



MINISTERUL EDUCAȚIEI ȘI CERCETĂRII AL REPUBLICII MOLDOVA
Universitatea Tehnică a Moldovei

RAPORT

Lucrare de laborator nr. 6
la cursul „*Rețele de calculatoare*”

A efectuat:

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Chișinău 2025

Obiective:

Cunoașterea noțiunii de rețelele locale virtuale (Virtual Local Area Networks – VLAN)?

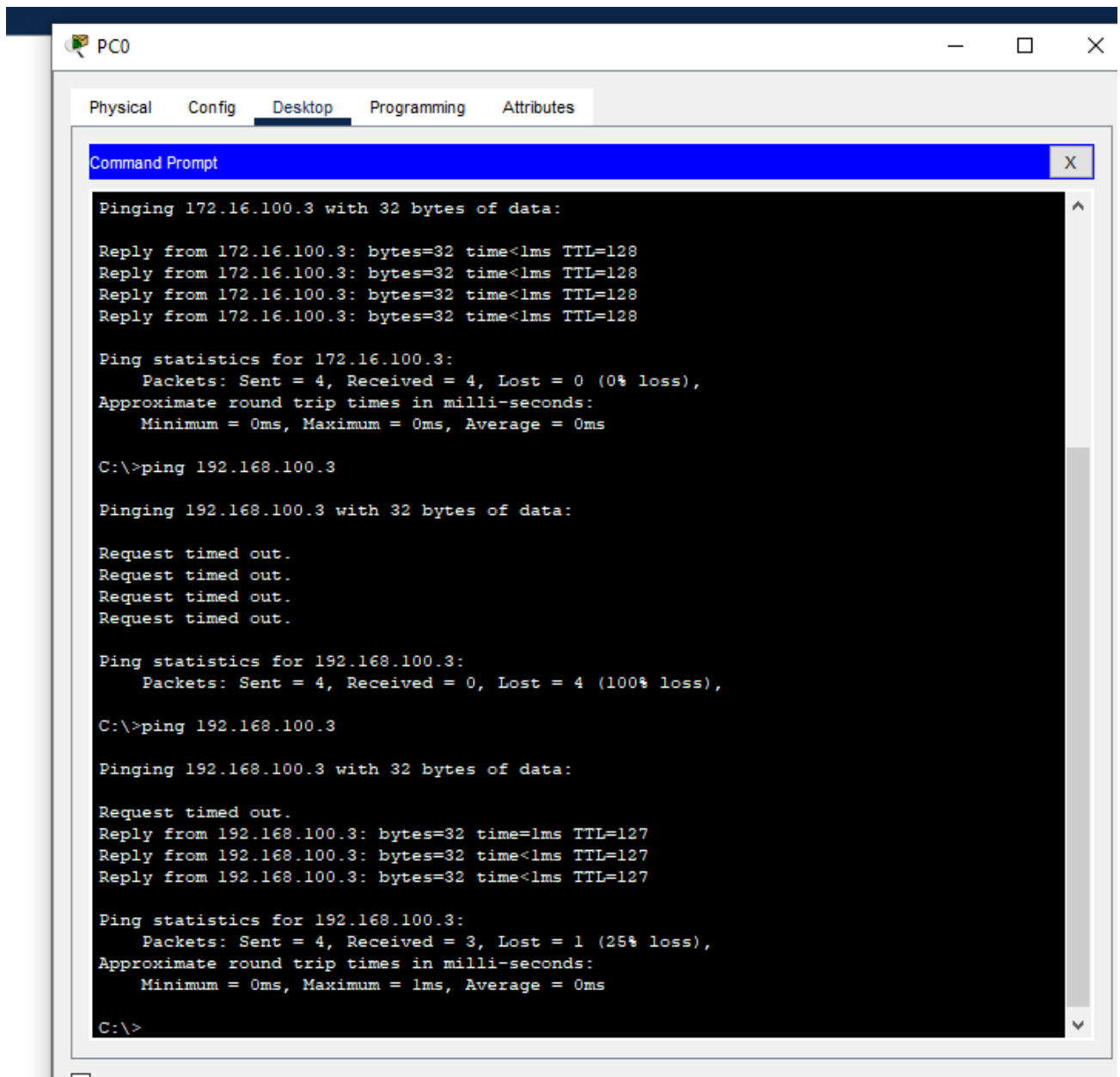
Studiarea tipurilor de legături în VLAN-uri (access, trunk)

Configurarea VLAN-urilor în Cisco IOS

Mersul lucrării:

1. Configurarea default gateway:

Primul ping către PC3 cu IP address 192.168.100.3 nu returna nimic, dar după configurarea, acesta întoarce mesaje înapoi, doar că numai după primul mesaj.



The screenshot shows a PC0 desktop environment with a Command Prompt window open. The window has tabs for Physical, Config, Desktop, Programming, and Attributes. The Command Prompt displays the following text:

```
Command Prompt

Pinging 172.16.100.3 with 32 bytes of data:

Reply from 172.16.100.3: bytes=32 time<1ms TTL=128
Reply from 172.16.100.3: bytes=32 time<1ms TTL=128
Reply from 172.16.100.3: bytes=32 time<1ms TTL=128
Reply from 172.16.100.3: bytes=32 time<1ms TTL=128

Ping statistics for 172.16.100.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.100.3

Pinging 192.168.100.3 with 32 bytes of data:

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

Ping statistics for 192.168.100.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 192.168.100.3

Pinging 192.168.100.3 with 32 bytes of data:

Request timed out.
Reply from 192.168.100.3: bytes=32 time=1ms TTL=127
Reply from 192.168.100.3: bytes=32 time<1ms TTL=127
Reply from 192.168.100.3: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.100.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

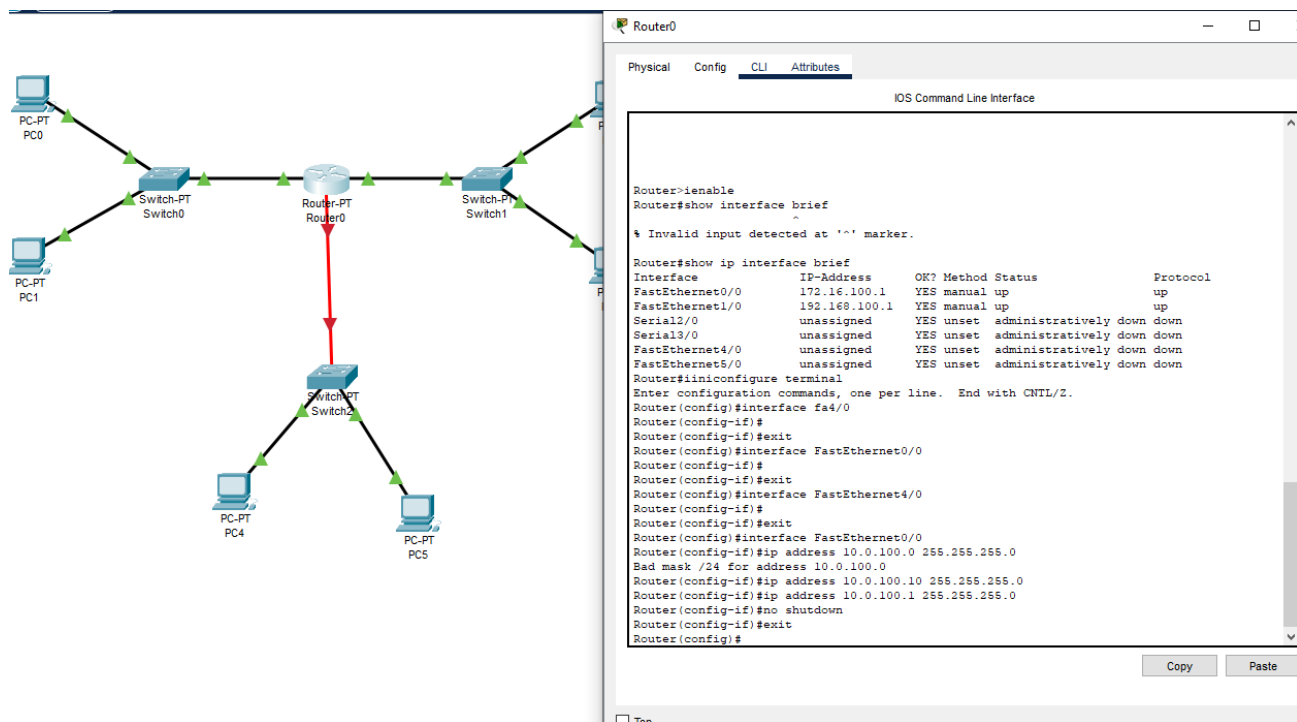
C:\>
```

2. Rute și pachete de reply

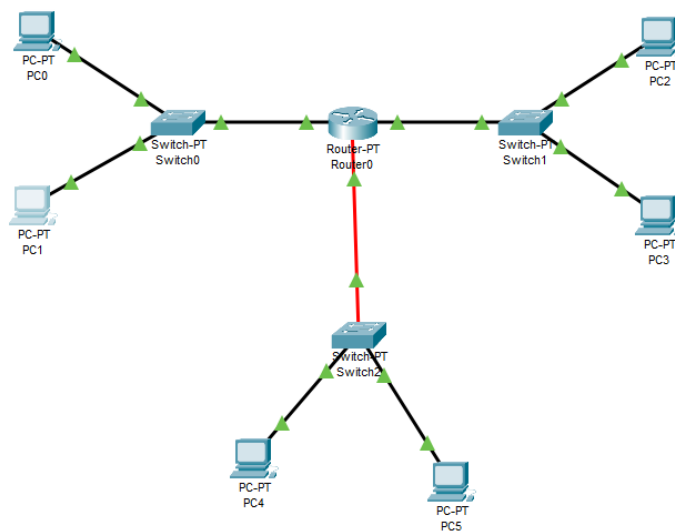
Pachetul este dropped deoarece pentru stația PC2 nu mai este configurat default gateway, adică în momentul când ajunge la router, acesta nu va fi recunoscut ca destinație, deci pachetul devine nefolosit.

3. Adresare și default gateway

Configurarea routerului cu switch-ul și stațiile noi:



Testarea conectivității dintre PC1 și PC4:



```

PC1
Physical Config Desktop Programming Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.0.100.4

Pinging 10.0.100.4 with 32 bytes of data:

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

Ping statistics for 10.0.100.4:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 10.0.100.4

Pinging 10.0.100.4 with 32 bytes of data:

Request timed out.
Reply from 10.0.100.4: bytes=32 time<1ms TTL=127
Reply from 10.0.100.4: bytes=32 time<1ms TTL=127
Reply from 10.0.100.4: bytes=32 time=12ms TTL=127

Ping statistics for 10.0.100.4:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 12ms, Average = 4ms

C:\>

```

Primul mesaj nu este recepționat, dar următoarele sunt răspunse.

4. Configurare rute statice

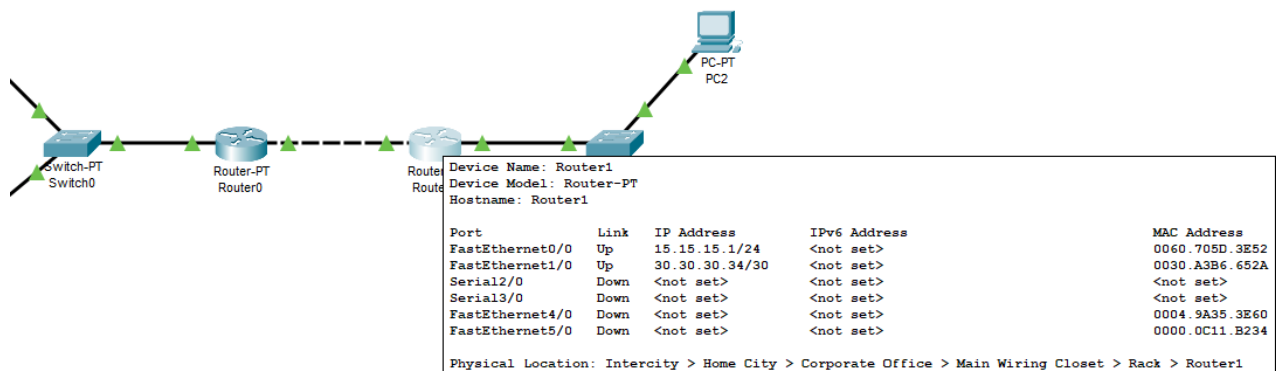
Router0:

Device Name: Router0
Device Model: Router-PT
Hostname: Router0

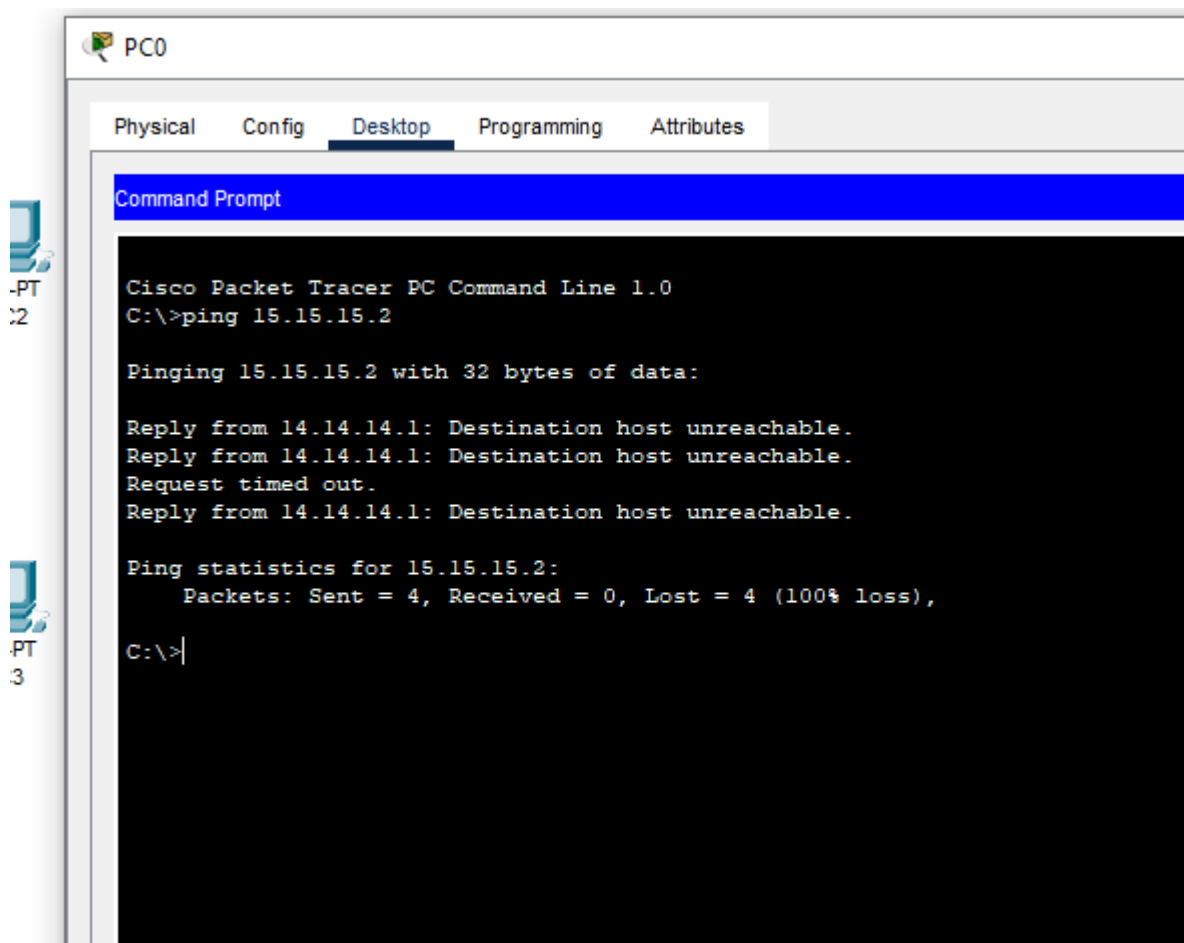
Port	Link	IP Address	IPv6 Address	MAC Address
FastEthernet0/0	Up	14.14.14.1/24	<not set>	0003.E408.85C4
FastEthernet1/0	Up	30.30.30.33/30	<not set>	0001.9689.22A5
Serial2/0	Down	<not set>	<not set>	<not set>
Serial3/0	Down	<not set>	<not set>	<not set>
FastEthernet4/0	Down	<not set>	<not set>	00D0.BA79.4A25
FastEthernet5/0	Down	<not set>	<not set>	00D0.FF3B.9E0A

Physical Location: Intercity > Home City > Corporate Office > Main Wiring Closet > Rack > Router0

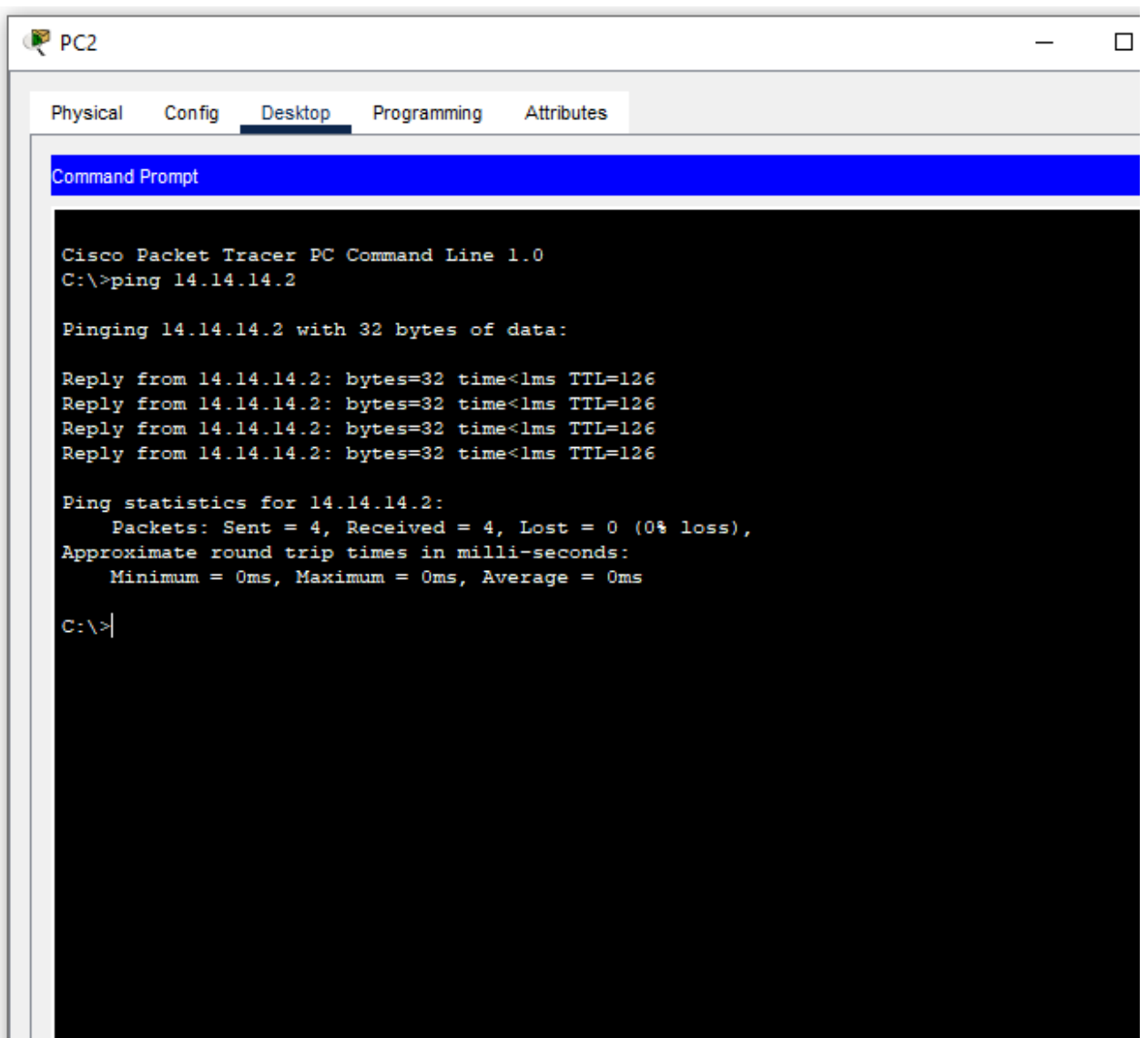
Router1:



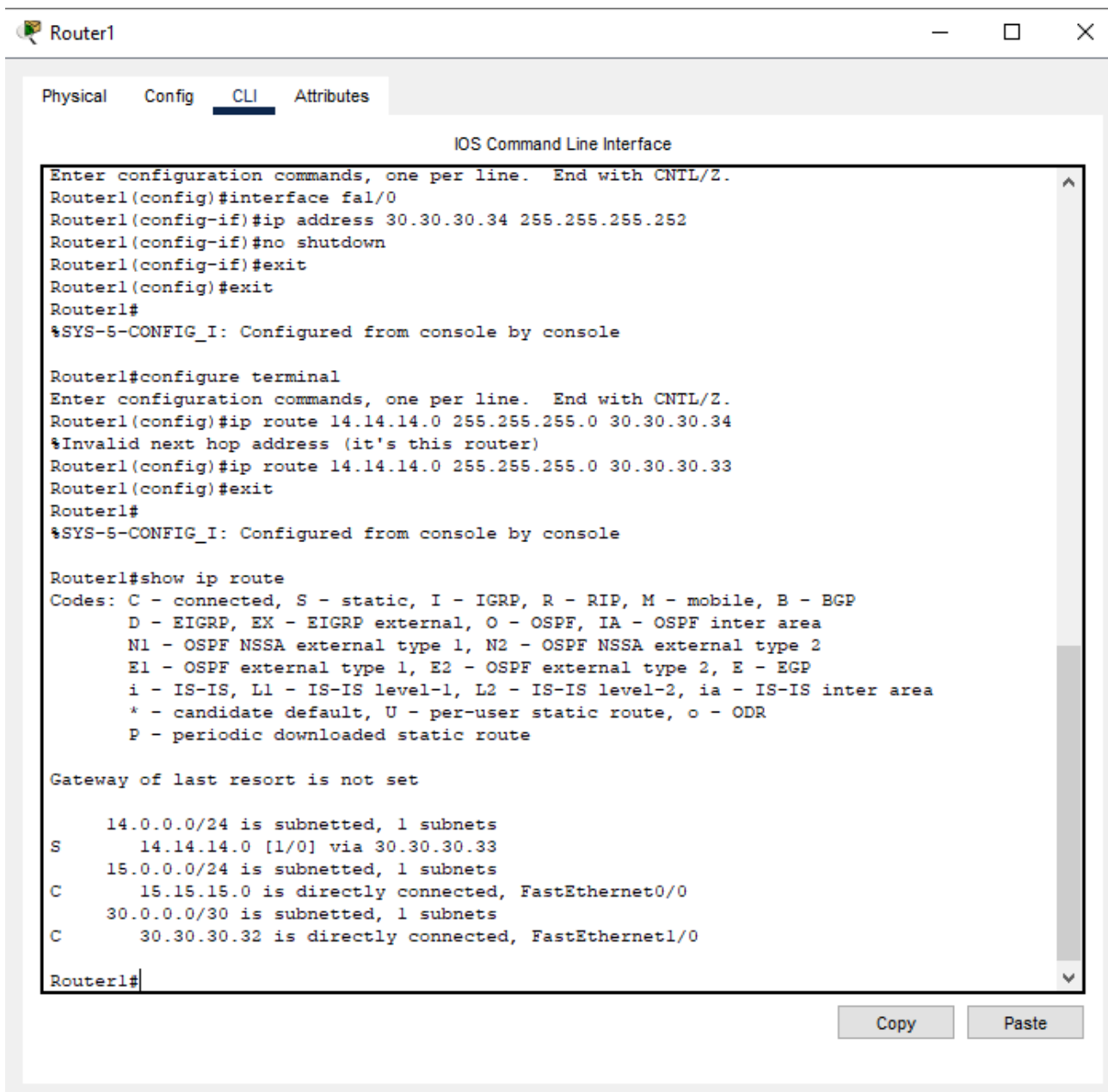
Testarea conectivității dintre PC0 și PC2:



După configurarea corectă a adresei statice, pachetele dintre PC2 și PC0 sunt transmise corect:



Tabelul de rutare pentru router1:



```
Router1
Physical Config CLI Attributes

IOS Command Line Interface

Enter configuration commands, one per line. End with CNTL/Z.
Router1(config)#interface fa1/0
Router1(config-if)#ip address 30.30.30.34 255.255.255.252
Router1(config-if)#no shutdown
Router1(config-if)#exit
Router1(config)#exit
Router1#
%SYS-5-CONFIG_I: Configured from console by console

Router1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router1(config)#ip route 14.14.14.0 255.255.255.0 30.30.30.34
%Invalid next hop address (it's this router)
Router1(config)#ip route 14.14.14.0 255.255.255.0 30.30.30.33
Router1(config)#exit
Router1#
%SYS-5-CONFIG_I: Configured from console by console

Router1#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

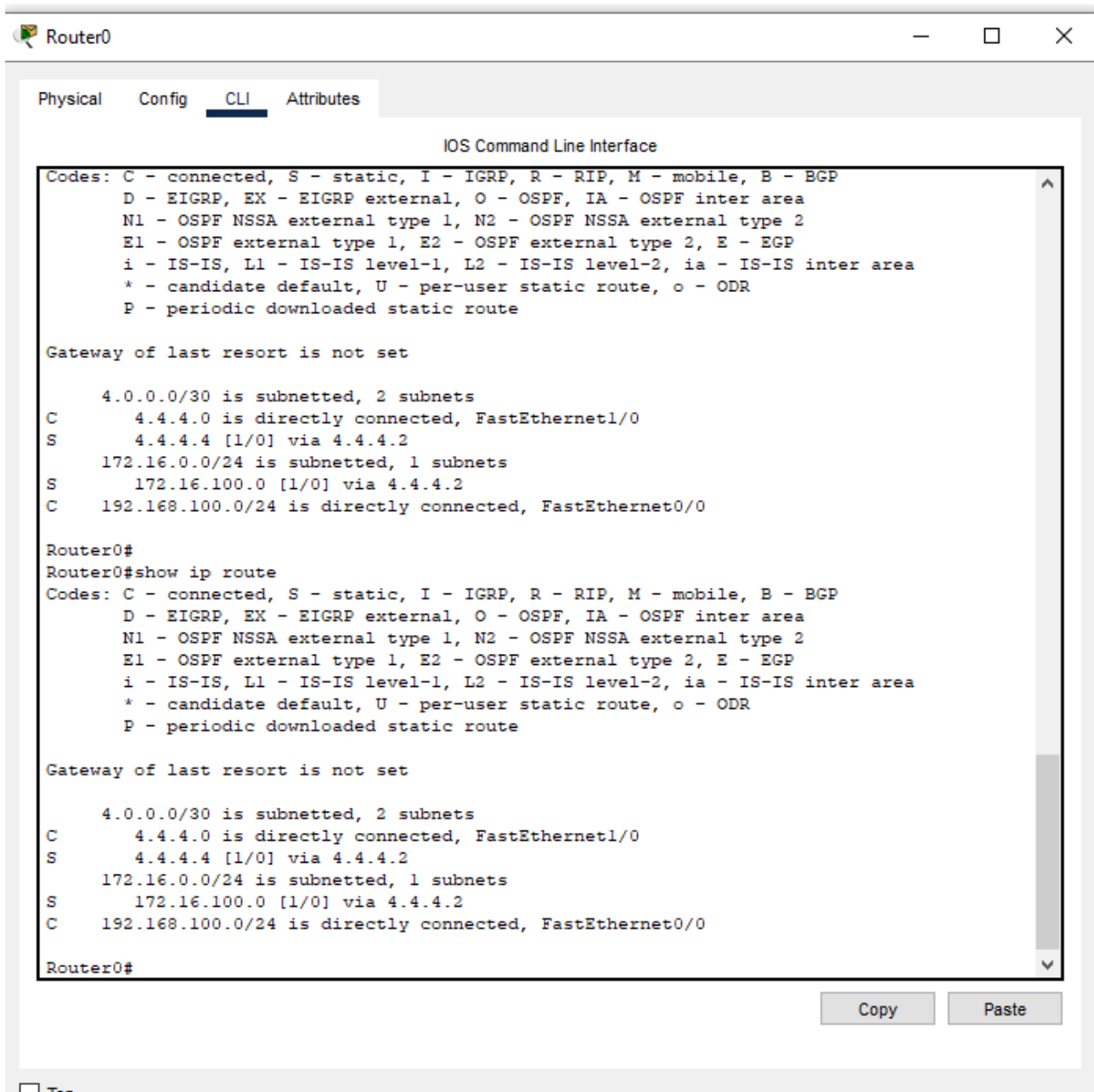
Gateway of last resort is not set

    14.0.0.0/24 is subnetted, 1 subnets
S       14.14.14.0 [1/0] via 30.30.30.33
    15.0.0.0/24 is subnetted, 1 subnets
C       15.15.15.0 is directly connected, FastEthernet0/0
    30.0.0.0/30 is subnetted, 1 subnets
C       30.30.30.32 is directly connected, FastEthernet1/0

Router1#
```

5. Adresare și configurare rute statice

Configurația pentru router0:



Configurația pentru router2:

IOS Command Line Interface

```
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

```
4.0.0.0/30 is subnetted, 2 subnets
C    4.4.4.0 is directly connected, FastEthernet0/0
C    4.4.4.4 is directly connected, FastEthernet1/0
172.16.0.0/24 is subnetted, 1 subnets
S    172.16.100.0 [1/0] via 4.4.4.6
S    192.168.100.0/24 [1/0] via 4.4.4.1
```

Router2#

Router2#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

```
4.0.0.0/30 is subnetted, 2 subnets
C    4.4.4.0 is directly connected, FastEthernet0/0
C    4.4.4.4 is directly connected, FastEthernet1/0
172.16.0.0/24 is subnetted, 1 subnets
S    172.16.100.0 [1/0] via 4.4.4.6
S    192.168.100.0/24 [1/0] via 4.4.4.1
```

Router2#

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Configurația pentru router1:

Router1

Physical Config CLI Attributes

IOS Command Line Interface

```
Router1#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

    4.0.0.0/30 is subnetted, 2 subnets
S       4.4.4.0 [1/0] via 4.4.4.5
C       4.4.4.4 is directly connected, FastEthernet0/0
    172.16.0.0/24 is subnetted, 1 subnets
C       172.16.100.0 is directly connected, FastEthernet1/0
S       192.168.100.0/24 [1/0] via 4.4.4.5

Router1#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

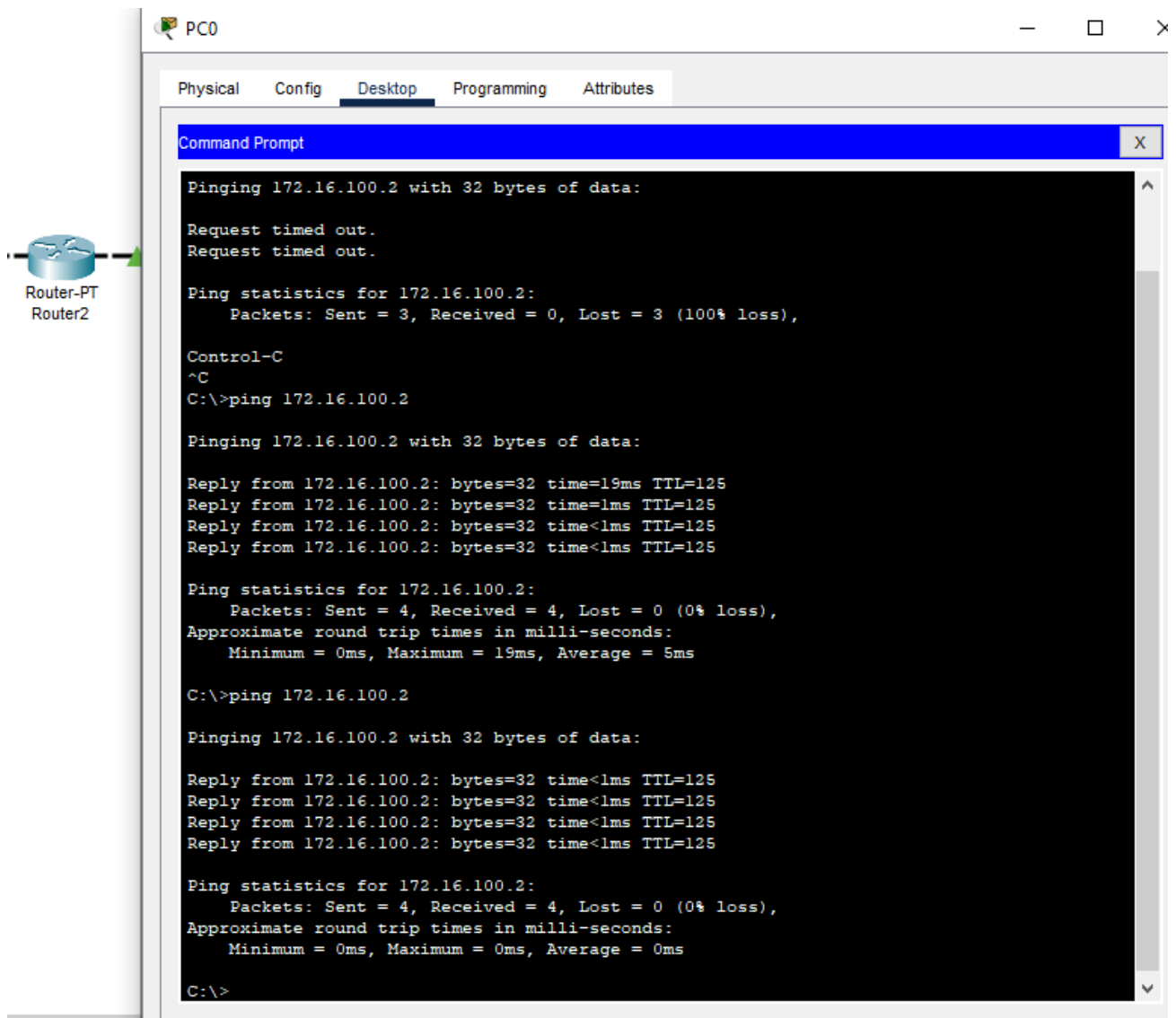
Gateway of last resort is not set

    4.0.0.0/30 is subnetted, 2 subnets
S       4.4.4.0 [1/0] via 4.4.4.5
C       4.4.4.4 is directly connected, FastEthernet0/0
    172.16.0.0/24 is subnetted, 1 subnets
C       172.16.100.0 is directly connected, FastEthernet1/0
S       192.168.100.0/24 [1/0] via 4.4.4.5

Router1#
```

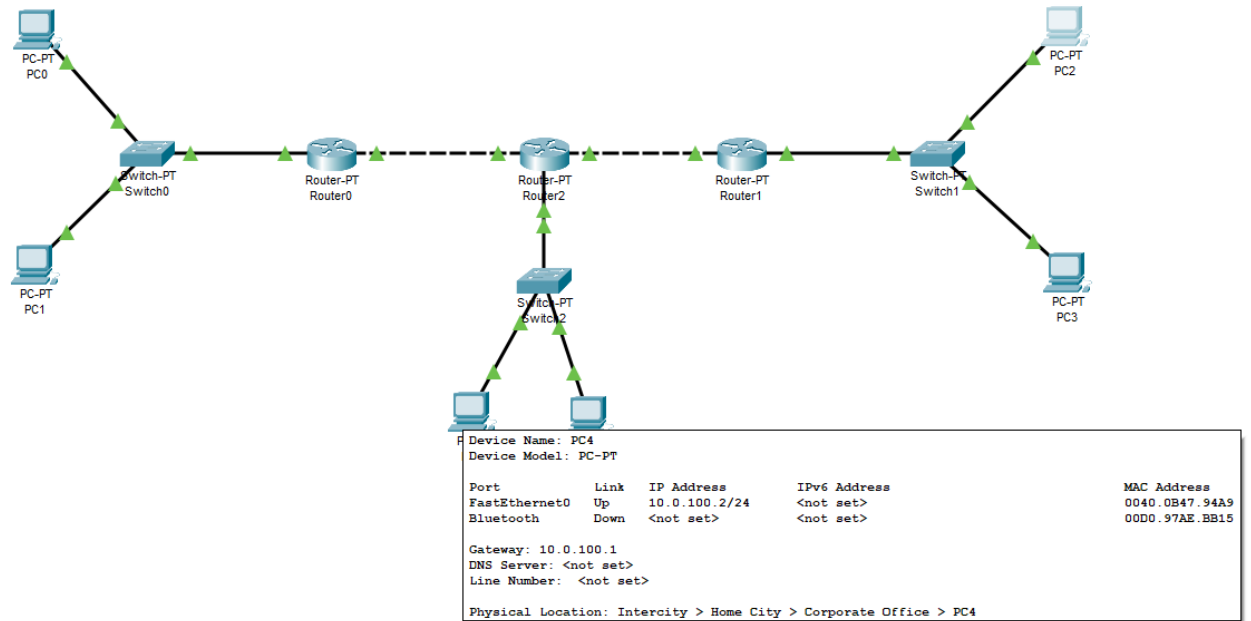
☐ Top

Pachetele între PC0 și PC2 sunt transmise corect:



6. Adresare și configurare rute statice (reiterare)

Am adăugat 2 stații și un switch

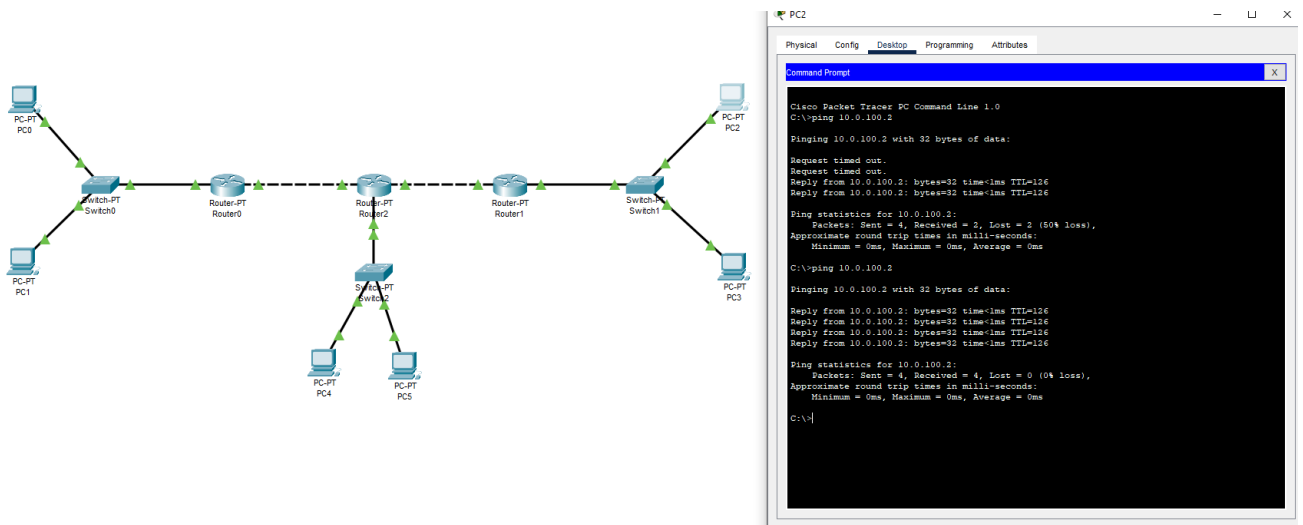


Apoi am configurat Router0 și Router1 astfel încât să ajungă la switch 2:

Pe Router0 (pentru a ajunge la 10.0.100.0/24 prin Router2 - IP 4.4.4.2)

Pe Router1 (pentru a ajunge la 10.0.100.0/24 prin Router2 - IP 4.4.4.5)

Testarea conectivității dintre PC2 și PC4:



7. Rute implicite pe rutere

Noua configurație a Router0:

```

Router0#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 4.4.4.2 to network 0.0.0.0

    4.0.0.0/30 is subnetted, 2 subnets
C       4.4.4.0 is directly connected, FastEthernet1/0
S       4.4.4.4 [1/0] via 4.4.4.2
C     192.168.100.0/24 is directly connected, FastEthernet0/0
S*    0.0.0.0/0 [1/0] via 4.4.4.2

Router0#

```

Router1:

```

Router1#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 4.4.4.5 to network 0.0.0.0

    4.0.0.0/30 is subnetted, 2 subnets
S       4.4.4.0 [1/0] via 4.4.4.5
C       4.4.4.4 is directly connected, FastEthernet0/0
       172.16.0.0/24 is subnetted, 1 subnets
C       172.16.100.0 is directly connected, FastEthernet1/0
S*    0.0.0.0/0 [1/0] via 4.4.4.5

Router1#

```

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Conexiunea dintre PC0 și PC4:

```
C:\>ping 10.0.100.2

Pinging 10.0.100.2 with 32 bytes of data:

Reply from 10.0.100.2: bytes=32 time<1ms TTL=126
Reply from 10.0.100.2: bytes=32 time<1ms TTL=126
Reply from 10.0.100.2: bytes=32 time<1ms TTL=126
Reply from 10.0.100.2: bytes=32 time<1ms TTL=126

Ping statistics for 10.0.100.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>|
```

Concluzii:

În urma exercițiilor efectuate, am dobândit abilități esențiale în configurarea rutelor statice, inclusiv rutele implicite (default route), ceea ce a permis simplificarea procesului de rutare și asigurarea conectivității între stațiile din diverse rețele. Prin analiza tabelelor de rutare și depanarea problemelor de conectivitate, am identificat erori comune, cum ar fi configurațiile incorecte ale rutelor sau ale interfețelor, și am învățat cum să le remediem.

De asemenea, am aprofundat utilizarea comenzilor de verificare a conectivității și monitorizare, precum ping, show ip route, și show ip interface brief, care au fost esențiale pentru a asigura o configurare corectă a rețelei.