<1ms TTL=255

 Ping statistics for 10.10.10.1:
     Packets: Sent = 10, Received = 10, Lost = 0 (0% loss),
 Approximate round trip times in milli-seconds:
     Minimum = 0ms, Maximum = 1ms, Average = 0ms

 C:\>
```
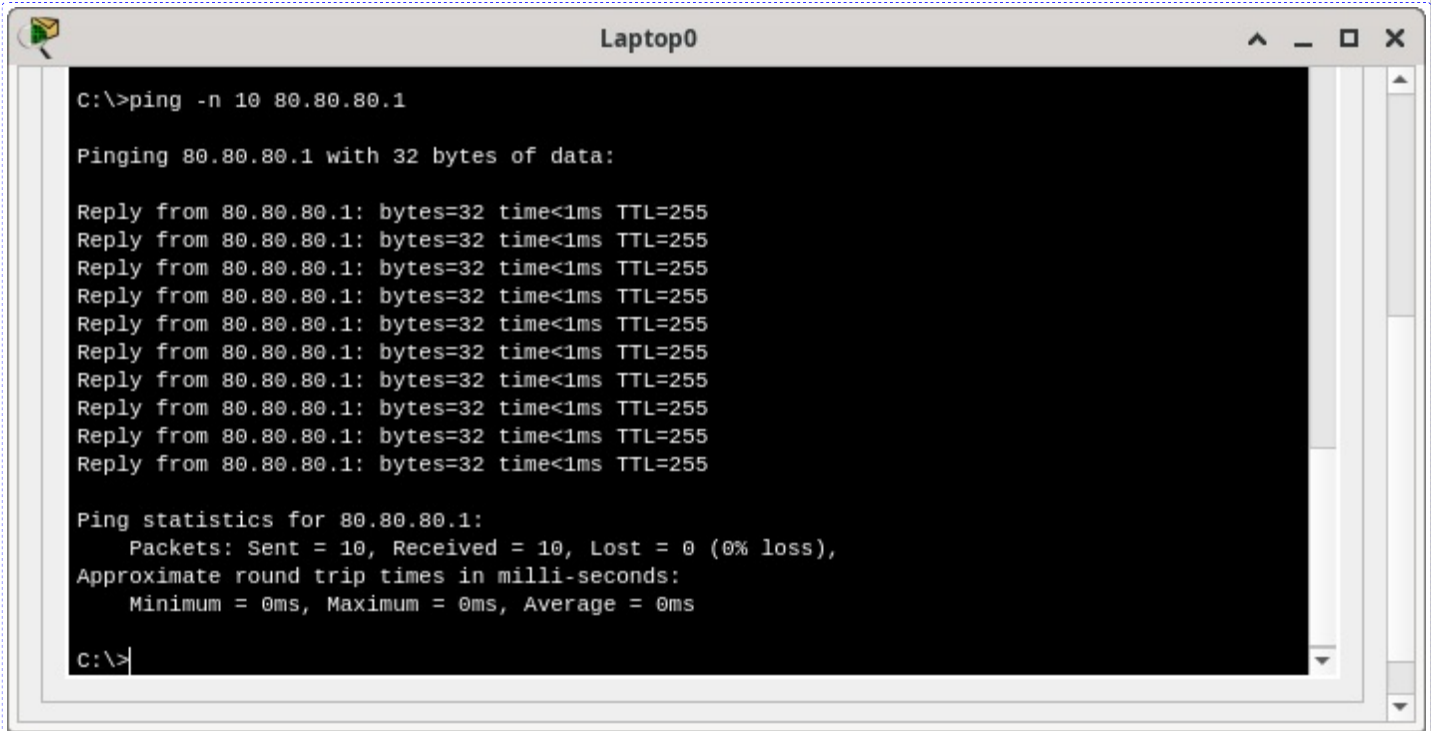
f. Do Laptop0 á IP 80.80.80.1 → ping -n 10 80.80.80.1 → Existe conectividade porque o Laptop0 ten configurado correctamente o gateway predeterminado (10.10.10.1), que corresponde á interface FastEthernet 0/0 do router. Cando o Laptop0 envía un ping a 80.80.80.1, o tráfico é dirixido ao gateway, que reenvía os paquetes a través da súa interface FastEthernet 0/1 coa IP 80.80.80.1. Este router actúa como un intermediario entre as dúas redes, permitindo a comunicación ao estar configurado correctamente coas súas interfaces en ambas redes (a 10.0.0.0/24 e a 80.0.0.0/8).

```
                                    Laptop0                           ^  _  □  ✕

    C:\>ping -n 10 80.80.80.1

    Pinging 80.80.80.1 with 32 bytes of data:

    Reply from 80.80.80.1: bytes=32 time<1ms TTL=255
    Reply from 80.80.80.1: bytes=32 time<1ms TTL=255
    Reply from 80.80.80.1: bytes=32 time<1ms TTL=255
    Reply from 80.80.80.1: bytes=32 time<1ms TTL=255
    Reply from 80.80.80.1: bytes=32 time<1ms TTL=255
    Reply from 80.80.80.1: bytes=32 time<1ms TTL=255
    Reply from 80.80.80.1: bytes=32 time<1ms TTL=255
    Reply from 80.80.80.1: bytes=32 time<1ms TTL=255
    Reply from 80.80.80.1: bytes=32 time<1ms TTL=255
    Reply from 80.80.80.1: bytes=32 time<1ms TTL=255

    Ping statistics for 80.80.80.1:
        Packets: Sent = 10, Received = 10, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

    C:\>
```
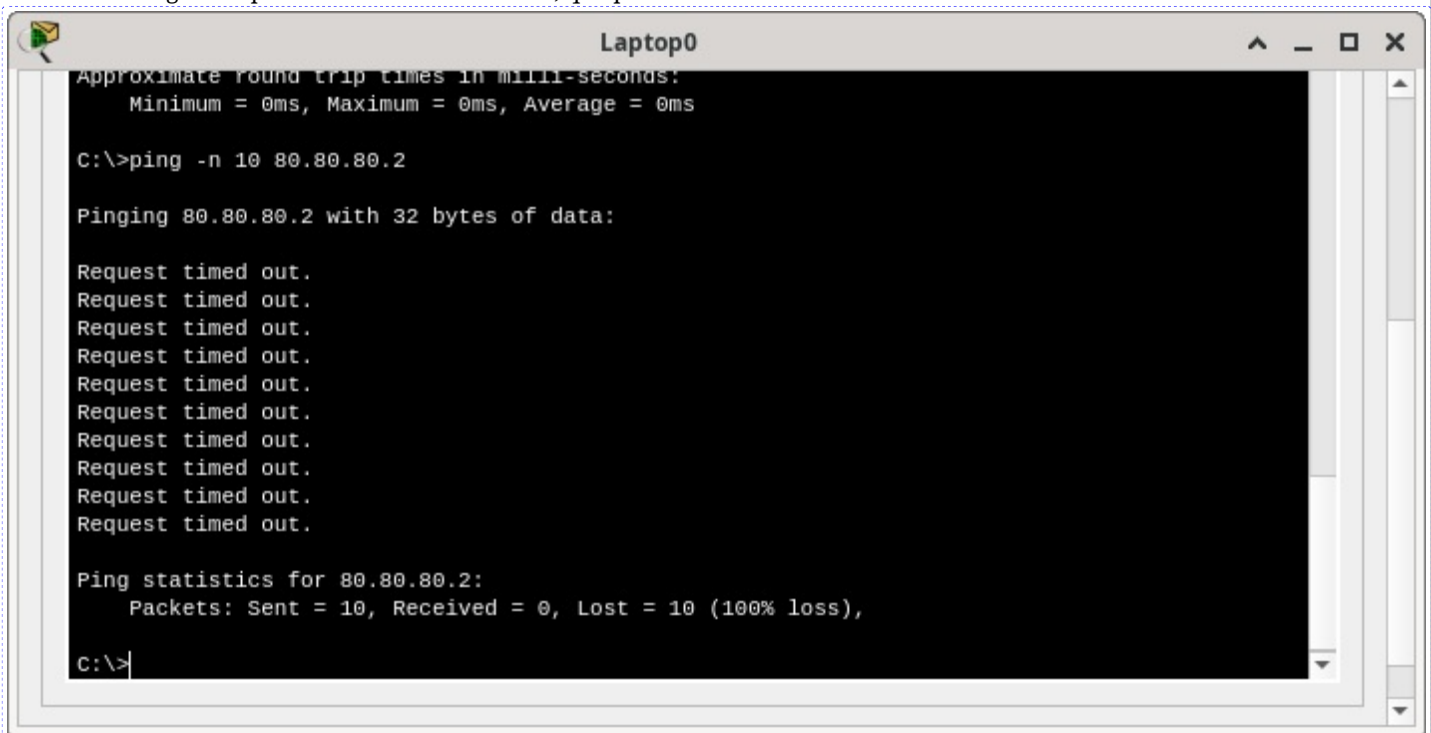
g. Do Laptop0 á IP 80.80.80.2 → ping -n 10 80.80.80.2 → Non existe conectividade porque o Router0 non ten unha ruta estática ou dinámica configurada para alcanzar esa dirección, que pertence ao Router1.

```
                                    Laptop0                           ^  _  □  ✕
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

    C:\>ping -n 10 80.80.80.2

    Pinging 80.80.80.2 with 32 bytes of data:

    Request timed out.
    Request timed out.
    Request timed out.
    Request timed out.
    Request timed out.
    Request timed out.
    Request timed out.
    Request timed out.
    Request timed out.
    Request timed out.

    Ping statistics for 80.80.80.2:
        Packets: Sent = 10, Received = 0, Lost = 10 (100% loss),

    C:\>
```
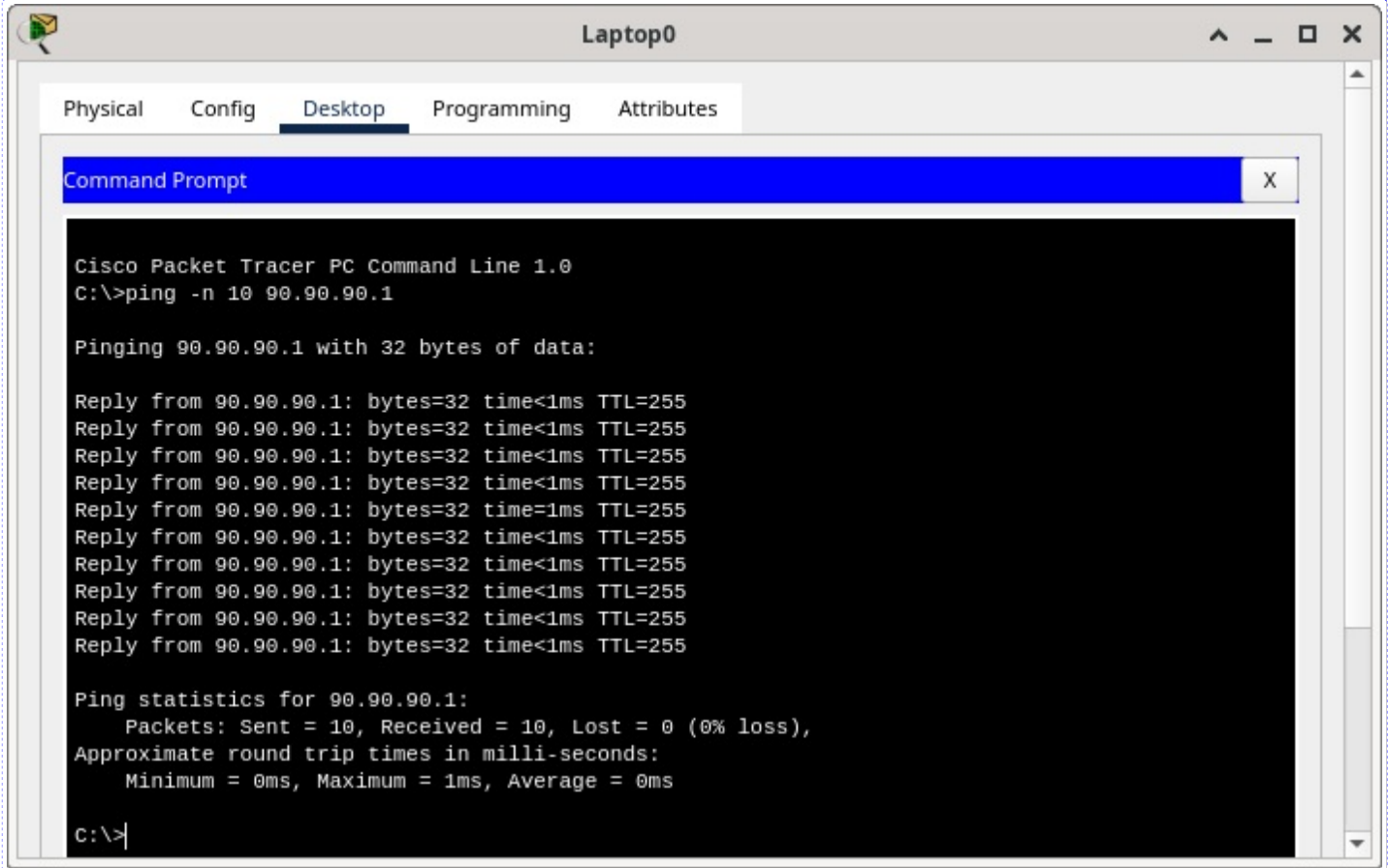
h. Do Laptop0 á IP 90.90.90.1 → ping -n 10 90.90.90.1 → Existe conectividade porque o Laptop0 ten configurado correctamente o gateway predeterminado (10.10.10.1), que corresponde á interface FastEthernet 0/0 do router. Cando o Laptop0 envía un ping a 90.90.90.1, o tráfico é dirixido ao gateway, que reenvía os paquetes a través da súa interface Ethernet 0/1/0 coa IP 90.90.90.1. Este router actúa como un intermediario entre as dúas redes, permitindo a comunicación ao estar configurado correctamente coas súas interfaces en ambas redes (a 10.0.0.0/24 e a 90.0.0.0/8).


```
                                           Laptop0                          ∧  _  □  ✕

   Physical    Config    Desktop    Programming    Attributes

   Command Prompt                                                                    X

      Cisco Packet Tracer PC Command Line 1.0
      C:\>ping -n 10 90.90.90.1

      Pinging 90.90.90.1 with 32 bytes of data:

      Reply from 90.90.90.1: bytes=32 time<1ms TTL=255
      Reply from 90.90.90.1: bytes=32 time<1ms TTL=255
      Reply from 90.90.90.1: bytes=32 time<1ms TTL=255
      Reply from 90.90.90.1: bytes=32 time<1ms TTL=255
      Reply from 90.90.90.1: bytes=32 time=1ms TTL=255
      Reply from 90.90.90.1: bytes=32 time<1ms TTL=255
      Reply from 90.90.90.1: bytes=32 time<1ms TTL=255
      Reply from 90.90.90.1: bytes=32 time<1ms TTL=255
      Reply from 90.90.90.1: bytes=32 time<1ms TTL=255
      Reply from 90.90.90.1: bytes=32 time<1ms TTL=255

      Ping statistics for 90.90.90.1:
          Packets: Sent = 10, Received = 10, Lost = 0 (0% loss),
      Approximate round trip times in milli-seconds:
          Minimum = 0ms, Maximum = 1ms, Average = 0ms

      C:\>
```
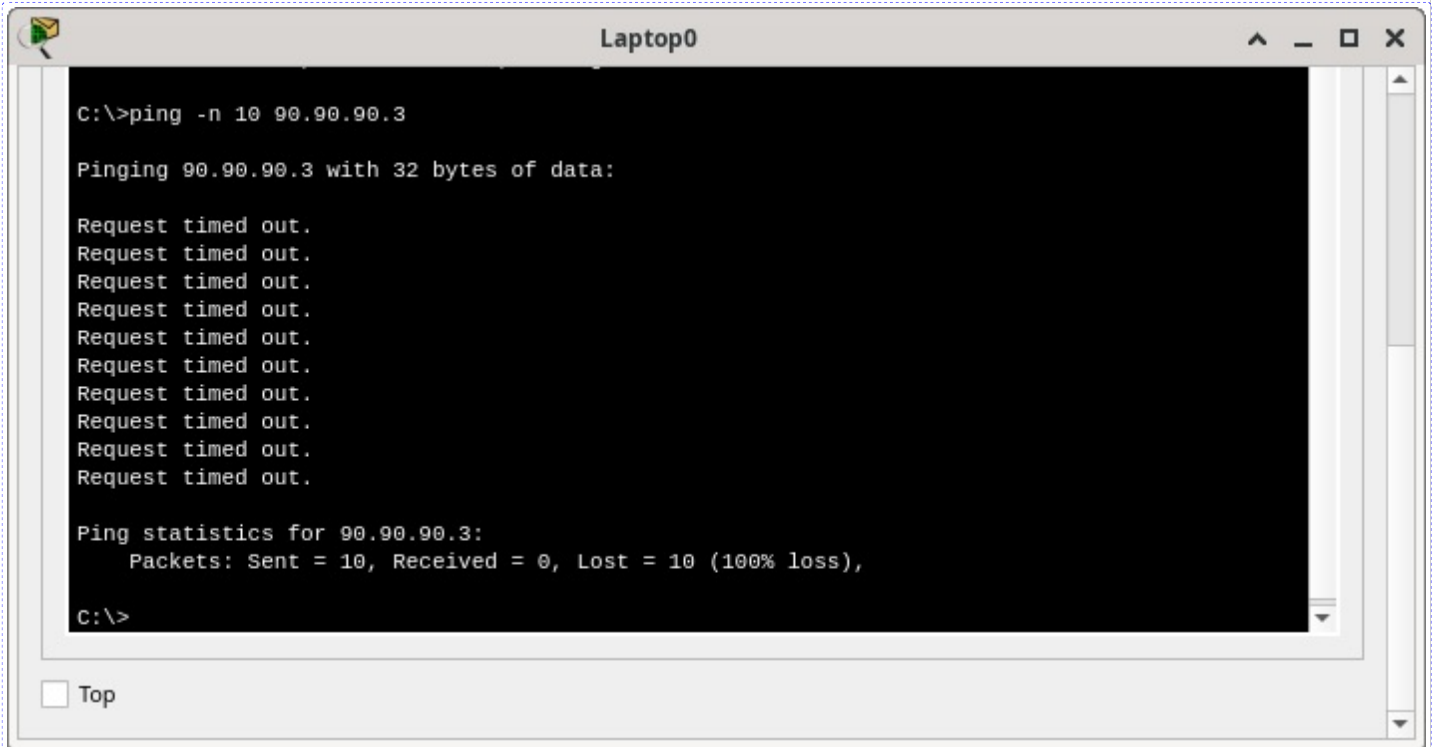
i. Do Laptop0 á IP 90.90.90.3 → ping -n 10 90.90.90.3 → Non existe conectividade porque o Router0 non ten unha ruta estática ou dinámica configurada para alcanzar esa dirección, que pertence ao Router2.


```
                                           Laptop0                          ∧  _  □  ✕

      C:\>ping -n 10 90.90.90.3

      Pinging 90.90.90.3 with 32 bytes of data:

      Request timed out.
      Request timed out.
      Request timed out.
      Request timed out.
      Request timed out.
      Request timed out.
      Request timed out.
      Request timed out.
      Request timed out.
      Request timed out.

      Ping statistics for 90.90.90.3:
          Packets: Sent = 10, Received = 0, Lost = 10 (100% loss),

      C:\>

   ☐ Top
```
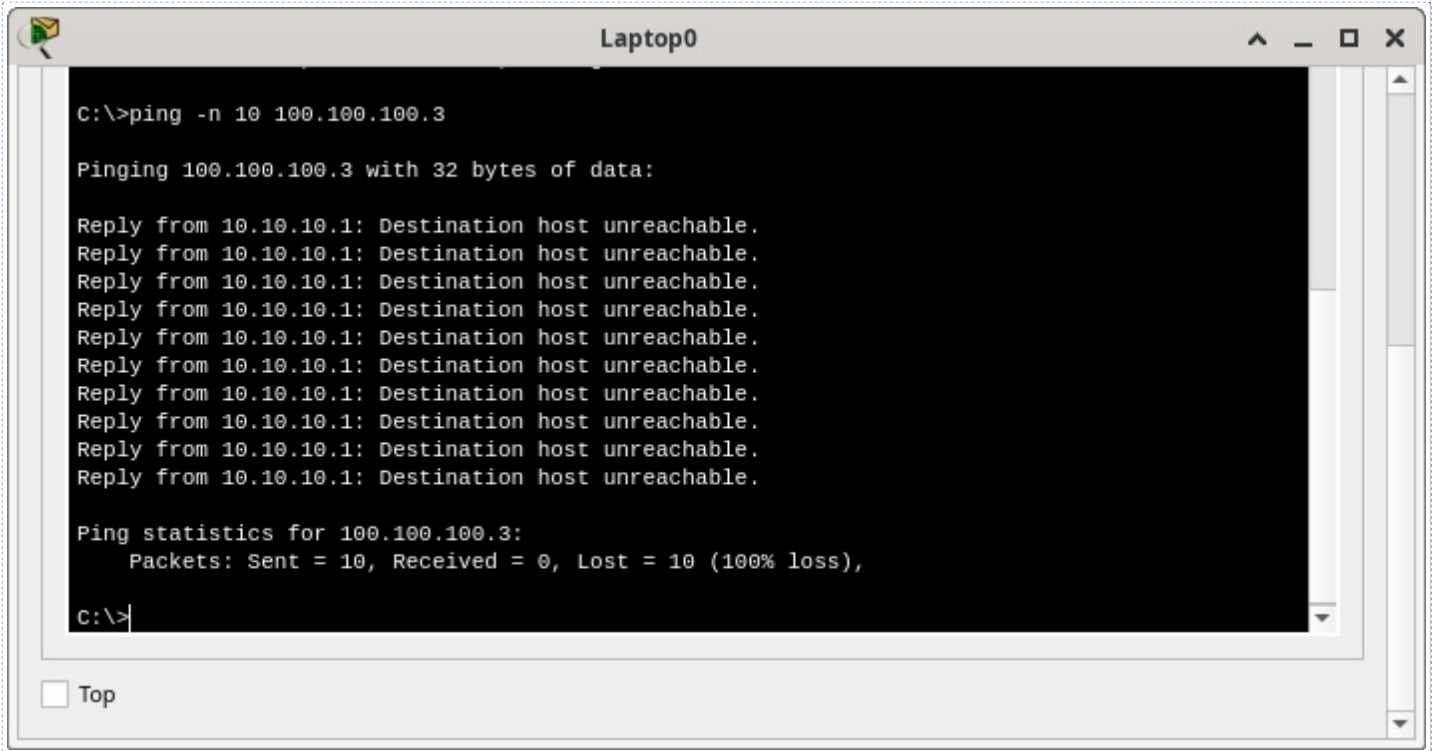
j. Do Laptop0 á IP 100.100.100.3 → ping -n 10 100.100.100.3 → Non existe conectividade porque o Router0 non ten unha ruta estática ou dinámica configurada para alcanzar esa dirección, que pertence ao Router2.

```
                                    Laptop0                                  ^  _  □  ×

  C:\>ping -n 10 100.100.100.3

  Pinging 100.100.100.3 with 32 bytes of data:

  Reply from 10.10.10.1: Destination host unreachable.
  Reply from 10.10.10.1: Destination host unreachable.
  Reply from 10.10.10.1: Destination host unreachable.
  Reply from 10.10.10.1: Destination host unreachable.
  Reply from 10.10.10.1: Destination host unreachable.
  Reply from 10.10.10.1: Destination host unreachable.
  Reply from 10.10.10.1: Destination host unreachable.
  Reply from 10.10.10.1: Destination host unreachable.
  Reply from 10.10.10.1: Destination host unreachable.
  Reply from 10.10.10.1: Destination host unreachable.

  Ping statistics for 100.100.100.3:
      Packets: Sent = 10, Received = 0, Lost = 10 (100% loss),

  C:\>

  □ Top
```
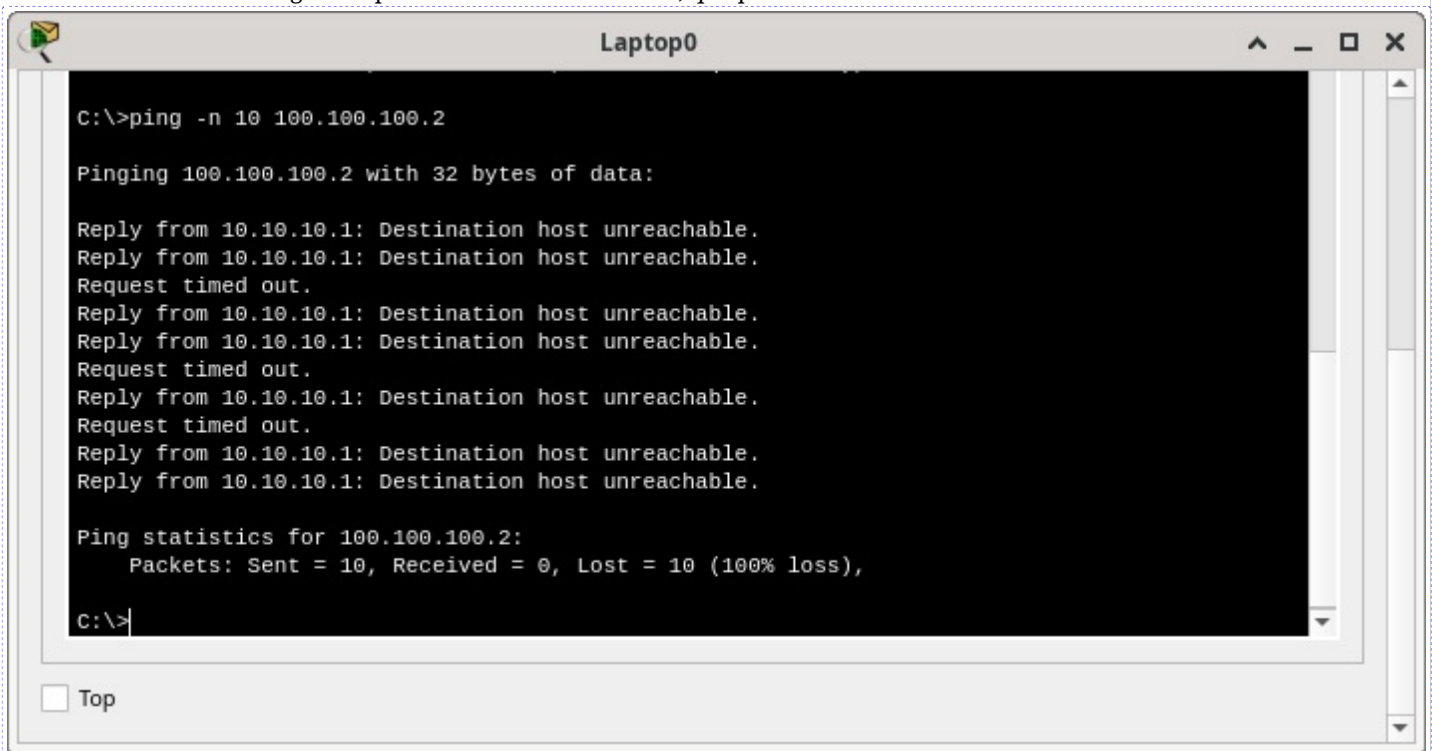
k. Do Laptop0 á IP 100.100.100.2 → ping -n 10 100.100.100.2 → Non existe conectividade porque o Router0 non ten unha ruta estática ou dinámica configurada para alcanzar esa dirección, que pertence ao Router1.

```
                                    Laptop0                                  ^  _  □  ×

  C:\>ping -n 10 100.100.100.2

  Pinging 100.100.100.2 with 32 bytes of data:

  Reply from 10.10.10.1: Destination host unreachable.
  Reply from 10.10.10.1: Destination host unreachable.
  Request timed out.
  Reply from 10.10.10.1: Destination host unreachable.
  Reply from 10.10.10.1: Destination host unreachable.
  Request timed out.
  Reply from 10.10.10.1: Destination host unreachable.
  Request timed out.
  Reply from 10.10.10.1: Destination host unreachable.
  Reply from 10.10.10.1: Destination host unreachable.

  Ping statistics for 100.100.100.2:
      Packets: Sent = 10, Received = 0, Lost = 10 (100% loss),

  C:\>

  □ Top
```
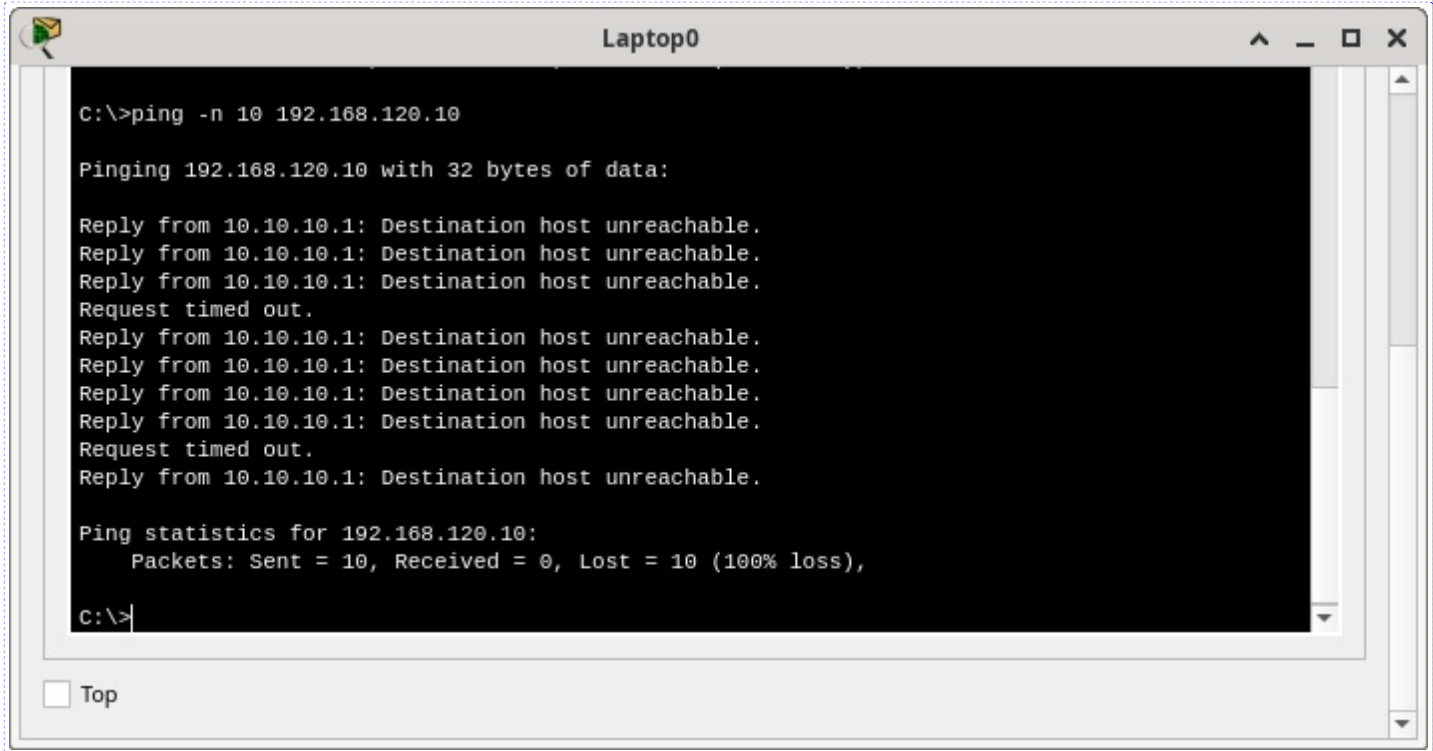
l. Do Laptop0 á IP 192.168.120.10 → ping -n 10 192.168.120.10 → Non existe conectividade xa que os paquetes ICMP non son quen de chegar ao Router1, polo que xa non son capaz de chegar ao PC1.

```
                                    Laptop0

C:\>ping -n 10 192.168.120.10

Pinging 192.168.120.10 with 32 bytes of data:

Reply from 10.10.10.1: Destination host unreachable.
Reply from 10.10.10.1: Destination host unreachable.
Reply from 10.10.10.1: Destination host unreachable.
Request timed out.
Reply from 10.10.10.1: Destination host unreachable.
Reply from 10.10.10.1: Destination host unreachable.
Reply from 10.10.10.1: Destination host unreachable.
Reply from 10.10.10.1: Destination host unreachable.
Request timed out.
Reply from 10.10.10.1: Destination host unreachable.

Ping statistics for 192.168.120.10:
    Packets: Sent = 10, Received = 0, Lost = 10 (100% loss),

C:\>

Top
```
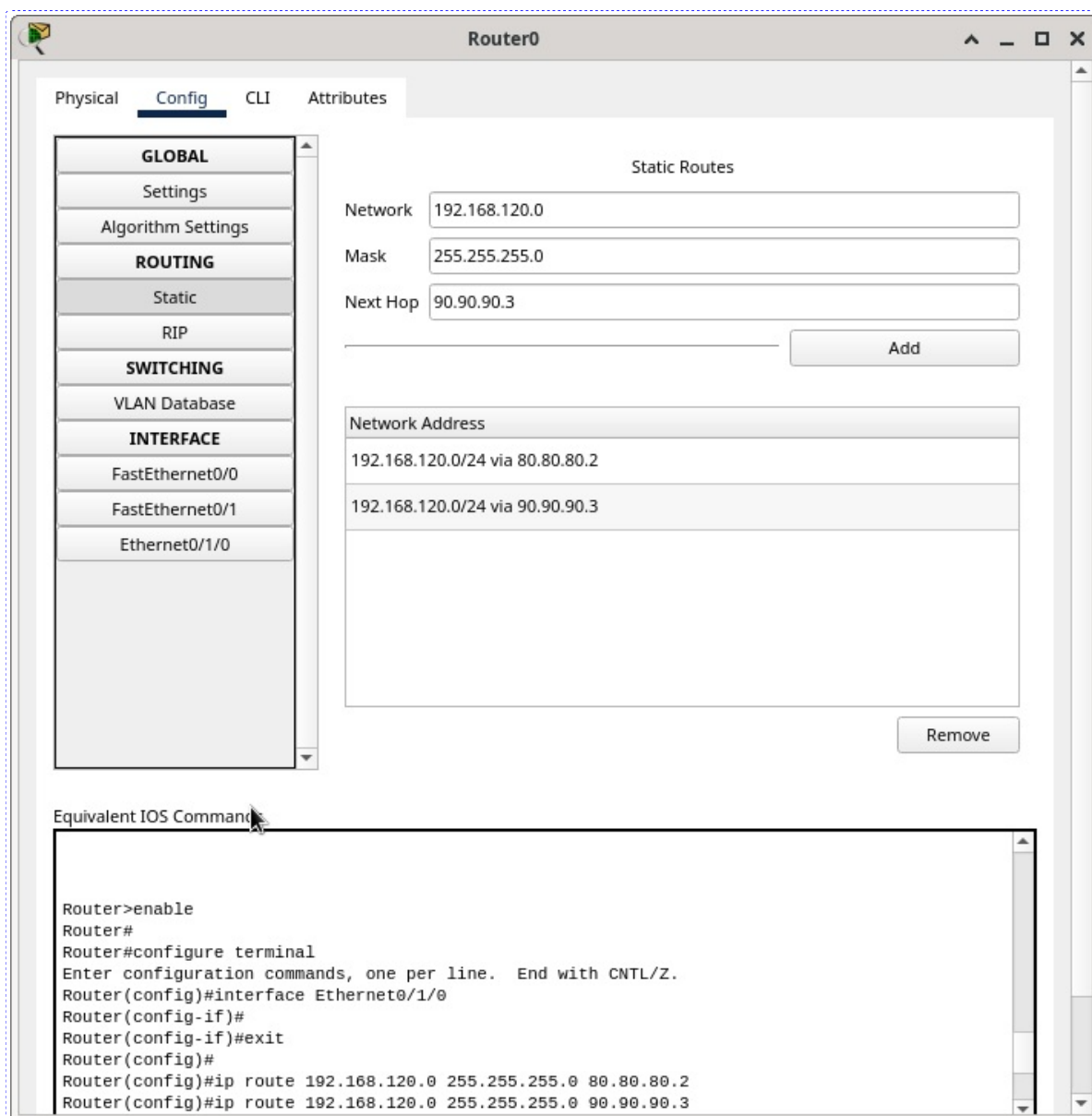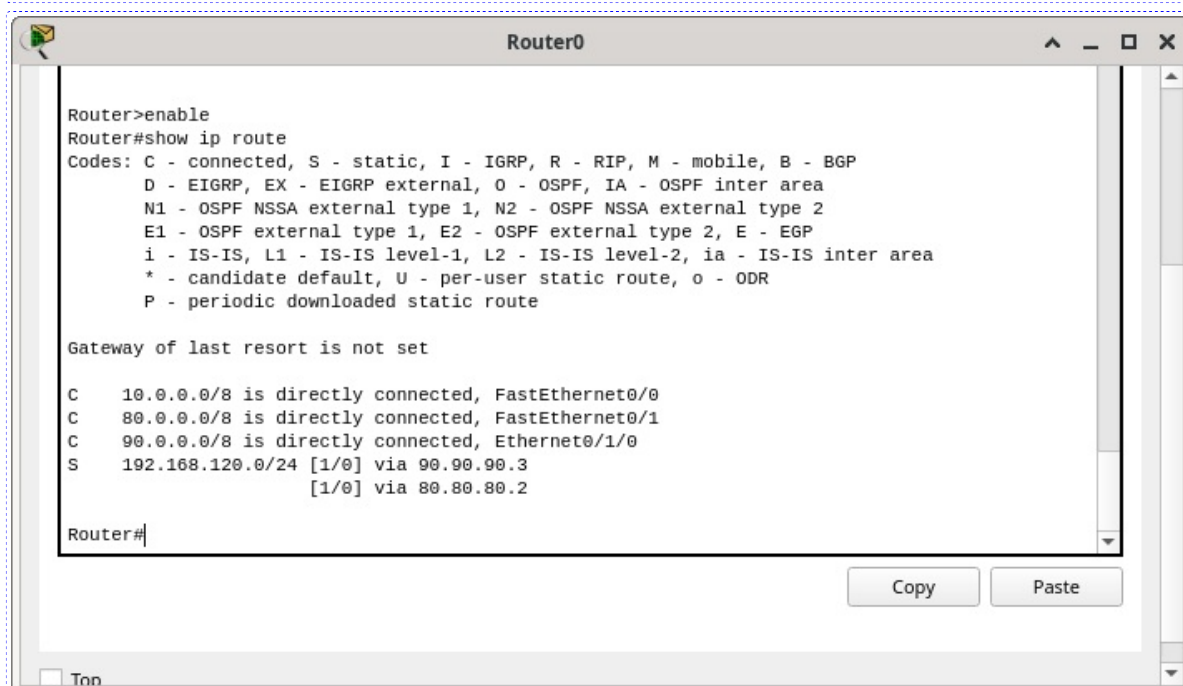
6. Realiza a configuración de enrutamento estático nos router (Router0, Router1 e Router2) capturando imaxes coa configuración de cada host router para que a conectividade entre PC1 e Laptop0 sexa posible.

Router0 — Config — Static Routes

```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface Ethernet0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#
Router(config)#ip route 192.168.120.0 255.255.255.0 80.80.80.2
Router(config)#ip route 192.168.120.0 255.255.255.0 90.90.90.3
```



```
Router>enable
Router#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    10.0.0.0/8 is directly connected, FastEthernet0/0
C    80.0.0.0/8 is directly connected, FastEthernet0/1
C    90.0.0.0/8 is directly connected, Ethernet0/1/0
S    192.168.120.0/24 [1/0] via 90.90.90.3
                      [1/0] via 80.80.80.2

Router#
```

Router1

Physical | Config | CLI | Attributes

GLOBAL
- Settings
- Algorithm Settings

ROUTING
- Static
- RIP

SWITCHING
- VLAN Database

INTERFACE
- FastEthernet0/0
- FastEthernet0/1
- Ethernet0/1/0

Static Routes

Network: `10.0.0.0`

Mask: `255.0.0.0`

Next Hop: `100.100.100.3`

[Add]

Network Address

10.0.0.0/8 via 80.80.80.1

10.0.0.0/8 via 100.100.100.3

[Remove]

Equivalent IOS Commands

```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#
Router(config)#ip route 10.0.0.0 255.0.0.0 80.80.80.1
Router(config)#ip route 10.0.0.0 255.0.0.0 100.100.100.3
Router(config)#
```

Router1

```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#
Router(config)#ip route 10.0.0.0 255.0.0.0 80.80.80.1
Router(config)#ip route 10.0.0.0 255.0.0.0 100.100.100.3
Router(config)#do 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

S    10.0.0.0/8 [1/0] via 80.80.80.1
                [1/0] via 100.100.100.3
C    80.0.0.0/8 is directly connected, FastEthernet0/0
C    100.0.0.0/8 is directly connected, Ethernet0/1/0
C    192.168.120.0/24 is directly connected, FastEthernet0/1

Router(config)#
```

Router2

Physical | Config | CLI | Attributes

GLOBAL
- Settings
- Algorithm Settings

ROUTING
- Static
- RIP

SWITCHING
- VLAN Database

INTERFACE
- FastEthernet0/0
- FastEthernet0/1

Static Routes

Network: `192.168.120.0`

Mask: `255.255.255.0`

Next Hop: `100.100.100.2`

[Add]

Network Address

10.0.0.0/8 via 90.90.90.1

192.168.120.0/24 via 100.100.100.2

Router2

```
Router#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

S    10.0.0.0/8 [1/0] via 90.90.90.1
C    90.0.0.0/8 is directly connected, FastEthernet0/0
C    100.0.0.0/8 is directly connected, FastEthernet0/1
S    192.168.120.0/24 [1/0] via 100.100.100.2

Router#
```
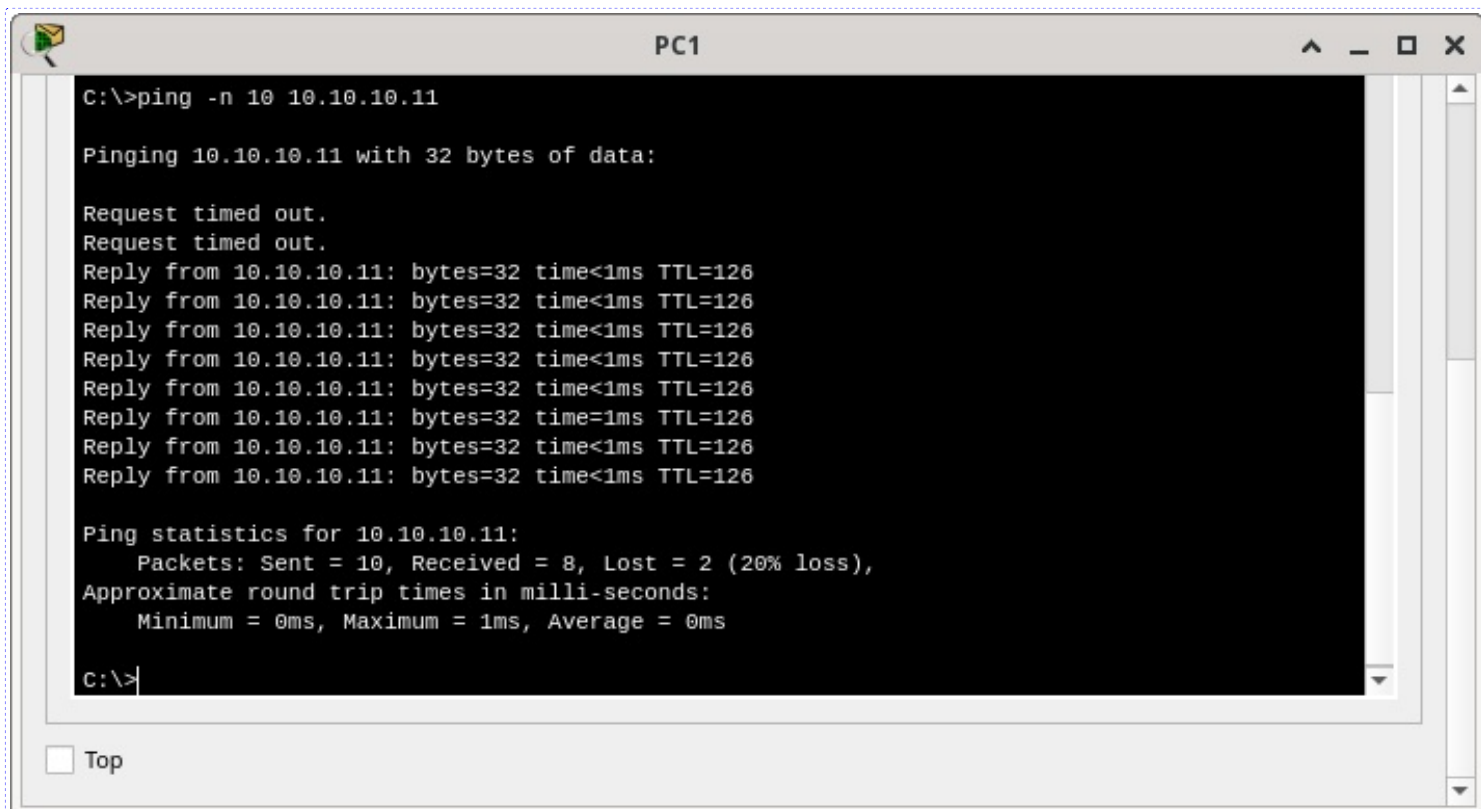
[Copy] [Paste]

☐ Top

7. Realiza de novo os apartados 4) e 5). Comproba que agora a conectividade é posible dende PC1 a Laptop0 e dende Laptop0 a PC1. Captura as imaxes correspondentes.

```
PC1                                                    ^ _ □ ✕

C:\>ping -n 10 10.10.10.11

Pinging 10.10.10.11 with 32 bytes of data:

Request timed out.
Request timed out.
Reply from 10.10.10.11: bytes=32 time<1ms TTL=126
Reply from 10.10.10.11: bytes=32 time<1ms TTL=126
Reply from 10.10.10.11: bytes=32 time<1ms TTL=126
Reply from 10.10.10.11: bytes=32 time<1ms TTL=126
Reply from 10.10.10.11: bytes=32 time<1ms TTL=126
Reply from 10.10.10.11: bytes=32 time=1ms TTL=126
Reply from 10.10.10.11: bytes=32 time<1ms TTL=126
Reply from 10.10.10.11: bytes=32 time<1ms TTL=126

Ping statistics for 10.10.10.11:
    Packets: Sent = 10, Received = 8, Lost = 2 (20% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```
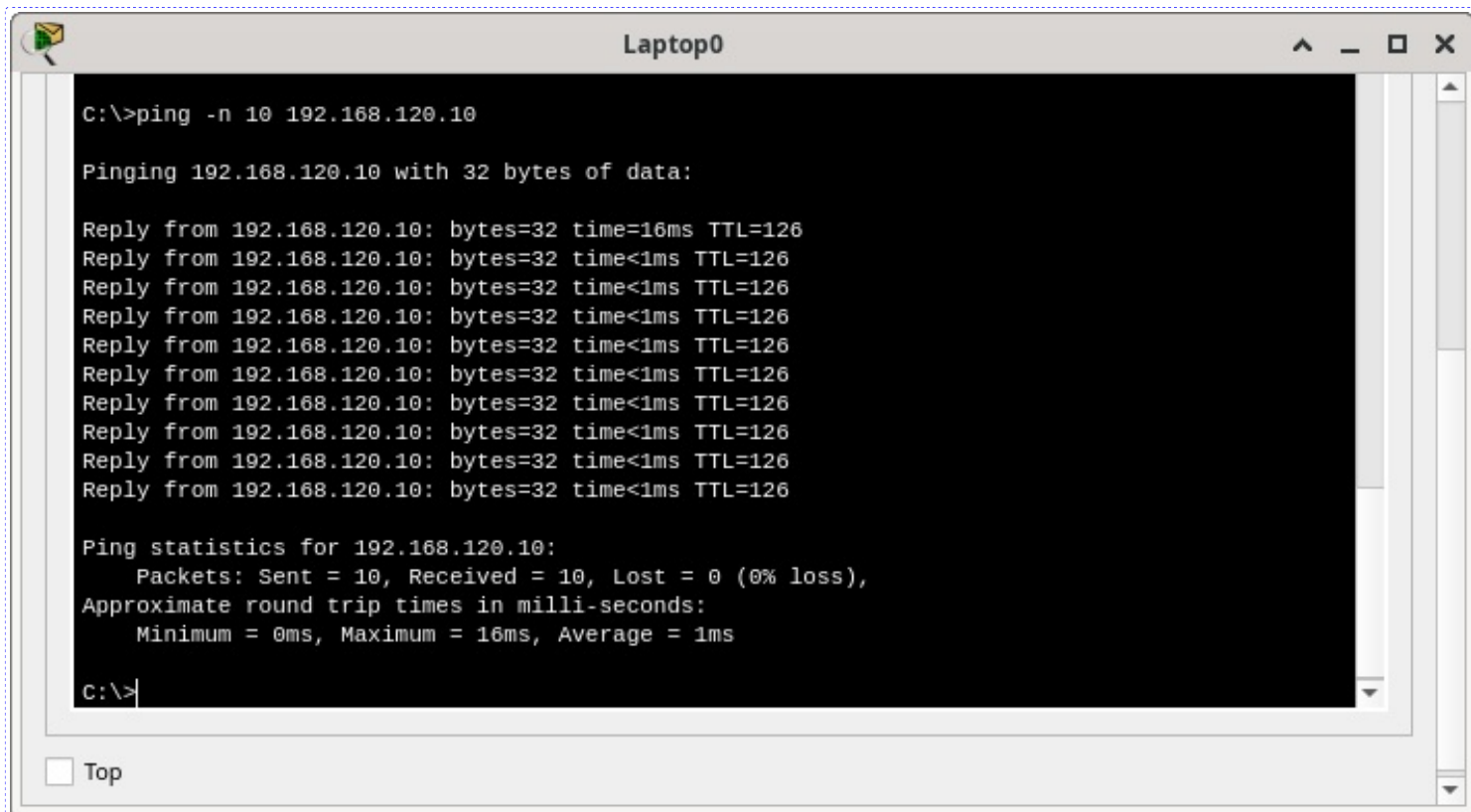☐ Top

```
Laptop0                                                ^ _ □ ✕

C:\>ping -n 10 192.168.120.10

Pinging 192.168.120.10 with 32 bytes of data:

Reply from 192.168.120.10: bytes=32 time=16ms TTL=126
Reply from 192.168.120.10: bytes=32 time<1ms TTL=126
Reply from 192.168.120.10: bytes=32 time<1ms TTL=126
Reply from 192.168.120.10: bytes=32 time<1ms TTL=126
Reply from 192.168.120.10: bytes=32 time<1ms TTL=126
Reply from 192.168.120.10: bytes=32 time<1ms TTL=126
Reply from 192.168.120.10: bytes=32 time<1ms TTL=126
Reply from 192.168.120.10: bytes=32 time<1ms TTL=126
Reply from 192.168.120.10: bytes=32 time<1ms TTL=126
Reply from 192.168.120.10: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.120.10:
    Packets: Sent = 10, Received = 10, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 16ms, Average = 1ms

C:\>
```
☐ Top