03 - Enrutamento Estático

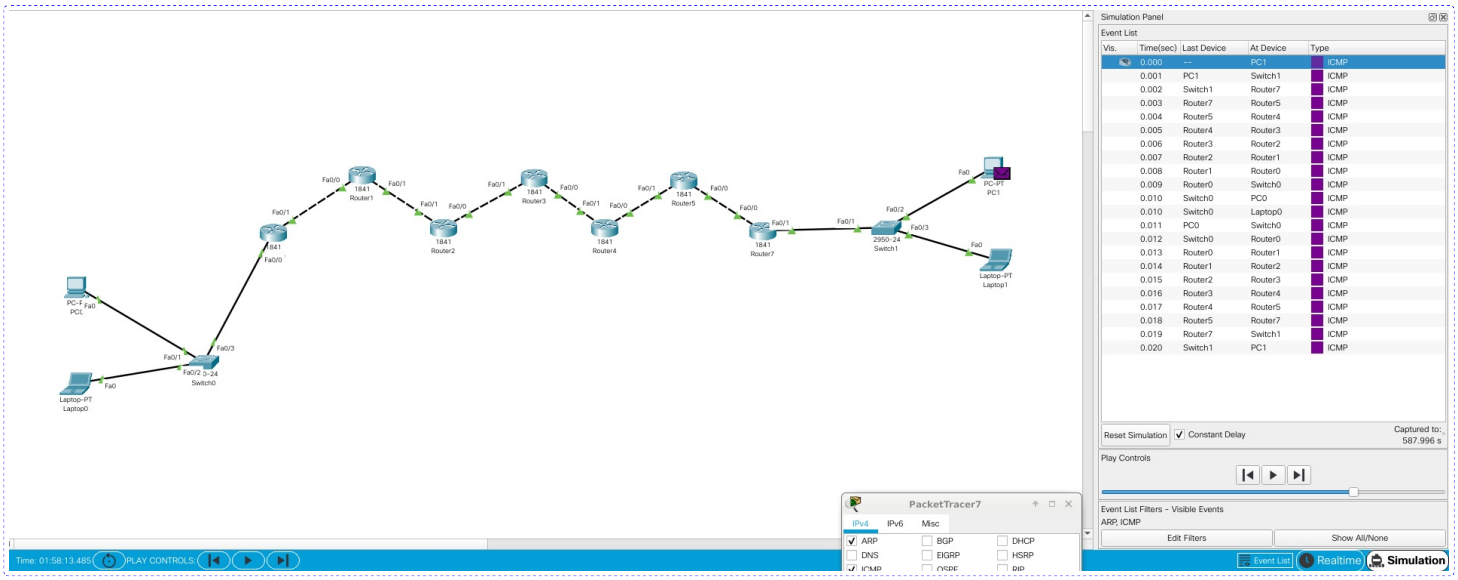


Fig.1 - Enrutamento Estático

NOTAS:

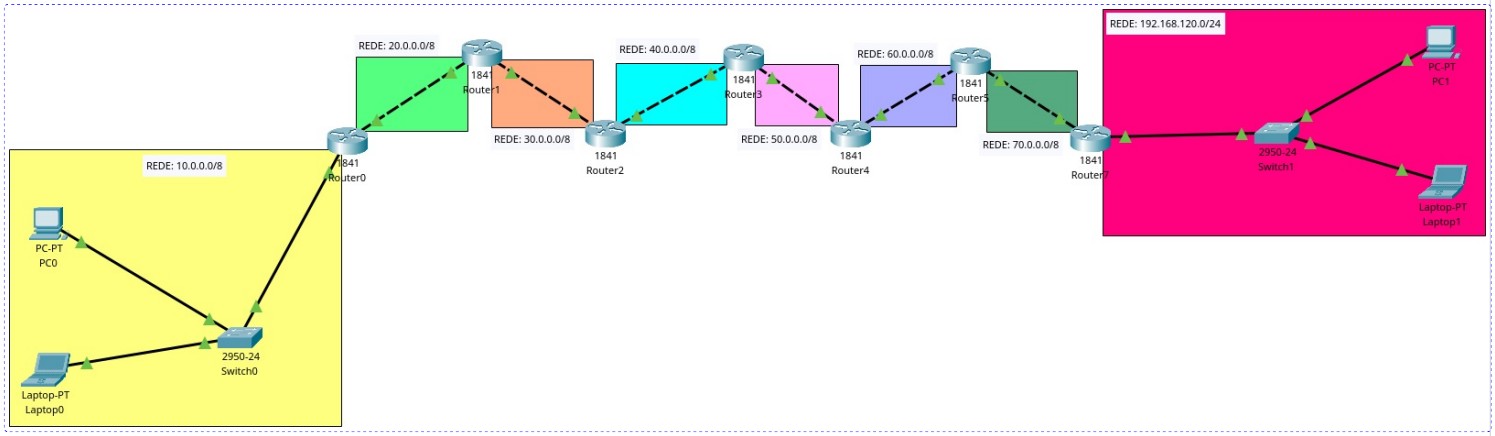
(1) Arquivo a descargar e abrir en Cisco Packet Tracer: **Enrutamento-Estatico-3-BRS.pkt**

(2) O diagrama representa 2 oficinas dunha empresa.

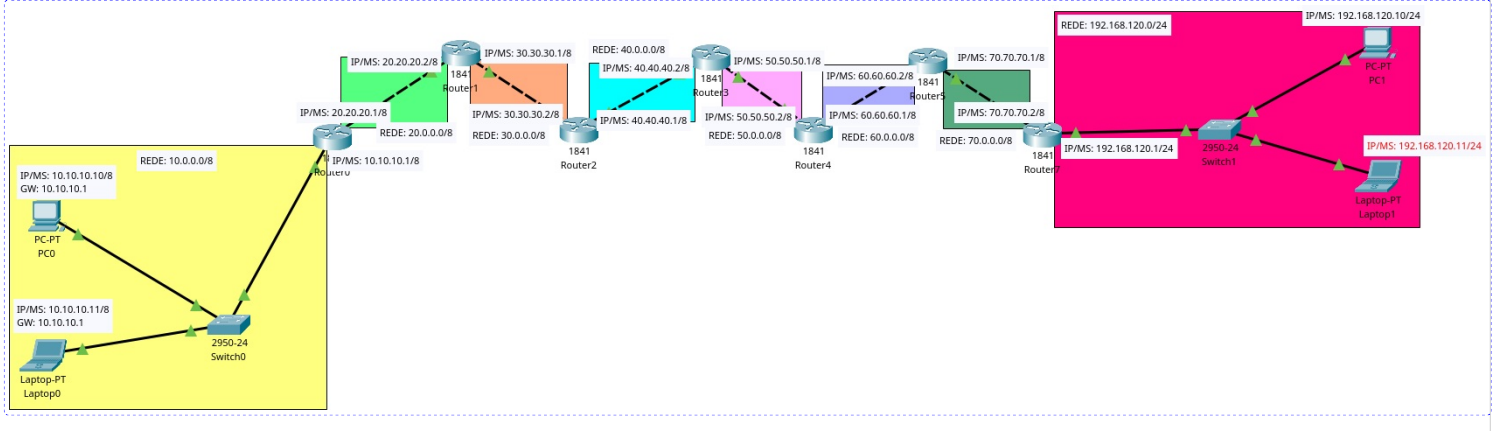
(3) IP=IPv4, MS=Máscara de Subrede, GW=Gateway, DR=Dirección de Rede.

Cisco Packet Tracer

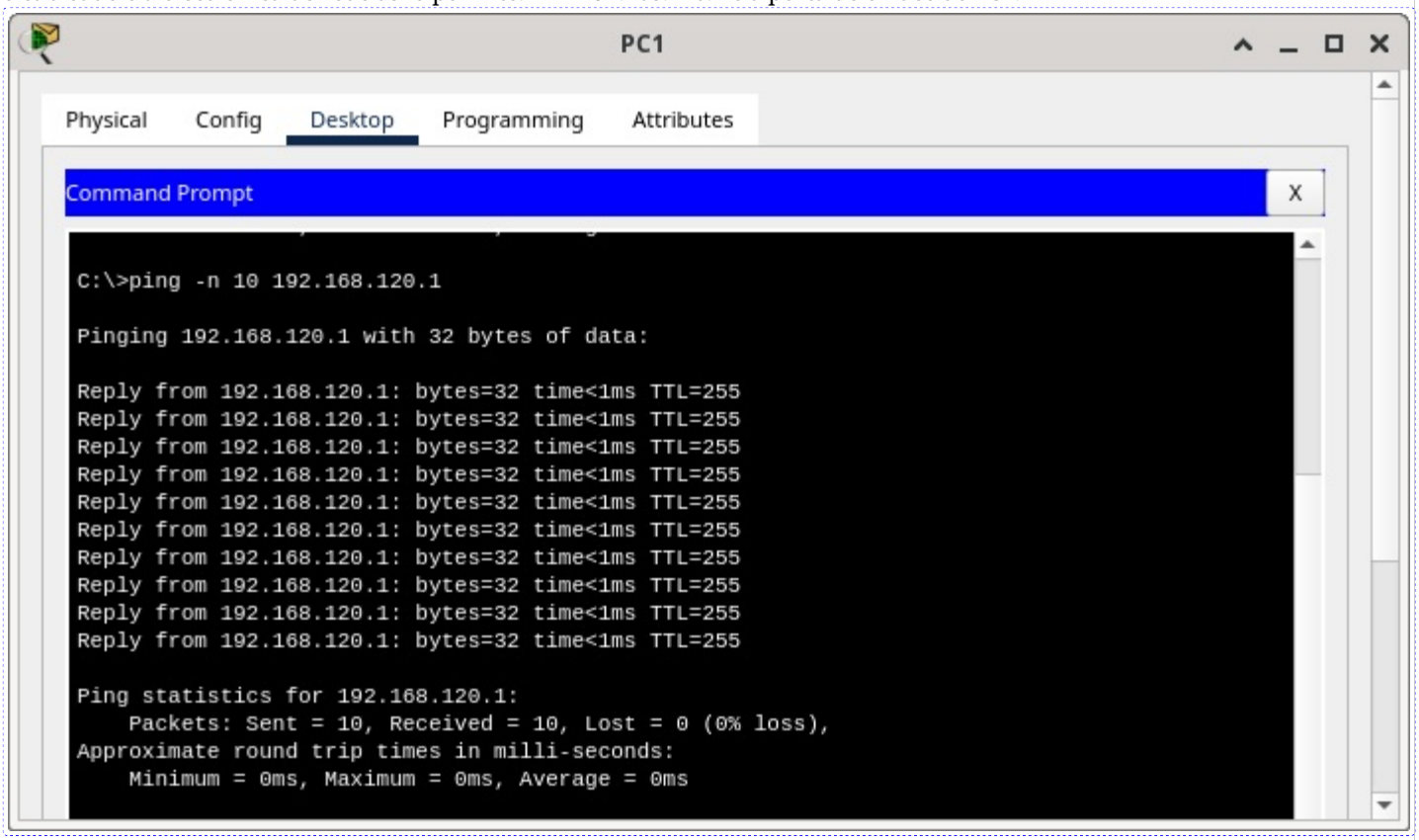
1. Carga o diagrama da Fig.1 no Cisco Packet Tracer, é dicir, abre o arquivo descargado (ver NOTAS) no Cisco Packet Tracer.
2. Identifica mediante rectángulos de cores os segmentos de redes existentes no diagrama.



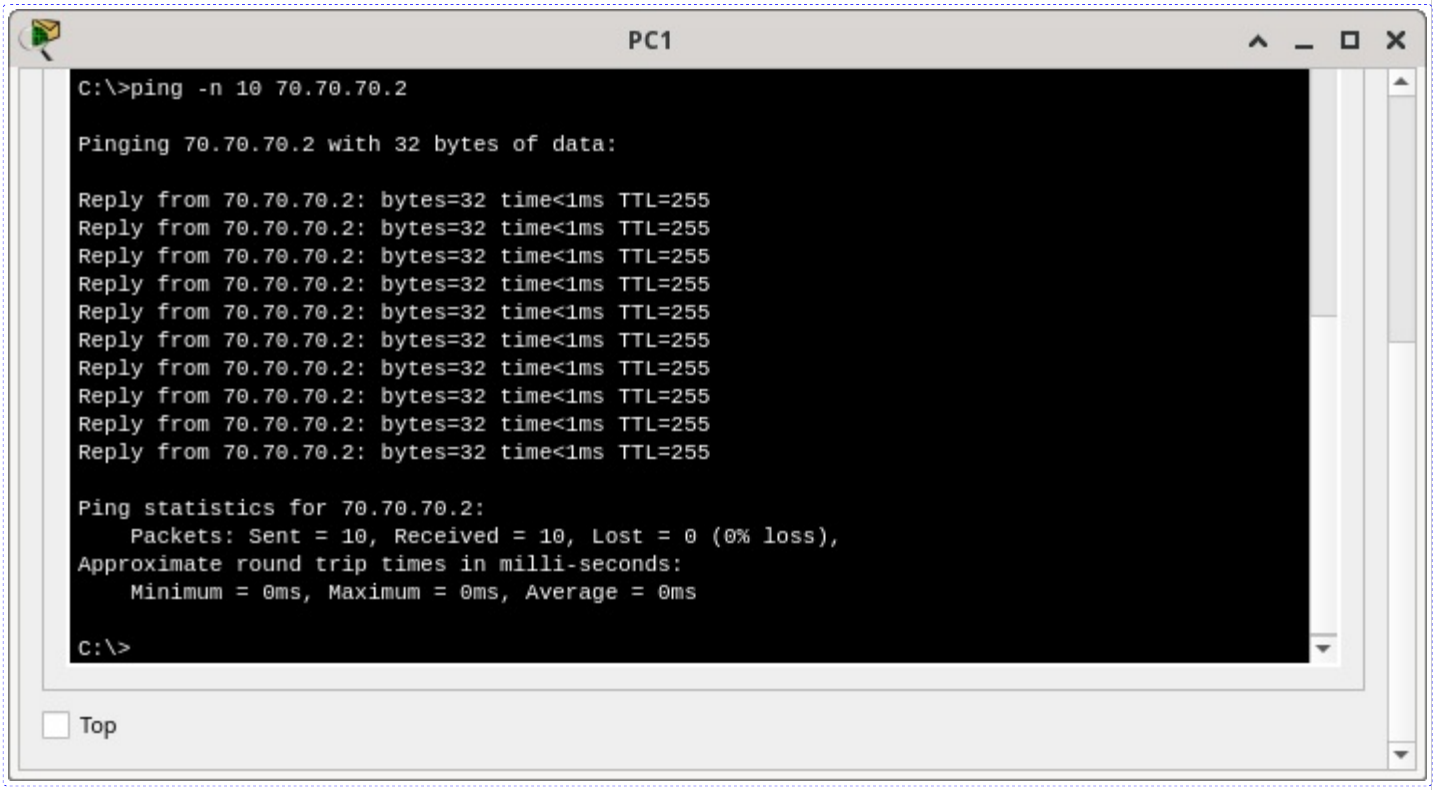
3. Representa no diagrama a topoloxía lóxica (IP/MS/GW/DR).



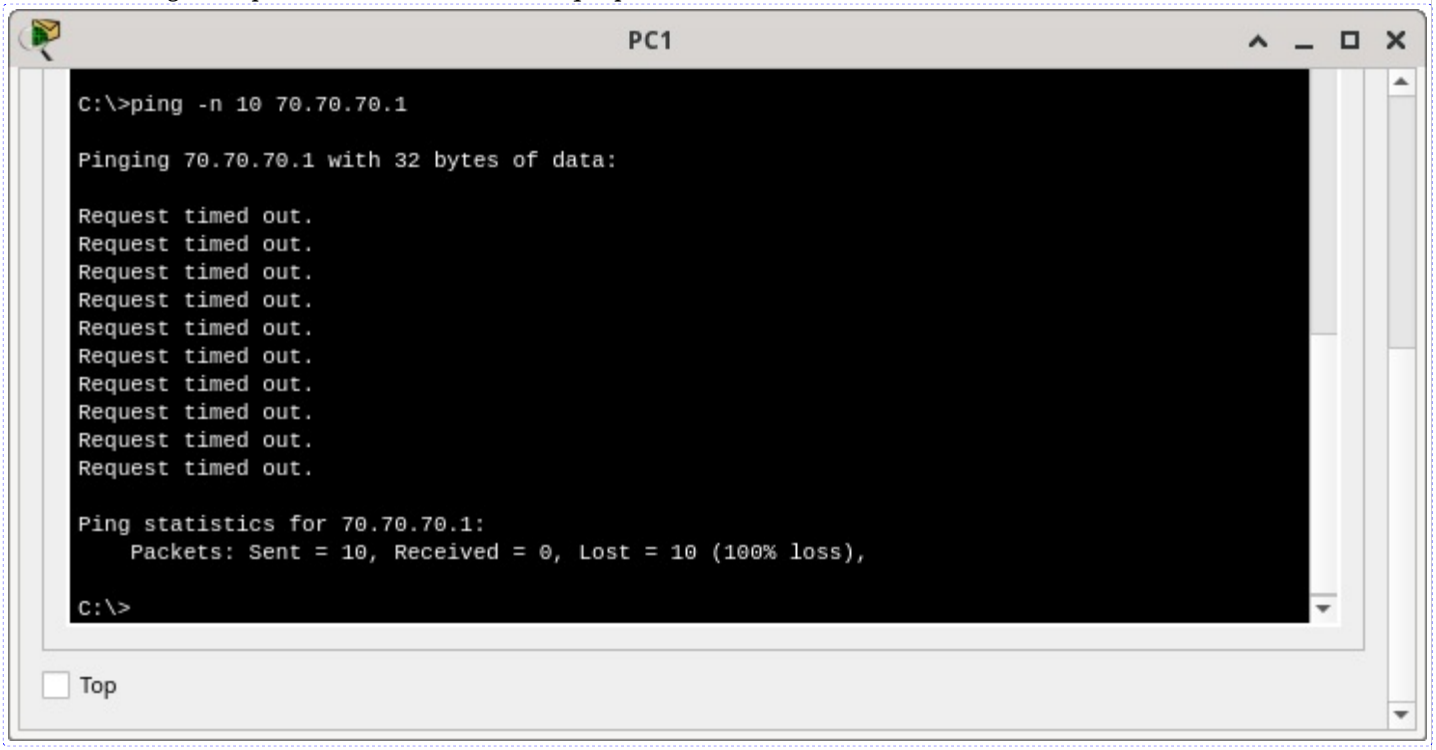
4. Realiza mediante comandos un ping de 10 paquetes ICMP dende PC1 a cada host que se atope ata chegar ao Laptop0. Por cada ping crea un apartado indicando que é o que acontece (Razoa a resposta):
   a. Do PC1 á IP 192.168.120.1 → ping -n 10 192.168.120.1 → Existe conectividade debido a que os 2 equipos 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.



   b. Do PC1 á IP 70.70.70.2 → ping -n 10 70.70.70.2 → 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 70.70.70.2, o tráfico é dirixido ao gateway, que reenvía os paquetes a través da súa interface FastEthernet 0/0 coa IP 70.70.70.2. 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 70.0.0.0/8).

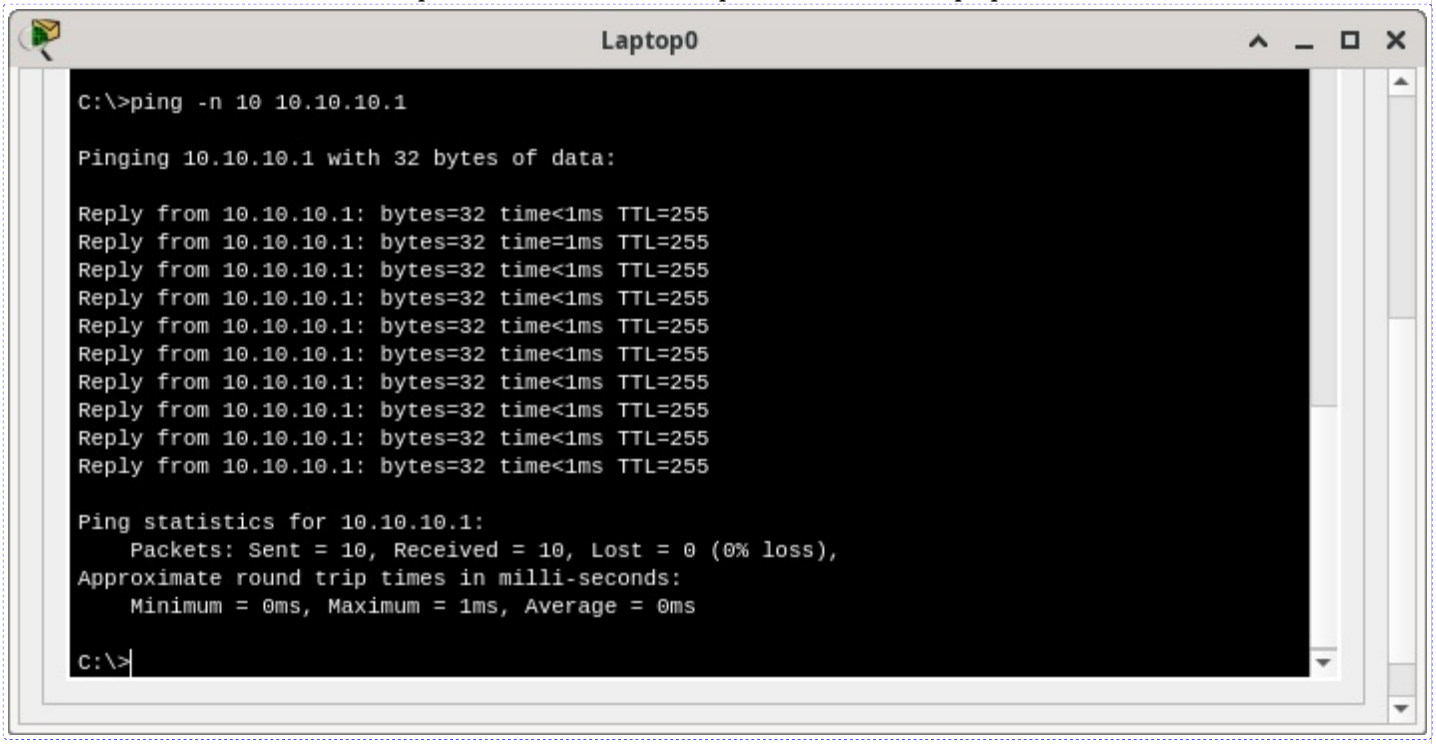


c. Do PC1 á IP 70.70.70.1 → ping -n 10 70.70.70.1 → Non existe conectividade porque o Router7 non ten unha ruta estática ou dinámica configurada para alcanzar esa dirección, que pertence ao Router5.

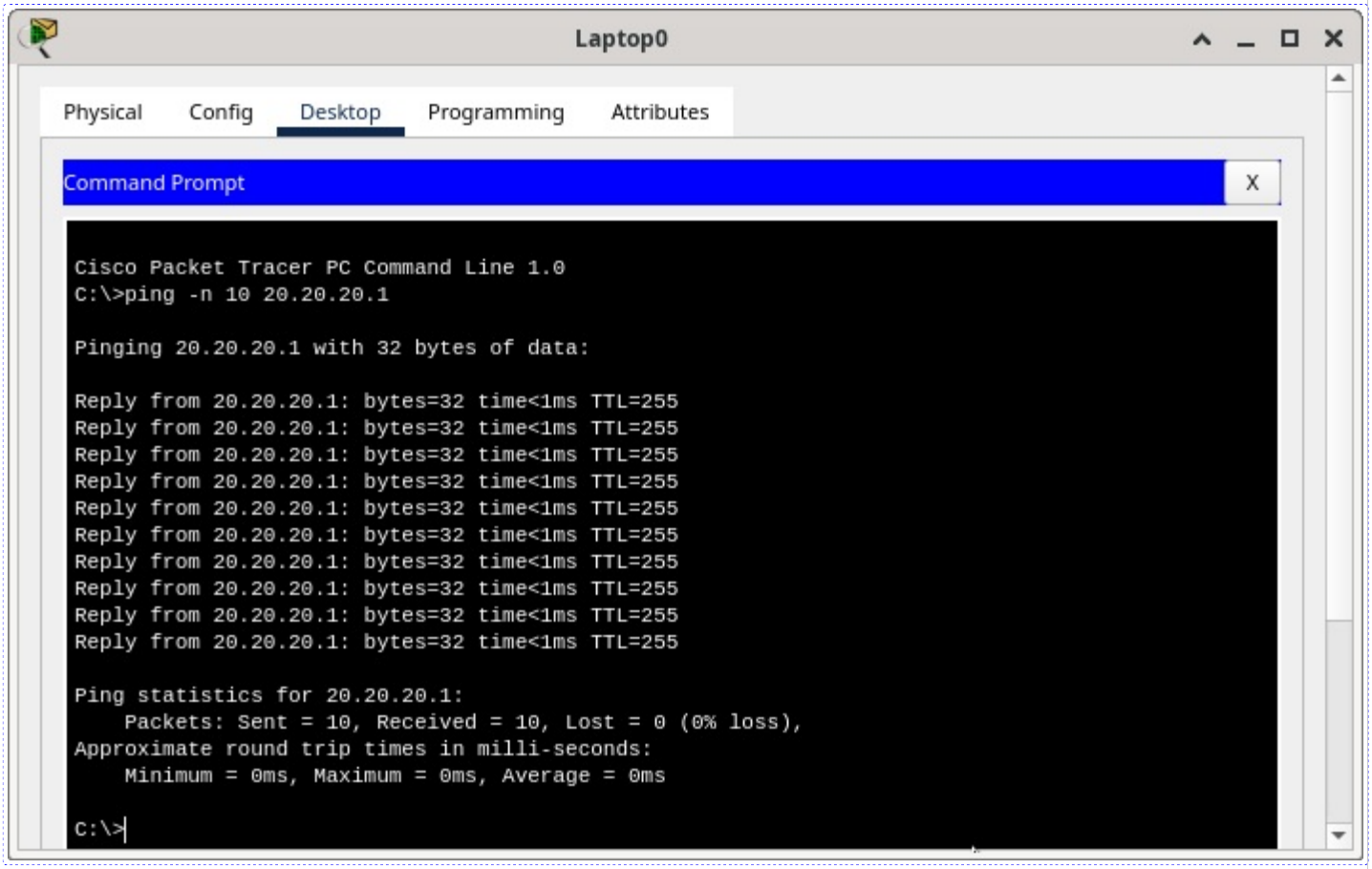


A partir de aquí non existe conectividade xa que os paquetes ICMP non son quen de chegar ao Router5, polo que xa non son capaz de chegar ao Laptop0.

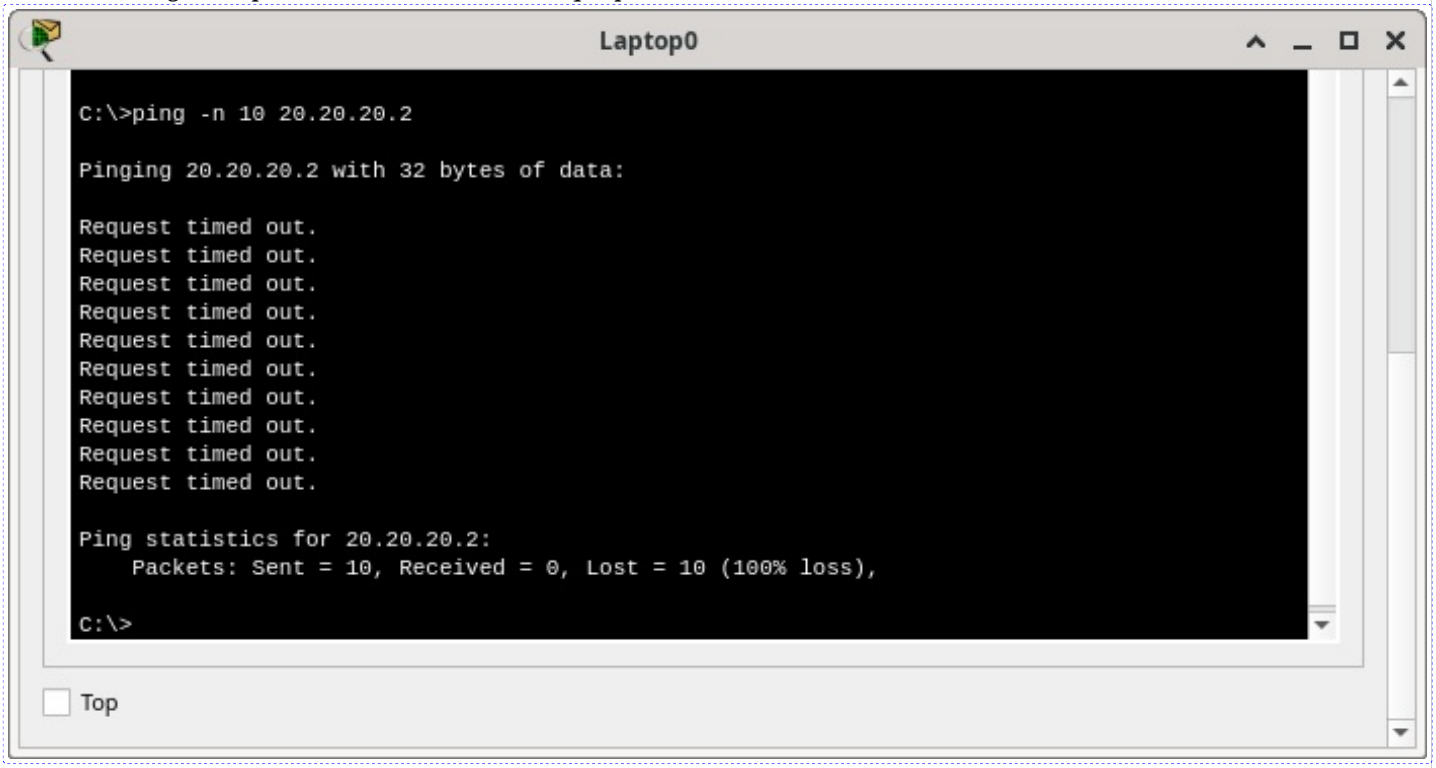
5. Realiza mediante comandos un ping de 10 paquetes ICMP dende Laptop0 a cada host que se atope ata chegar ao PC1. Por cada ping crea un apartado indicando que é o que acontece (Razoa a resposta):
   1. Do Laptop0 á IP 10.10.10.1 → ping -n 10 10.10.10.1 → Existe conectividade debido a que os 2 equipos 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.



2. Do Laptop0 á IP 20.20.20.1 → ping -n 10 20.20.20.1 → Existe conectividade porque o PC1 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 20.20.20.1, o tráfico é dirixido ao gateway, que reenvía os paquetes a través da súa interface FastEthernet 0/1 coa IP 20.20.20.1. 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 20.0.0.0/8).

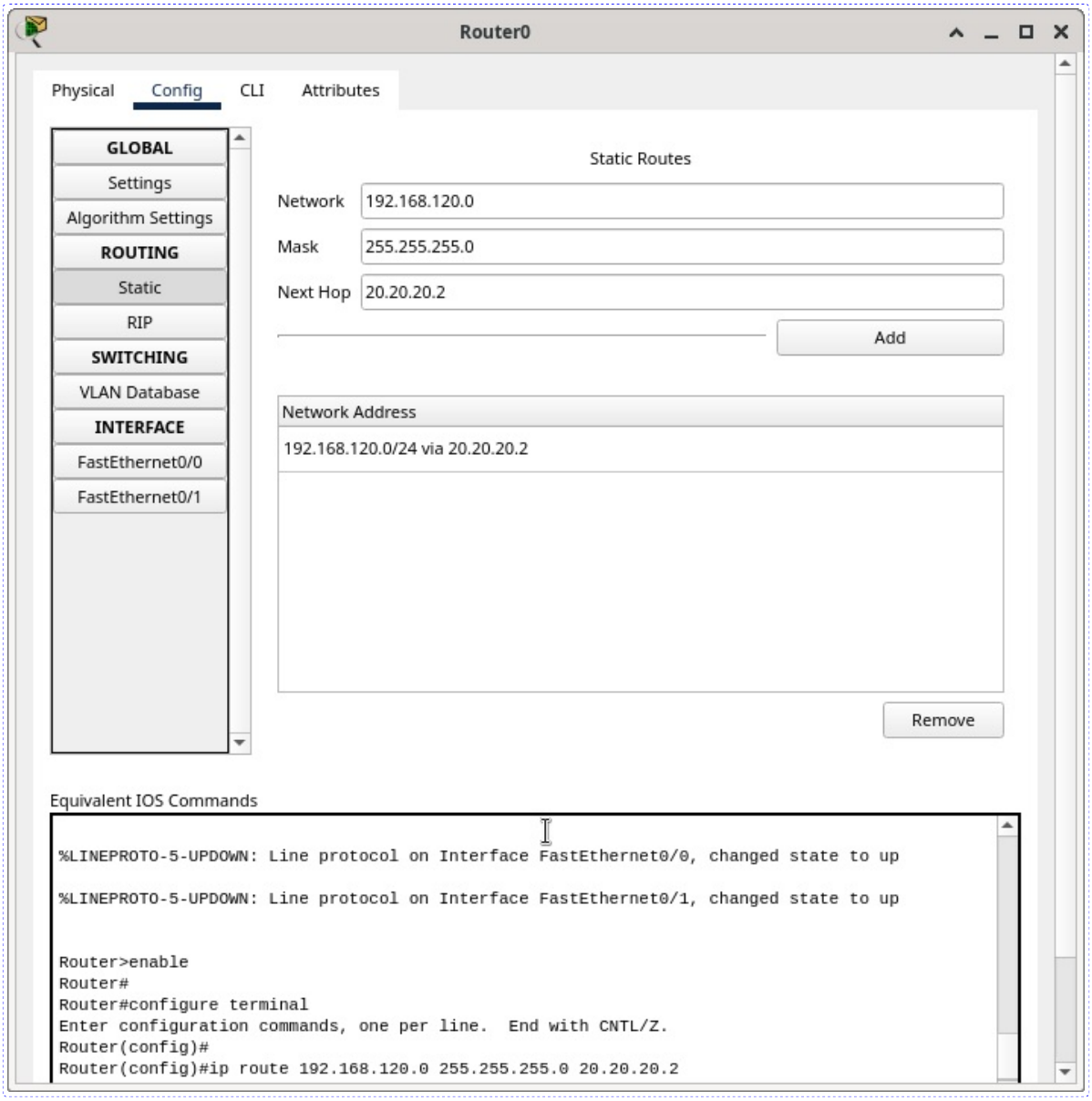


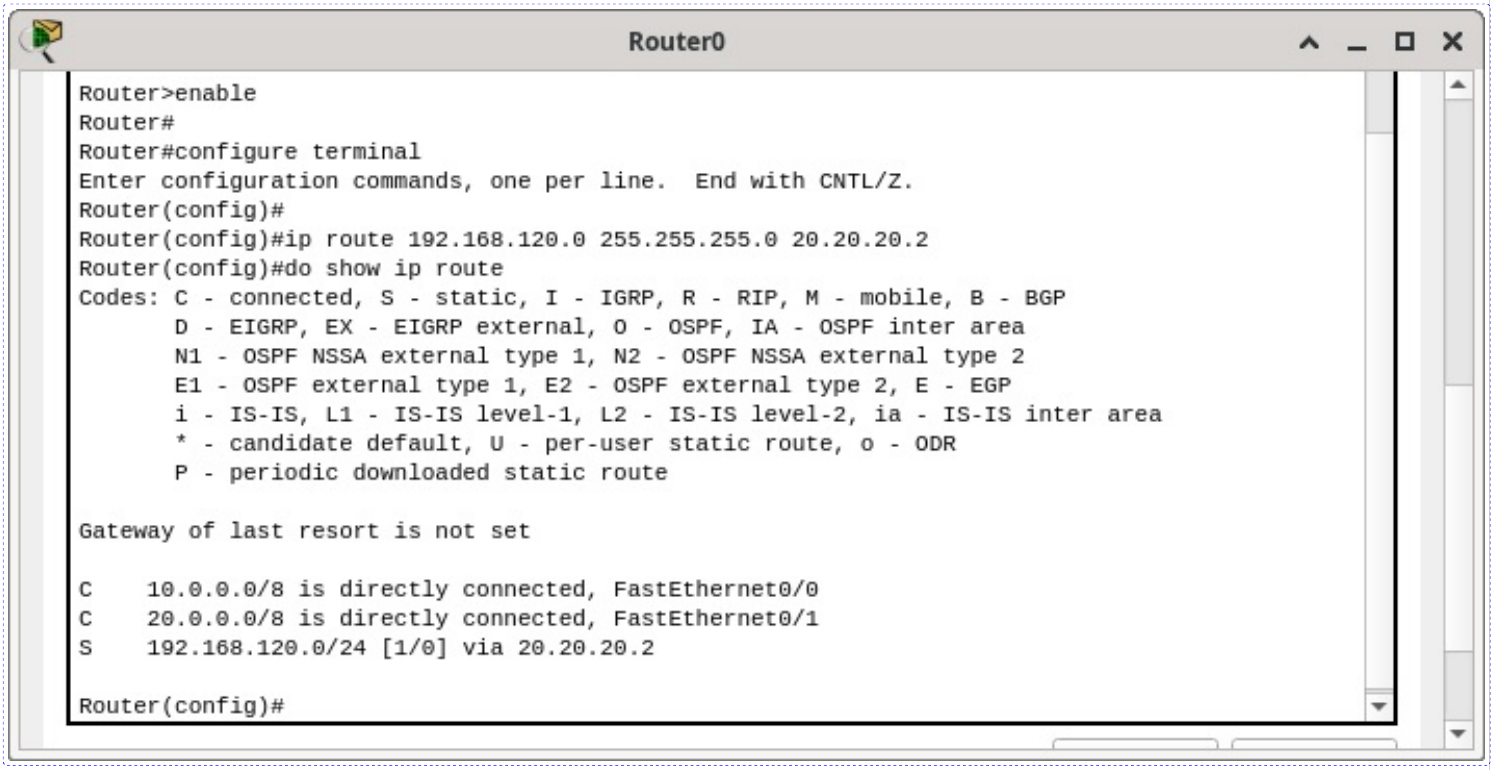
3. Do Laptop0 á IP 20.20.20.2 → ping -n 10 20.20.20.2 → Non existe conectividade porque o Router0 non ten unha ruta estática ou dinámica configurada para alcanzar esa dirección, que pertence ao Router1.

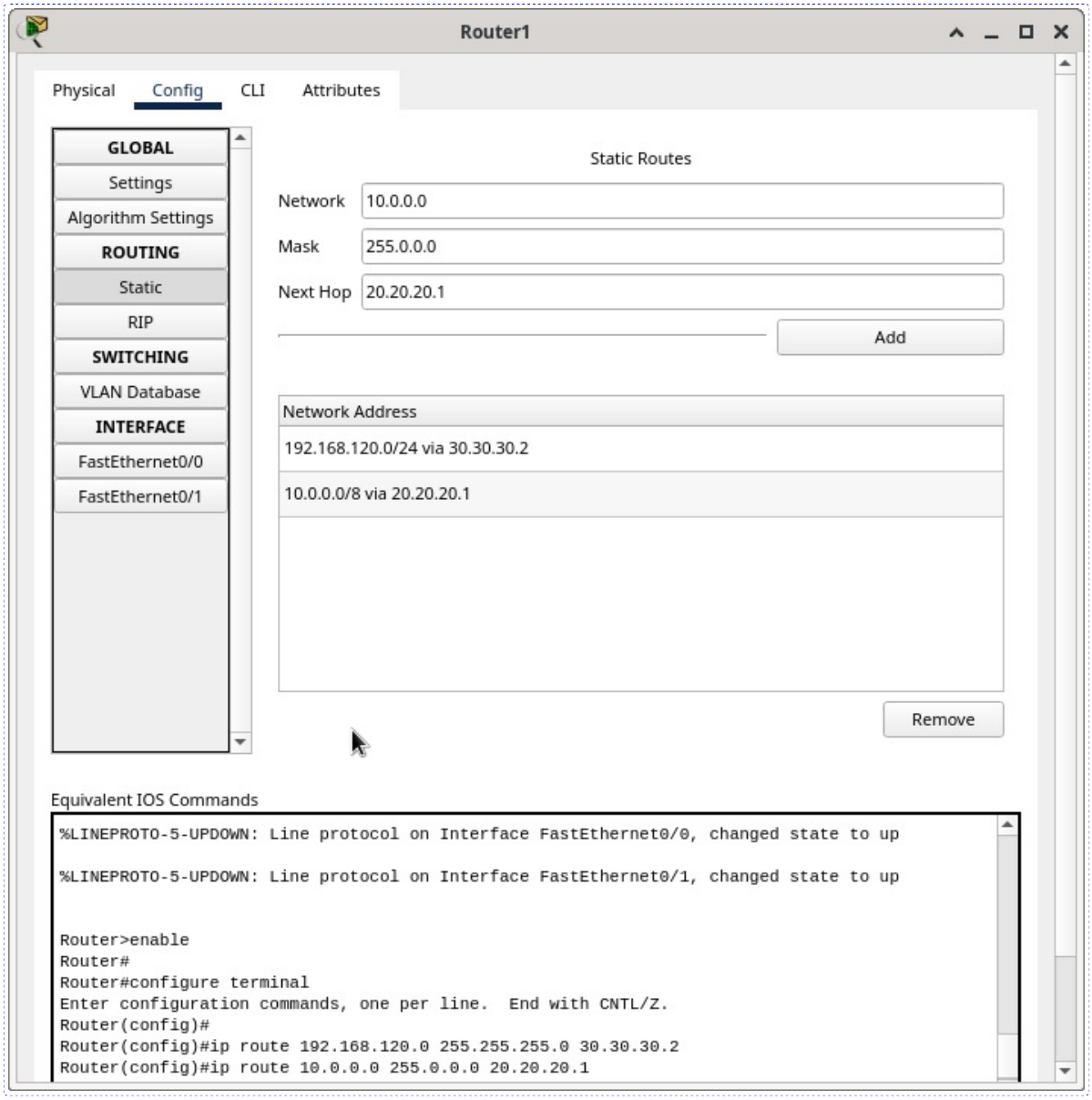


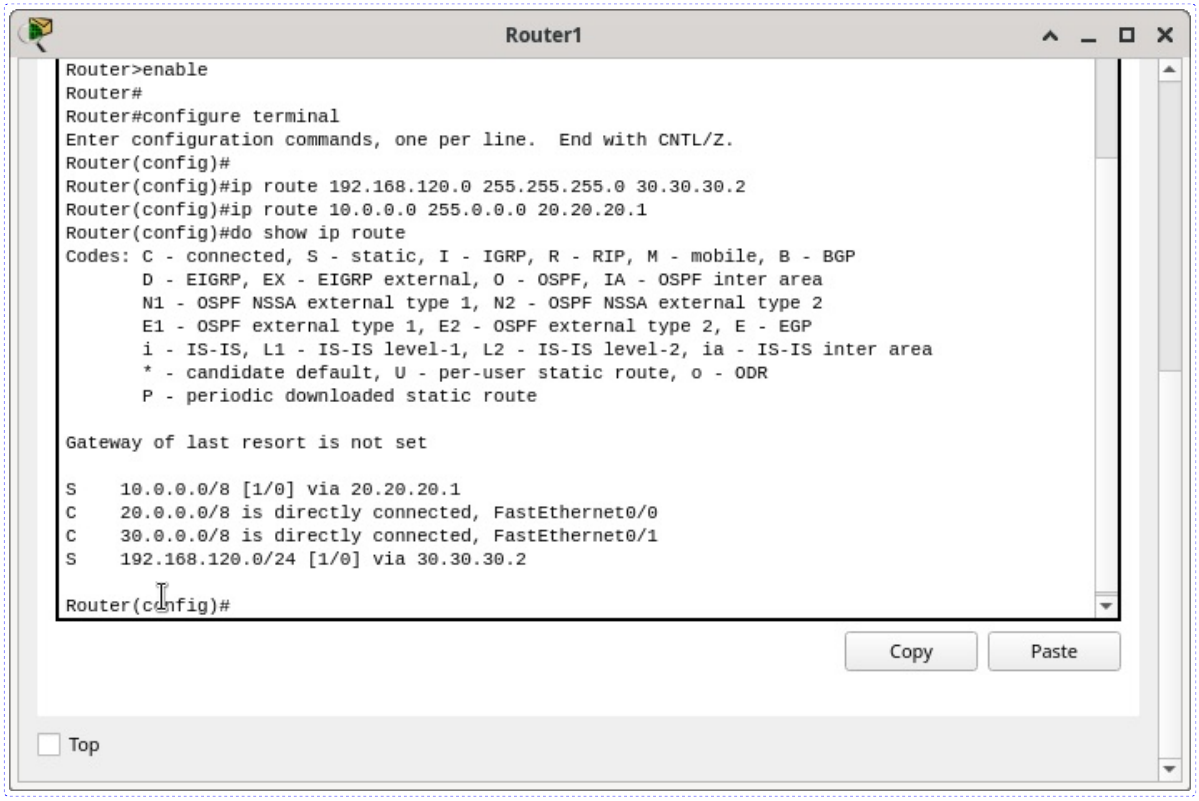
A partir de aquí non existe conectividade xa que os paquetes ICMP non son quen de chegar ao Router1, polo que xa non son capaz de chegar ao PC1.

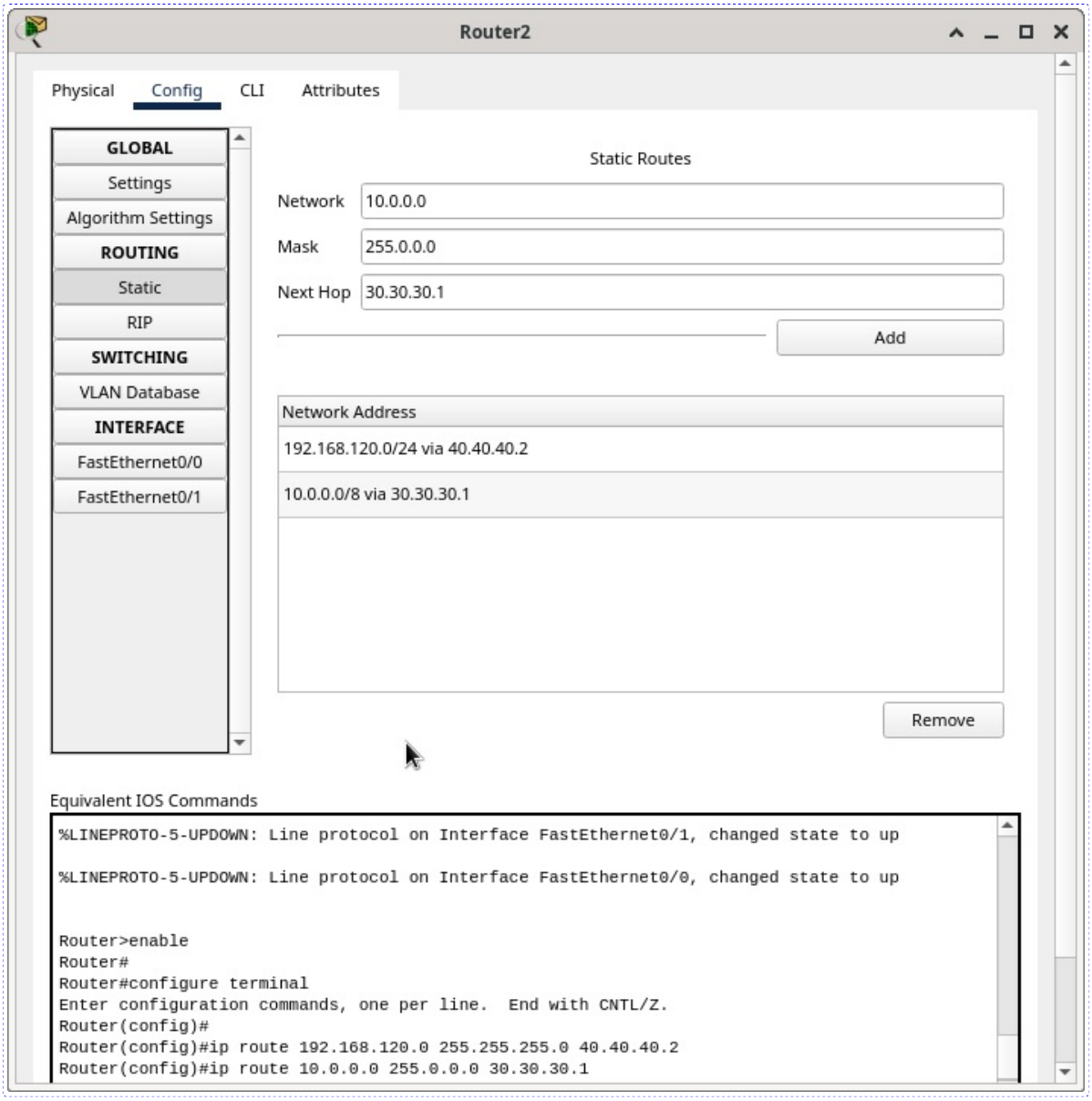
6. Realiza a configuración de enrutamento estático en todos os router capturando imaxes coa configuración de cada host router para que a conectividade entre PC1 e Laptop0 sexa posible.

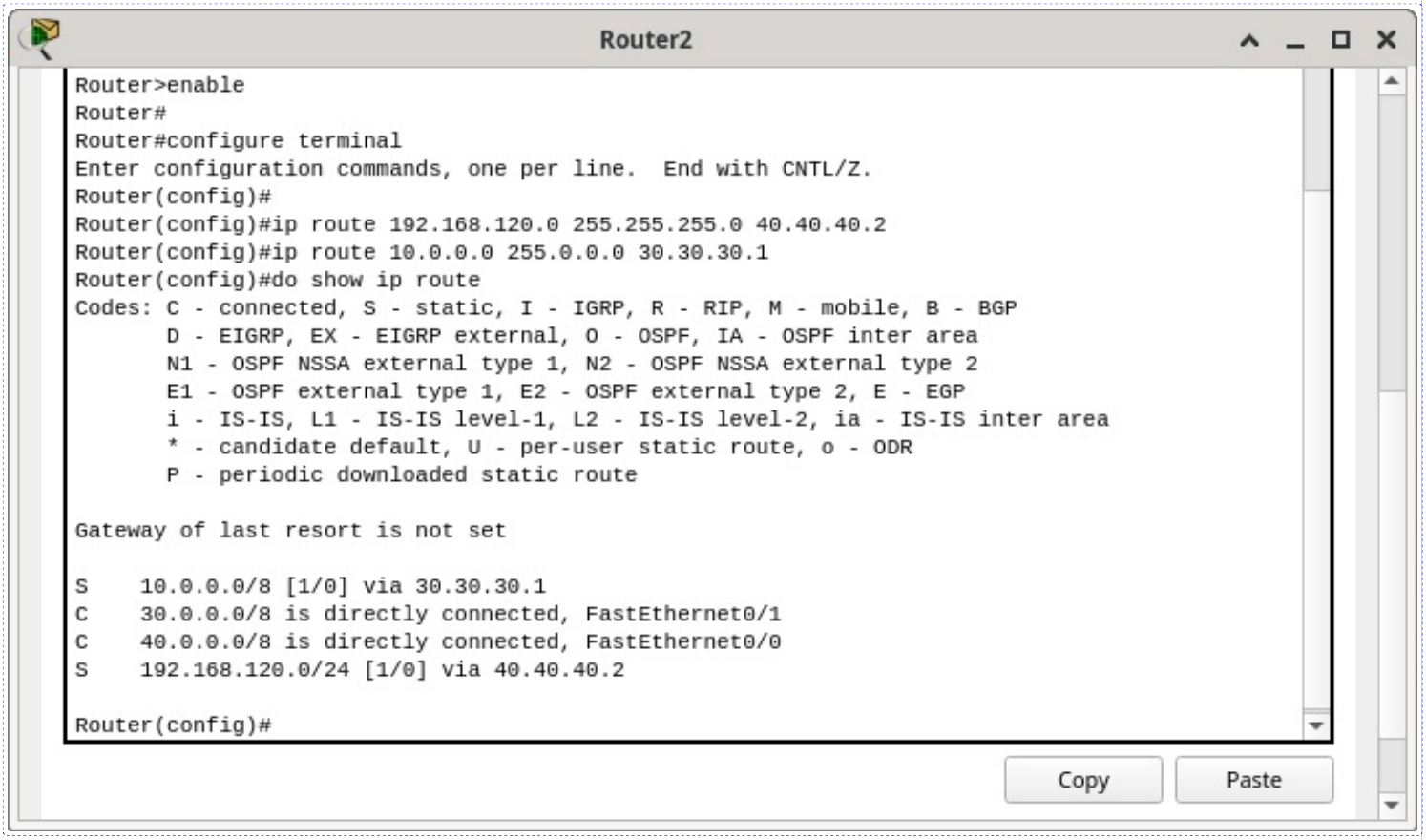


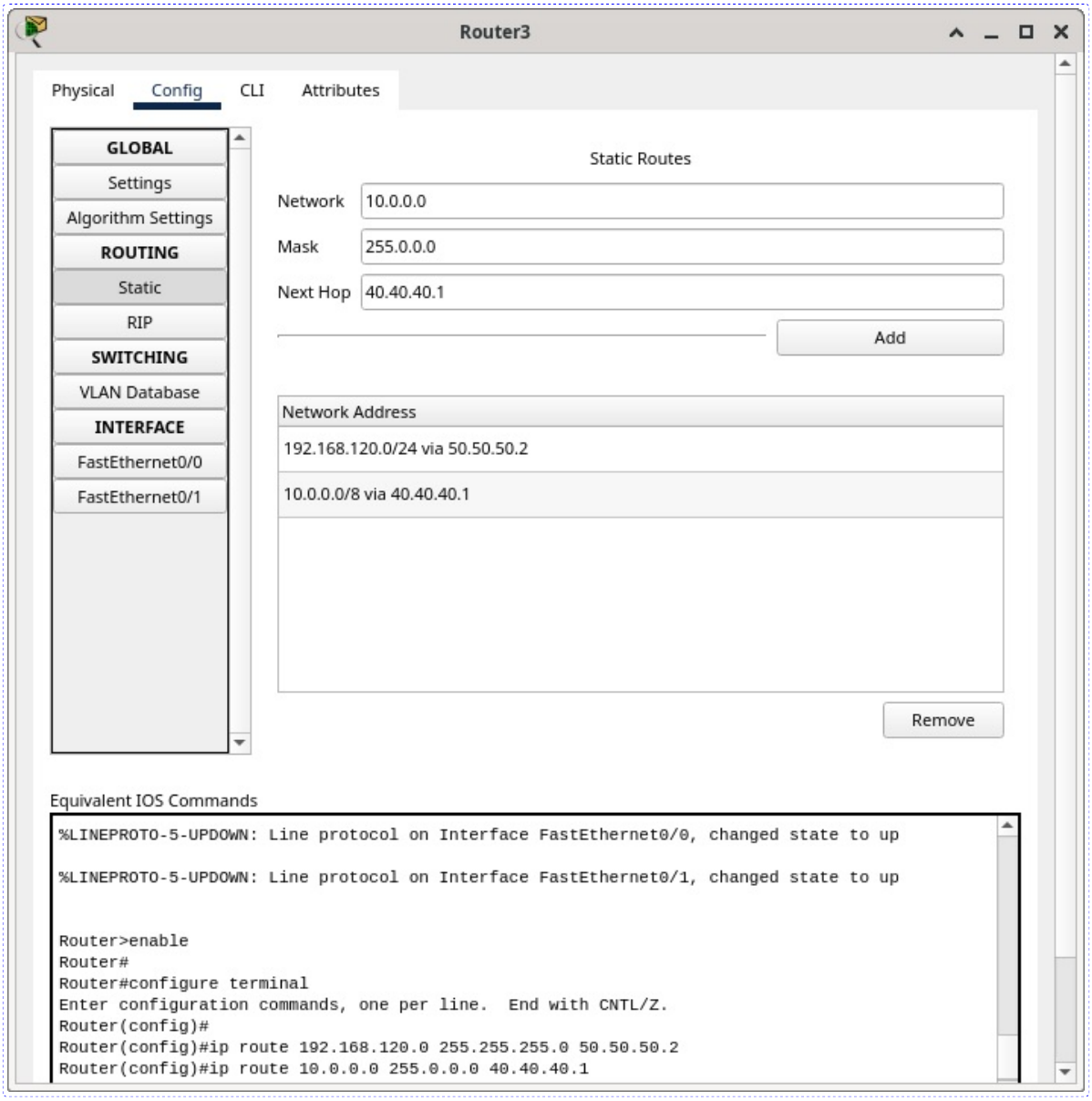


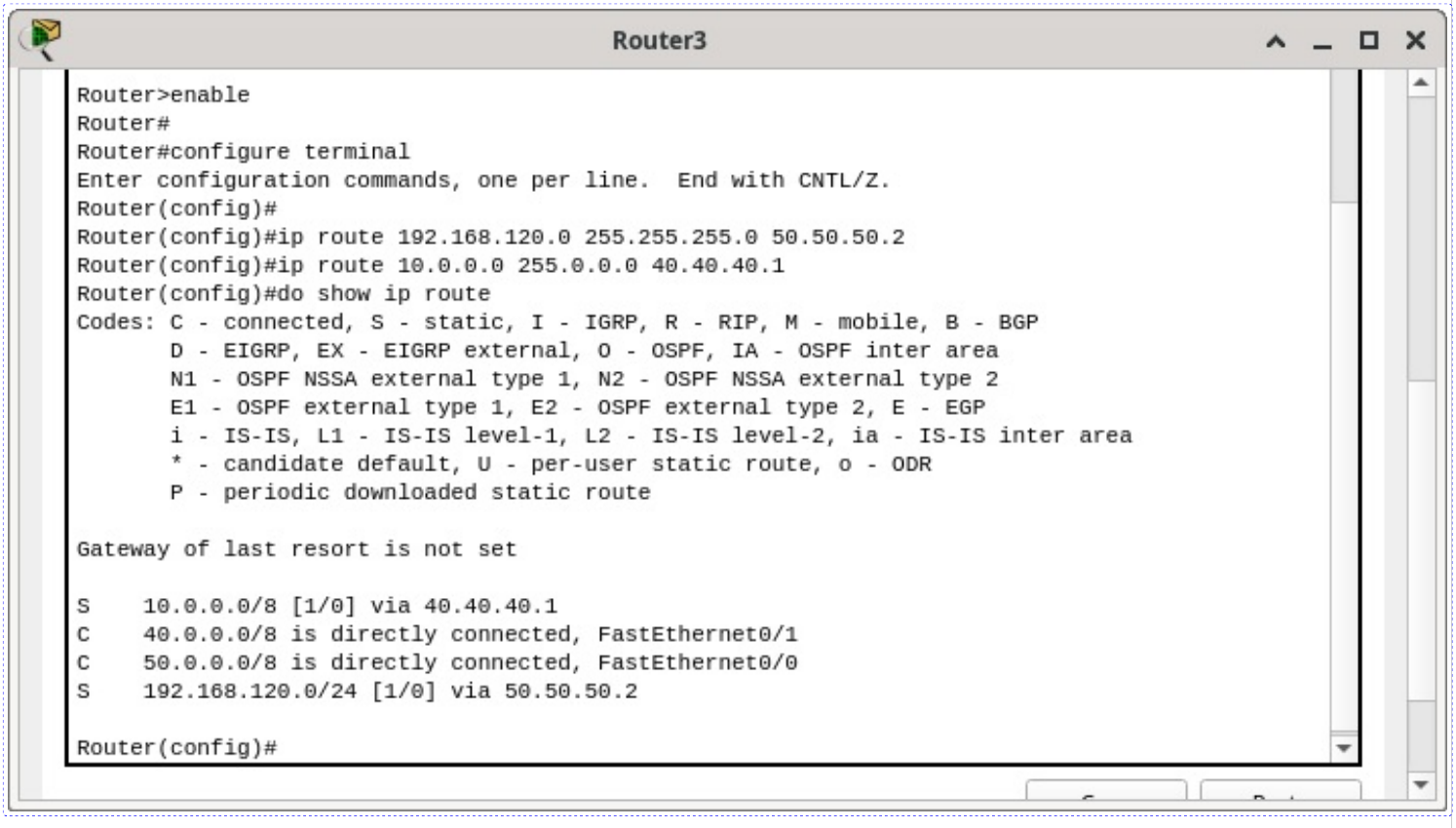

Router1
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/0
FastEthernet0/1
Static Routes
Network 10.0.0.0
Mask 255.0.0.0
Next Hop 20.20.20.1
Add
Network Address
192.168.120.0/24 via 30.30.30.2
10.0.0.0/8 via 20.20.20.1
Remove
Equivalent IOS Commands
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#ip route 192.168.120.0 255.255.255.0 30.30.30.2
Router(config)#ip route 10.0.0.0 255.0.0.0 20.20.20.1

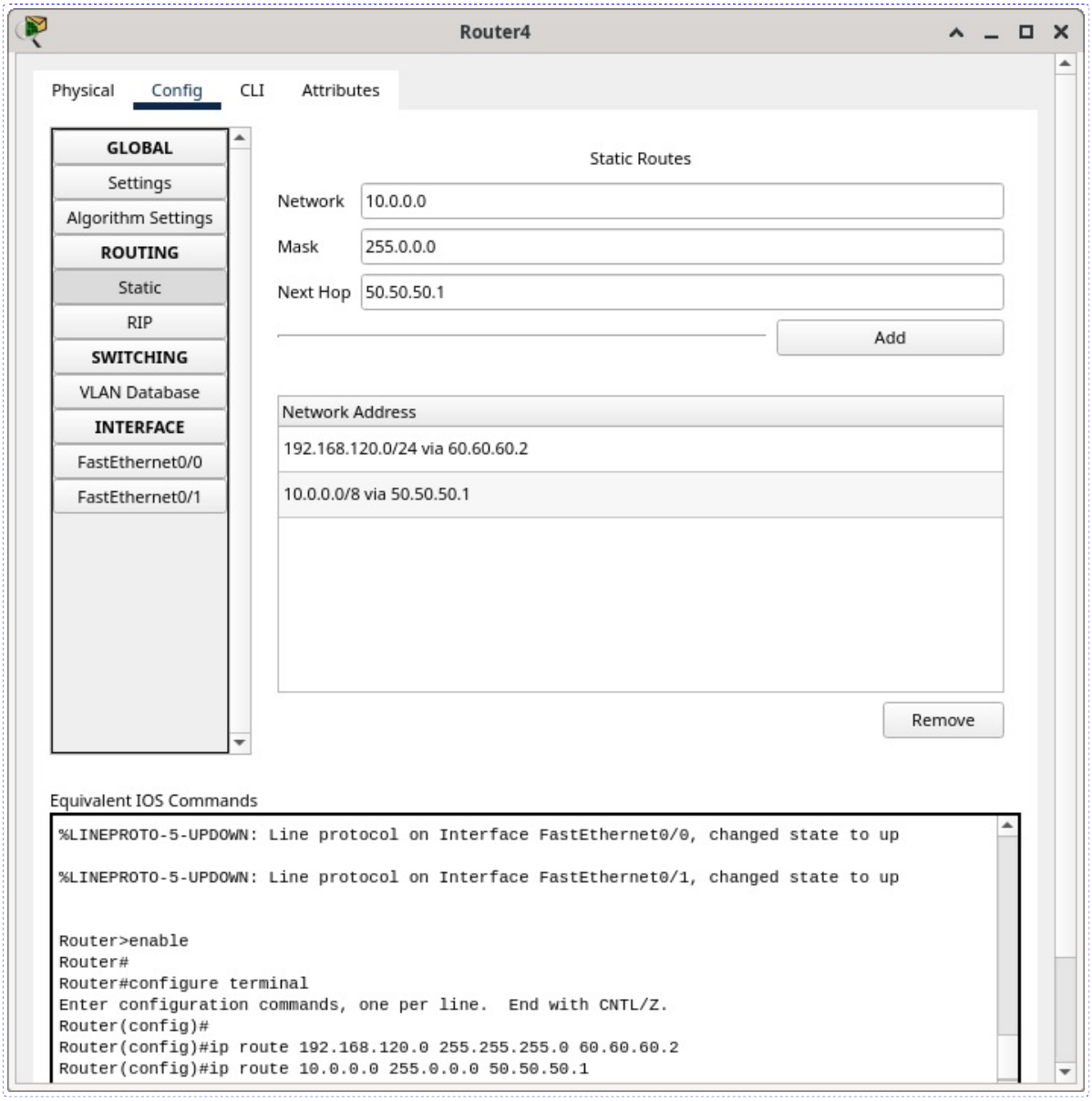

Router1
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#ip route 192.168.120.0 255.255.255.0 30.30.30.2
Router(config)#ip route 10.0.0.0 255.0.0.0 20.20.20.1
Router(config)#do show ip route
Codes: C - connected, 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 20.20.20.1
C 20.0.0.0/8 is directly connected, FastEthernet0/0
C 30.0.0.0/8 is directly connected, FastEthernet0/1
S 192.168.120.0/24 [1/0] via 30.30.30.2
Router(config)#
Copy
Paste
Top

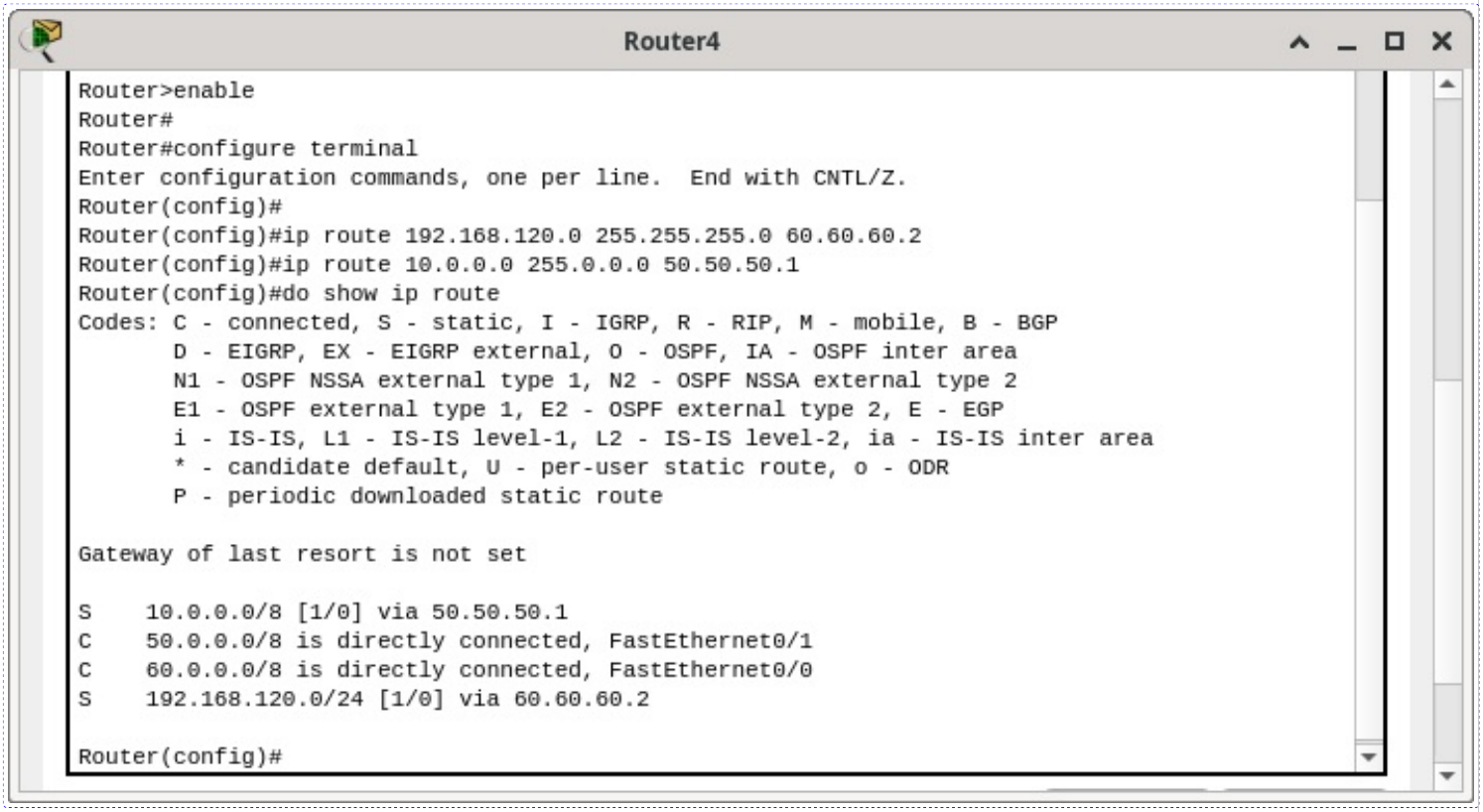

Router2
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/0
FastEthernet0/1
Static Routes
Network 10.0.0.0
Mask 255.0.0.0
Next Hop 30.30.30.1
Add
Network Address
192.168.120.0/24 via 40.40.40.2
10.0.0.0/8 via 30.30.30.1
Remove
Equivalent IOS Commands
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#ip route 192.168.120.0 255.255.255.0 40.40.40.2
Router(config)#ip route 10.0.0.0 255.0.0.0 30.30.30.1

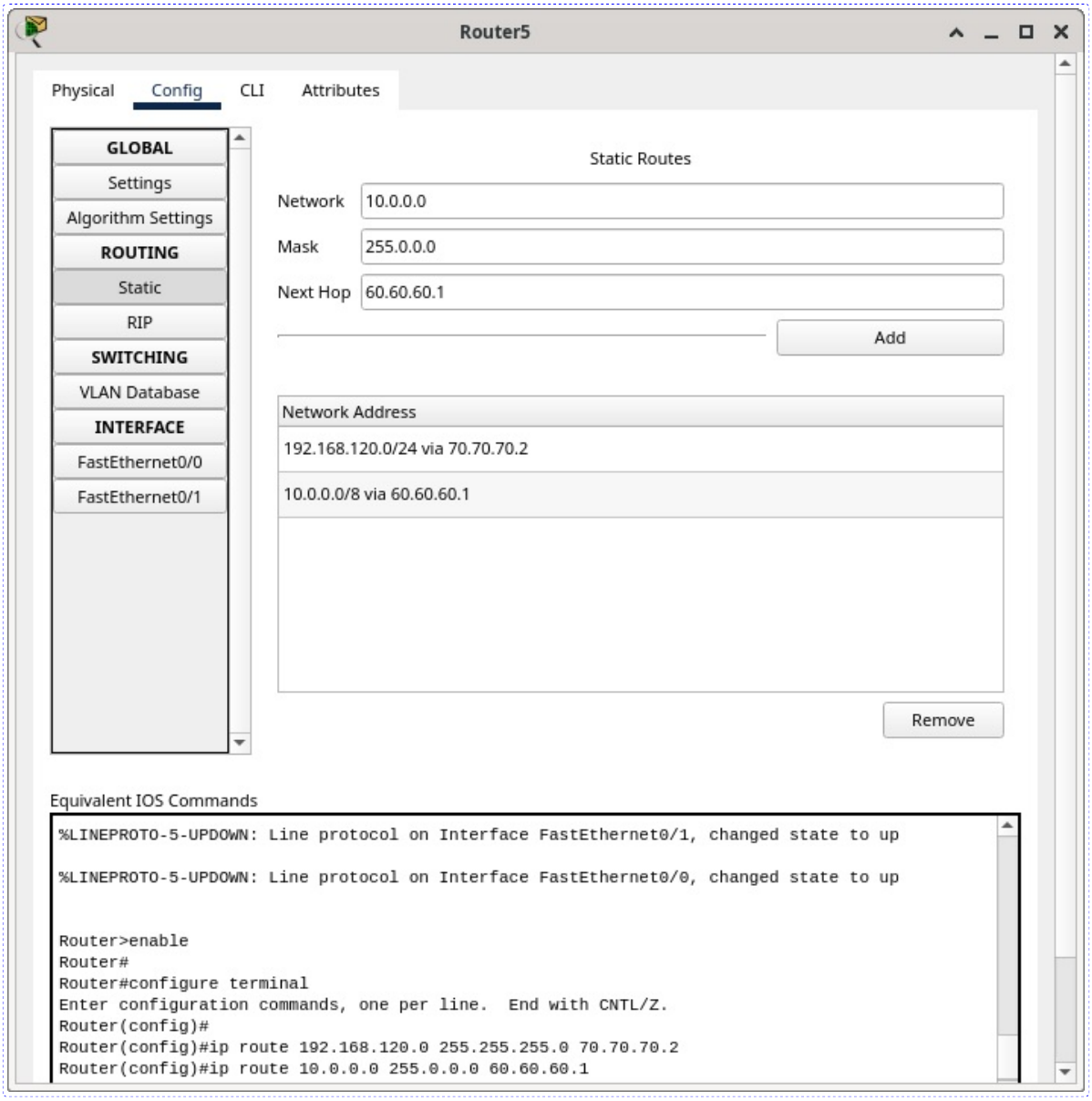

Router2
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#ip route 192.168.120.0 255.255.255.0 40.40.40.2
Router(config)#ip route 10.0.0.0 255.0.0.0 30.30.30.1
Router(config)#do show ip route
Codes: C - connected, 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 30.30.30.1
C 30.0.0.0/8 is directly connected, FastEthernet0/1
C 40.0.0.0/8 is directly connected, FastEthernet0/0
S 192.168.120.0/24 [1/0] via 40.40.40.2
Router(config)#
Copy
Paste

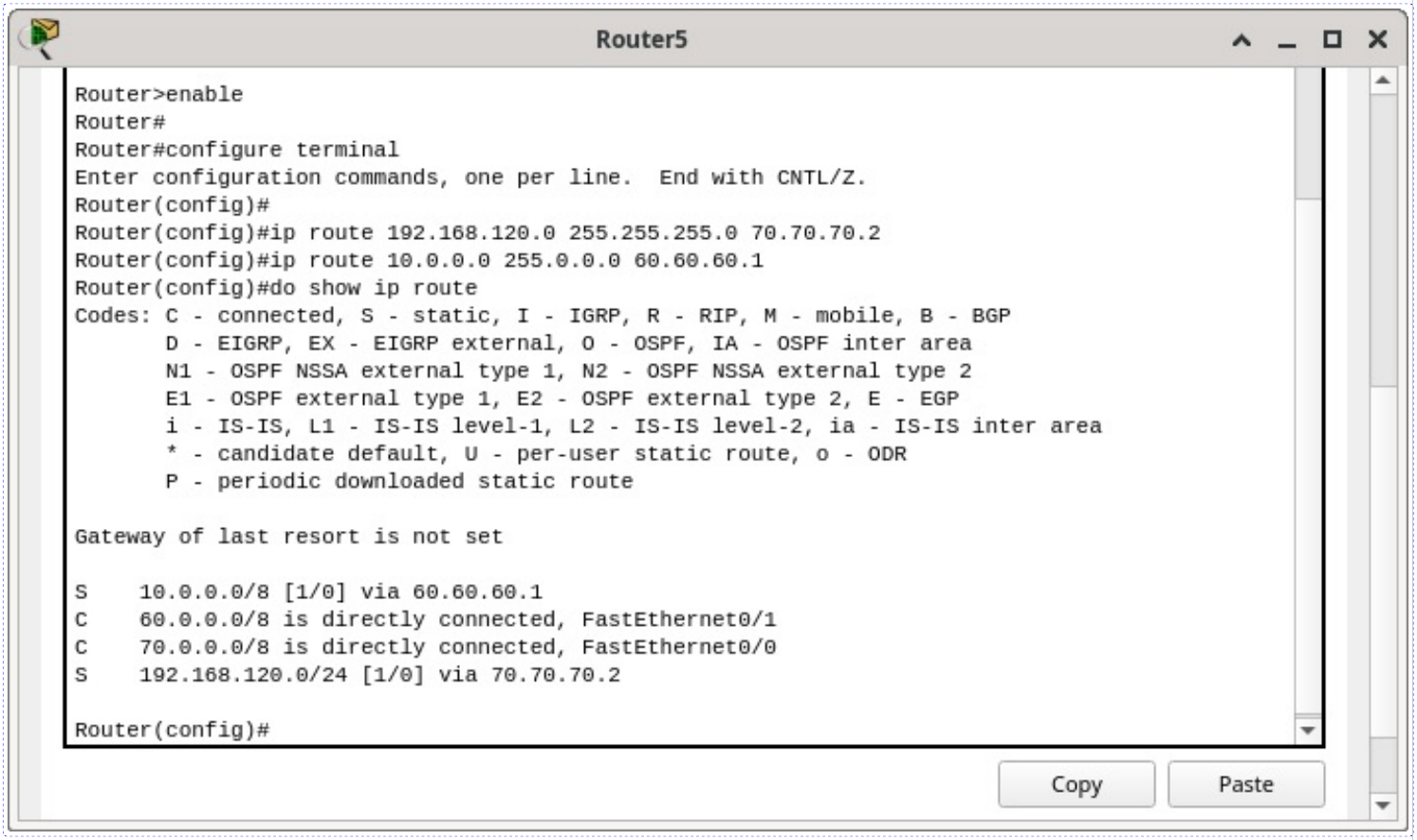

Router3
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/0
FastEthernet0/1
Static Routes
Network 10.0.0.0
Mask 255.0.0.0
Next Hop 40.40.40.1
Add
Network Address
192.168.120.0/24 via 50.50.50.2
10.0.0.0/8 via 40.40.40.1
Remove
Equivalent IOS Commands
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#ip route 192.168.120.0 255.255.255.0 50.50.50.2
Router(config)#ip route 10.0.0.0 255.0.0.0 40.40.40.1

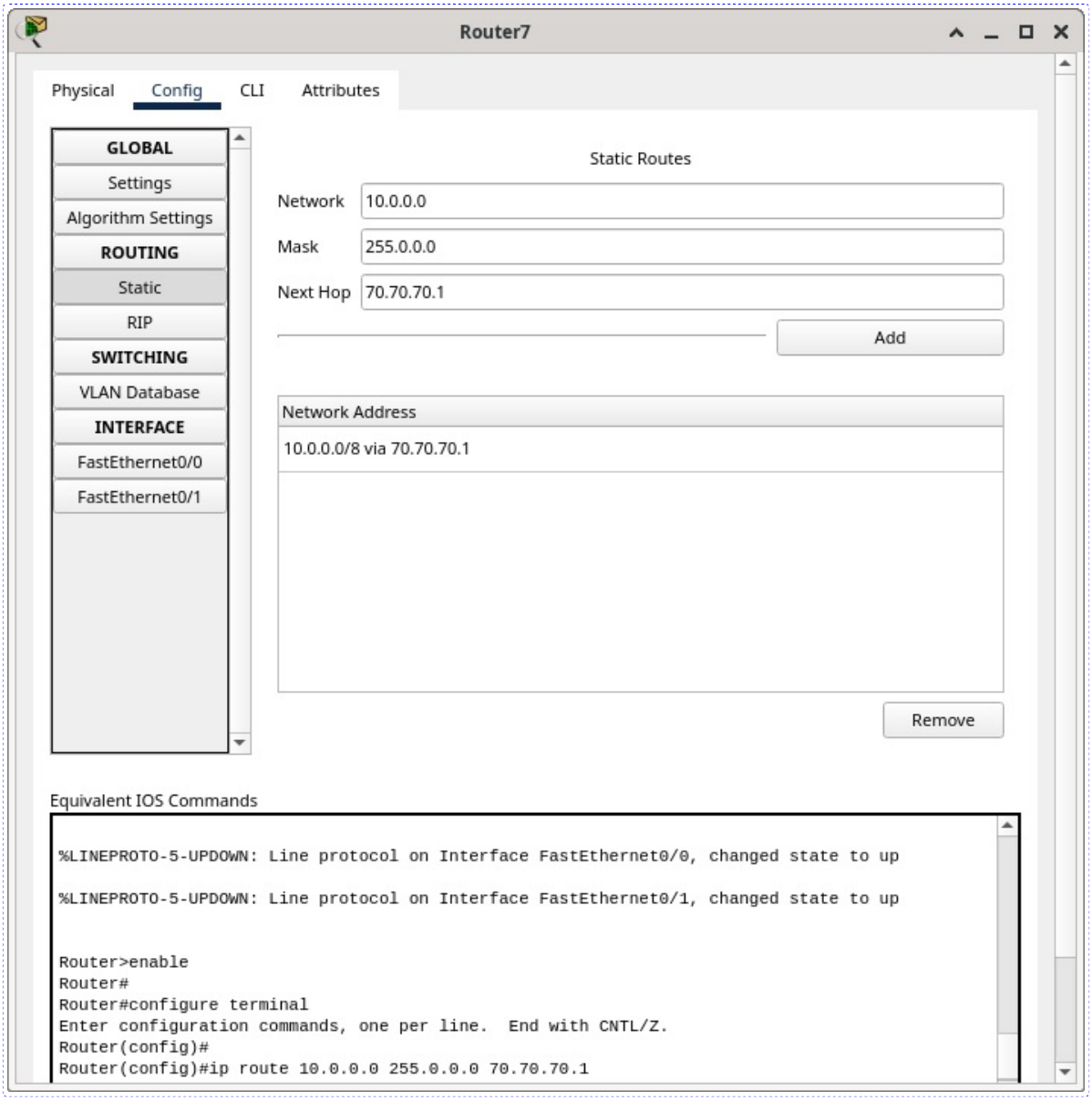

Router3
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#ip route 192.168.120.0 255.255.255.0 50.50.50.2
Router(config)#ip route 10.0.0.0 255.0.0.0 40.40.40.1
Router(config)#do show ip route
Codes: C - connected, 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 40.40.40.1
C 40.0.0.0/8 is directly connected, FastEthernet0/1
C 50.0.0.0/8 is directly connected, FastEthernet0/0
S 192.168.120.0/24 [1/0] via 50.50.50.2
Router(config)#

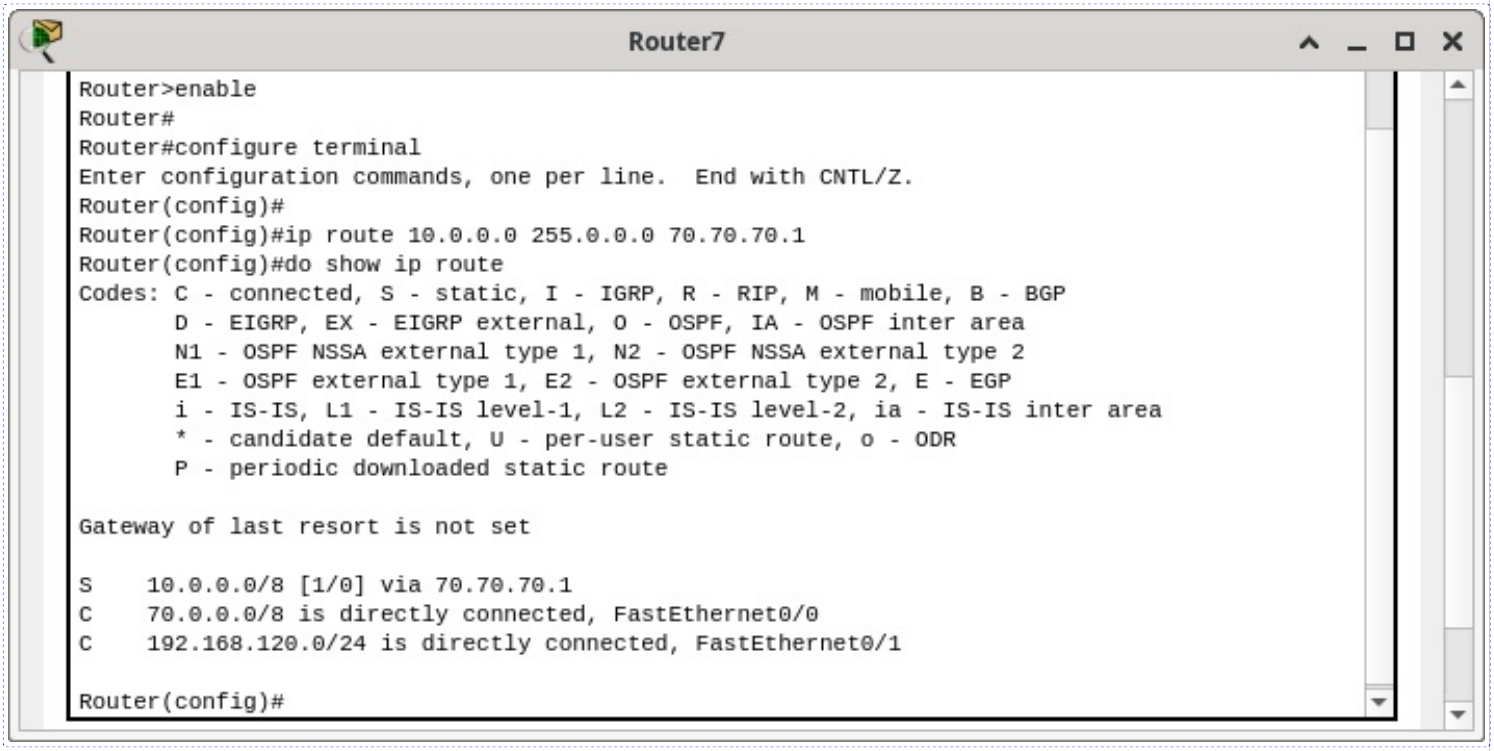

Router4
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/0
FastEthernet0/1
Static Routes
Network 10.0.0.0
Mask 255.0.0.0
Next Hop 50.50.50.1
Add
Network Address
192.168.120.0/24 via 60.60.60.2
10.0.0.0/8 via 50.50.50.1
Remove
Equivalent IOS Commands
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#ip route 192.168.120.0 255.255.255.0 60.60.60.2
Router(config)#ip route 10.0.0.0 255.0.0.0 50.50.50.1


Router4
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#ip route 192.168.120.0 255.255.255.0 60.60.60.2
Router(config)#ip route 10.0.0.0 255.0.0.0 50.50.50.1
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 50.50.50.1
C 50.0.0.0/8 is directly connected, FastEthernet0/1
C 60.0.0.0/8 is directly connected, FastEthernet0/0
S 192.168.120.0/24 [1/0] via 60.60.60.2
Router(config)#

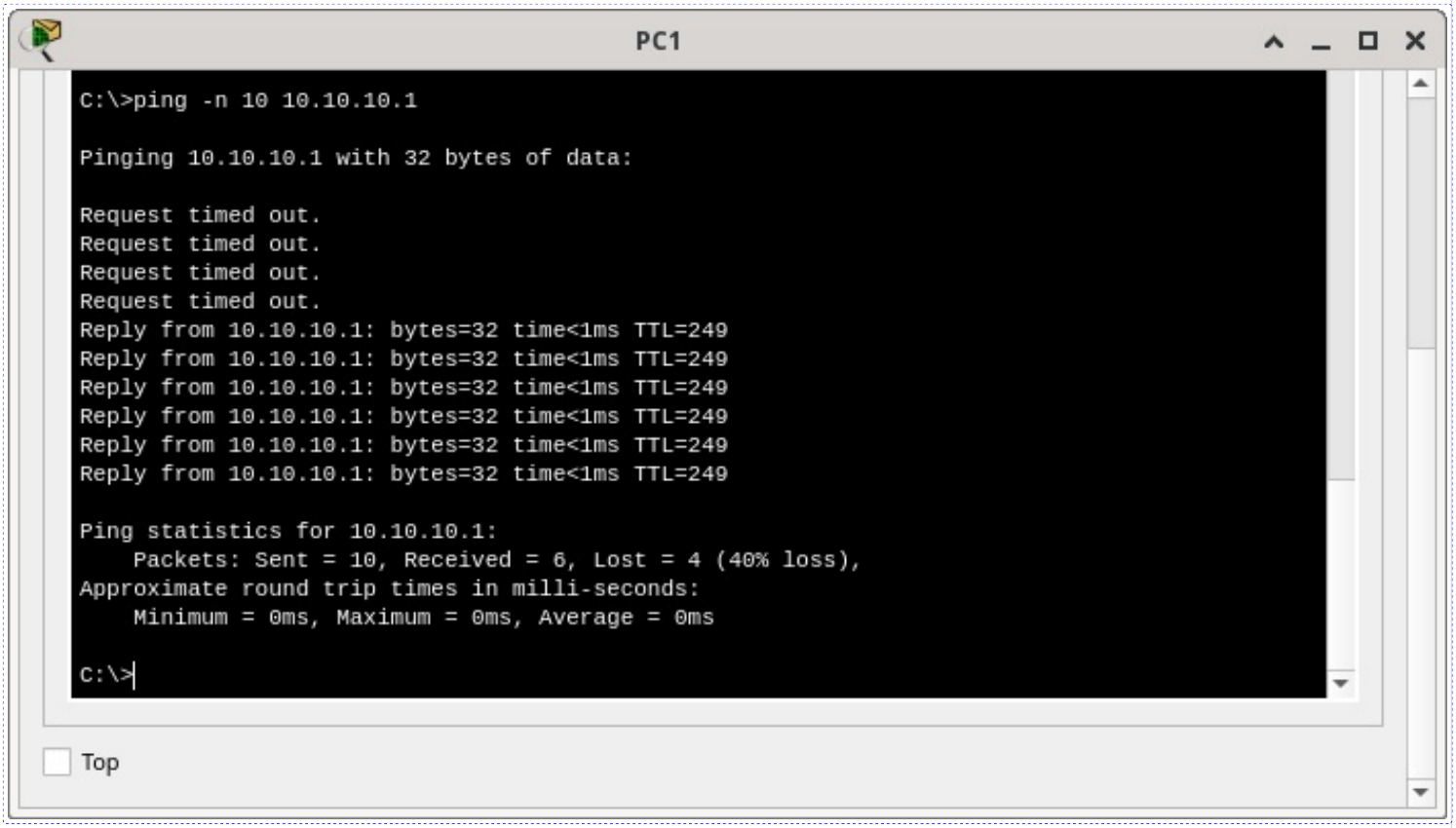

Router5
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/0
FastEthernet0/1
Static Routes
Network 10.0.0.0
Mask 255.0.0.0
Next Hop 60.60.60.1
Add
Network Address
192.168.120.0/24 via 70.70.70.2
10.0.0.0/8 via 60.60.60.1
Remove
Equivalent IOS Commands
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#ip route 192.168.120.0 255.255.255.0 70.70.70.2
Router(config)#ip route 10.0.0.0 255.0.0.0 60.60.60.1

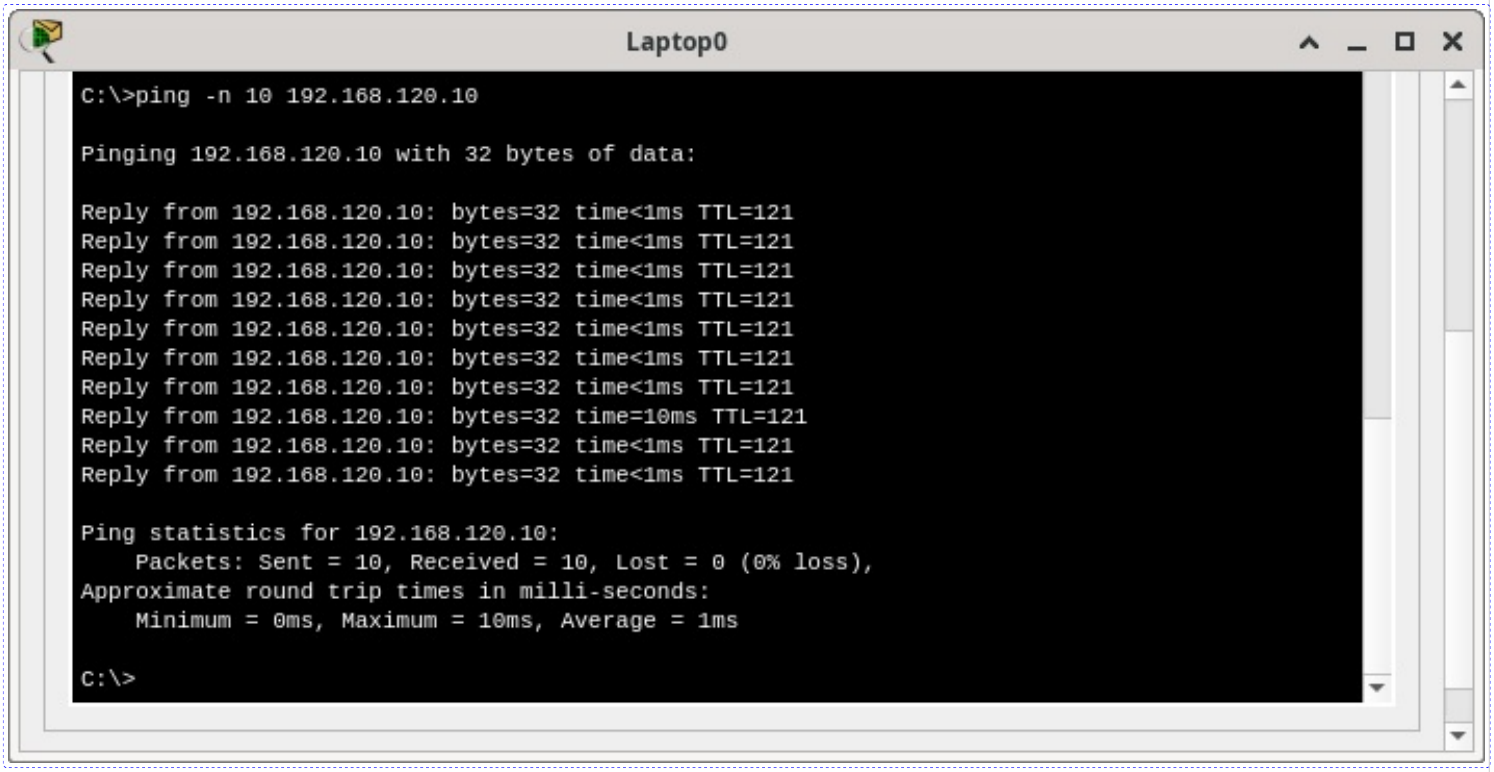

Router5
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#ip route 192.168.120.0 255.255.255.0 70.70.70.2
Router(config)#ip route 10.0.0.0 255.0.0.0 60.60.60.1
Router(config)#do show ip route
Codes: C - connected, 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 60.60.60.1
C 60.0.0.0/8 is directly connected, FastEthernet0/1
C 70.0.0.0/8 is directly connected, FastEthernet0/0
S 192.168.120.0/24 [1/0] via 70.70.70.2
Router(config)#
Copy
Paste


Router7
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/0
FastEthernet0/1
Static Routes
Network 10.0.0.0
Mask 255.0.0.0
Next Hop 70.70.70.1
Add
Network Address
10.0.0.0/8 via 70.70.70.1
Remove
Equivalent IOS Commands
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
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 70.70.70.1


Router7
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 70.70.70.1
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 70.70.70.1
C 70.0.0.0/8 is directly connected, FastEthernet0/0
C 192.168.120.0/24 is directly connected, FastEthernet0/1
Router(config)#

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.





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