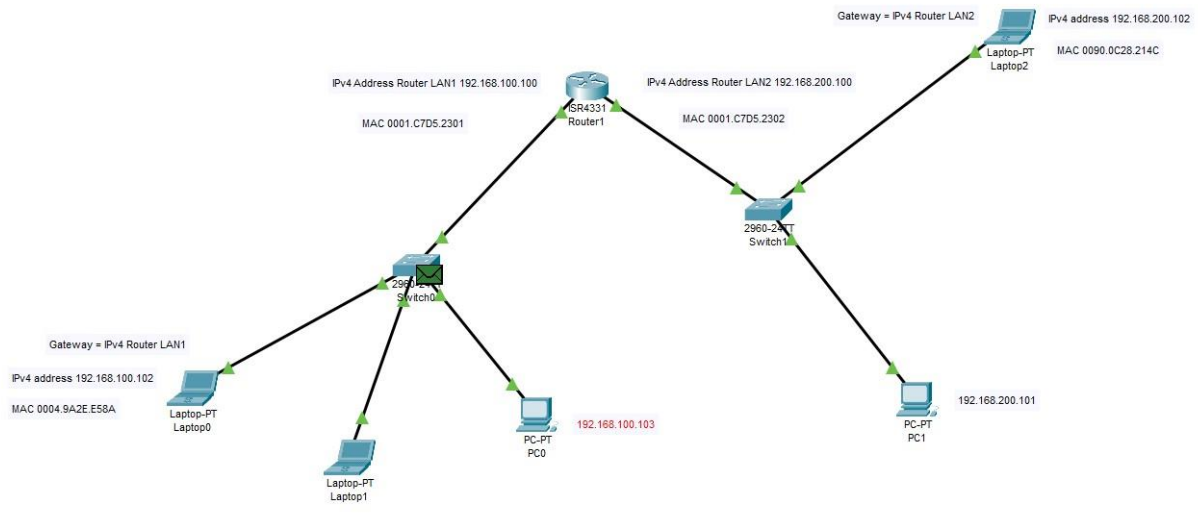
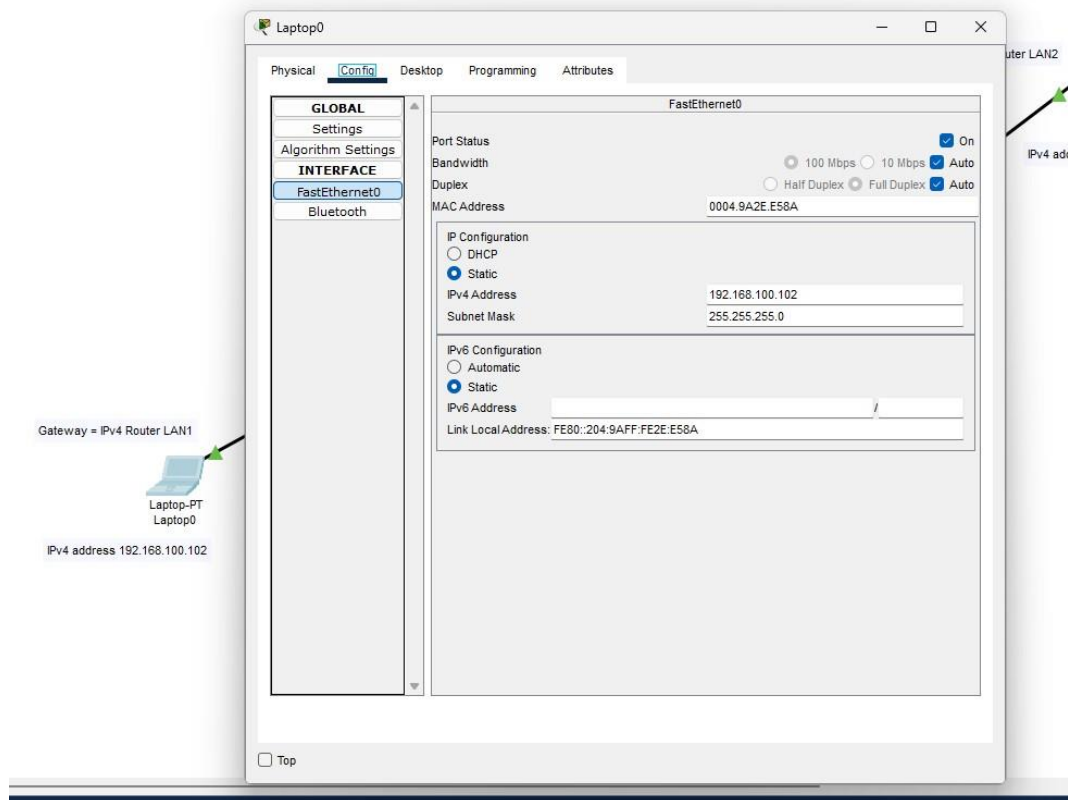


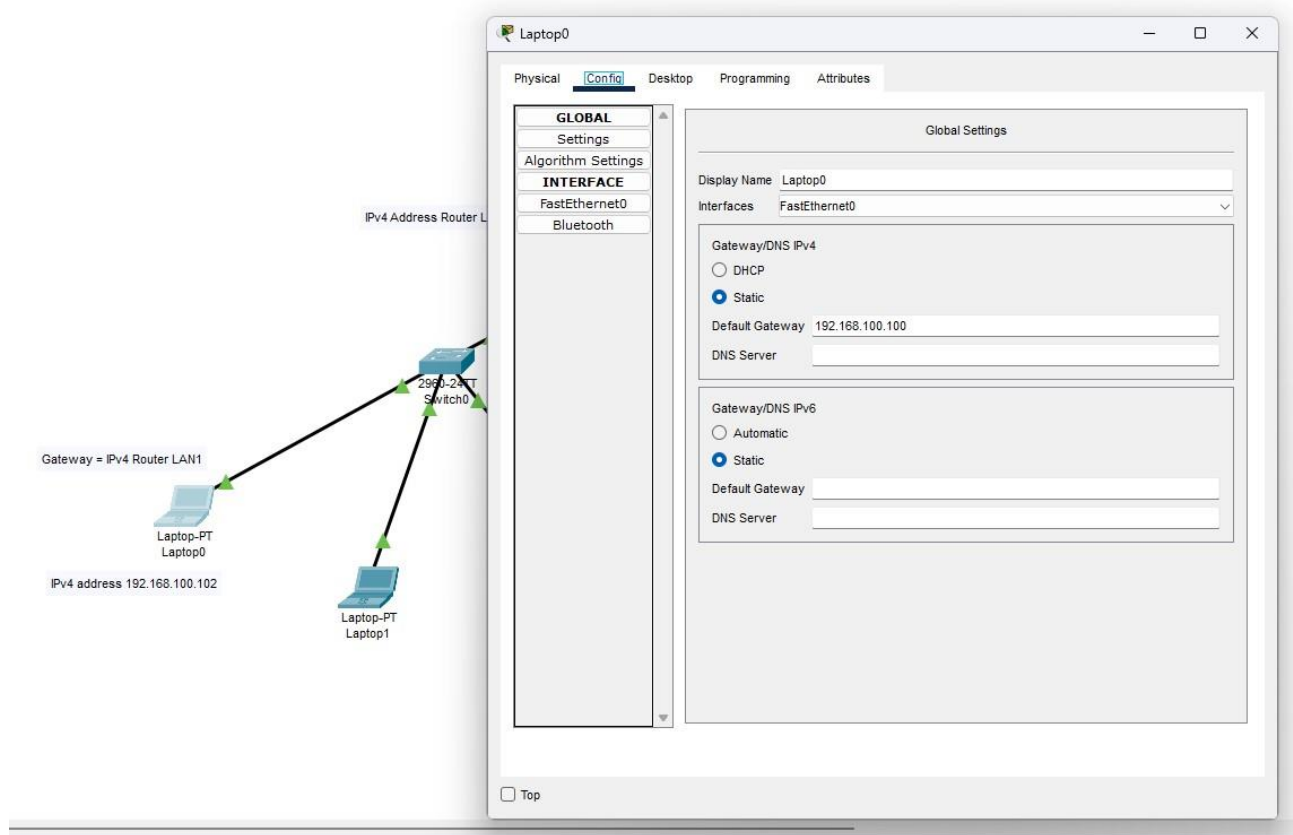
Configurazione iniziale di una rete di calcolatori



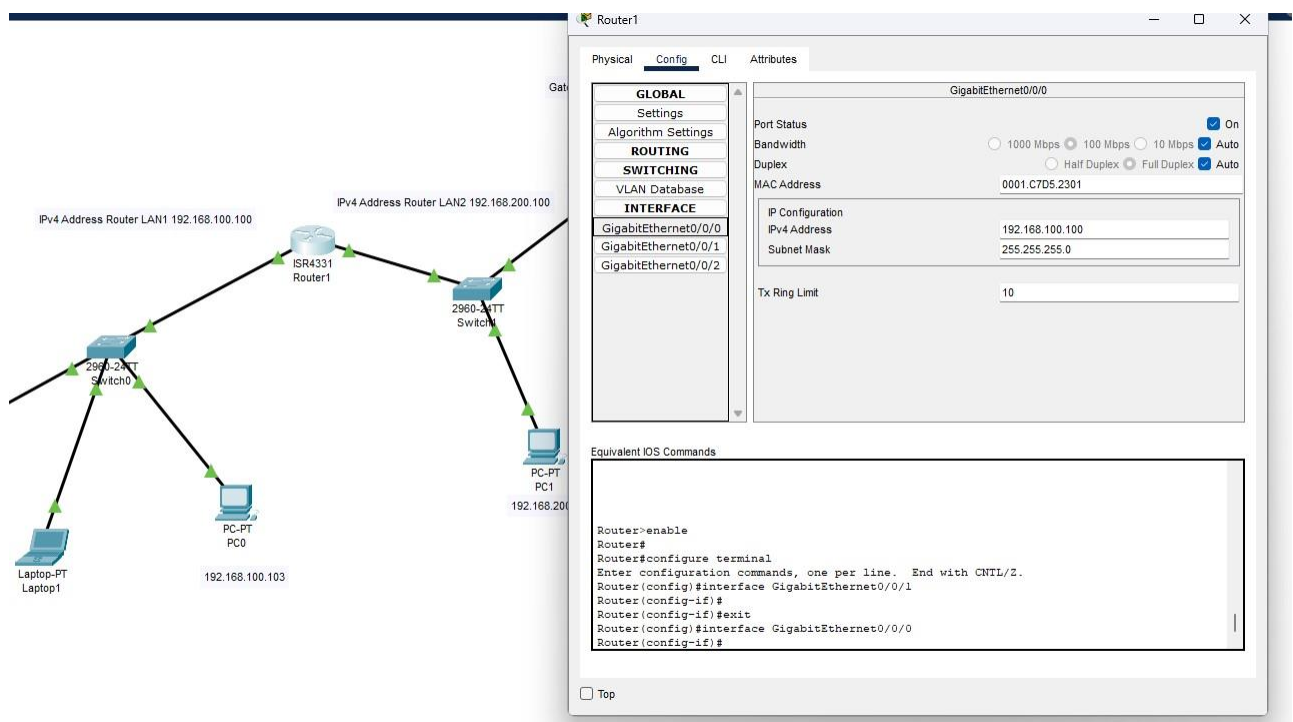
0.2 Configurazione IP Laptop0 FastEther. Sono andato a configurare la FastEther aggiungendo un IPv4 address, in questo caso 192.168.100.102. Il MAC Address è 0004.9A2E.E58A



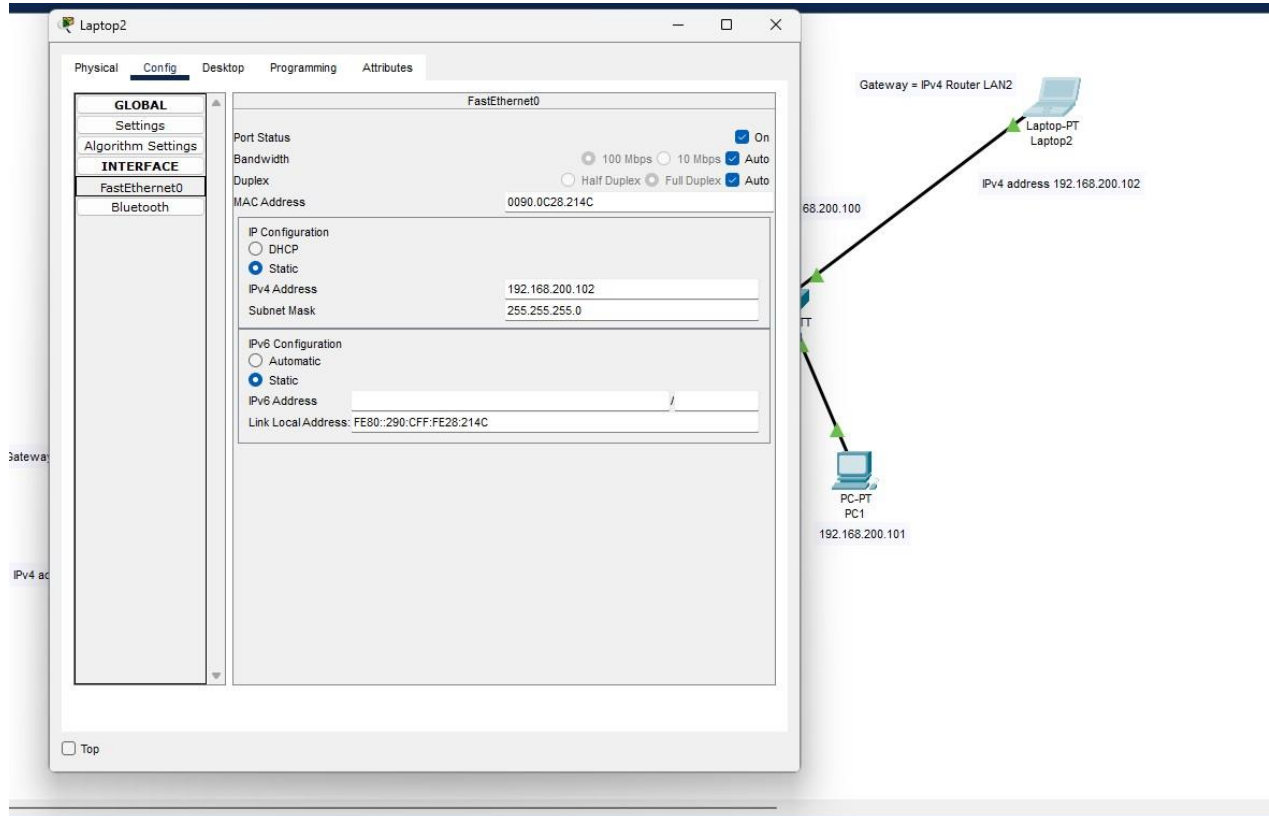
0.3 Configurazione Gateway Laptop0. Configurazione del gateway con indirizzo 192.168.100.100, in comunicazione con IPv4 Router GigaEther0



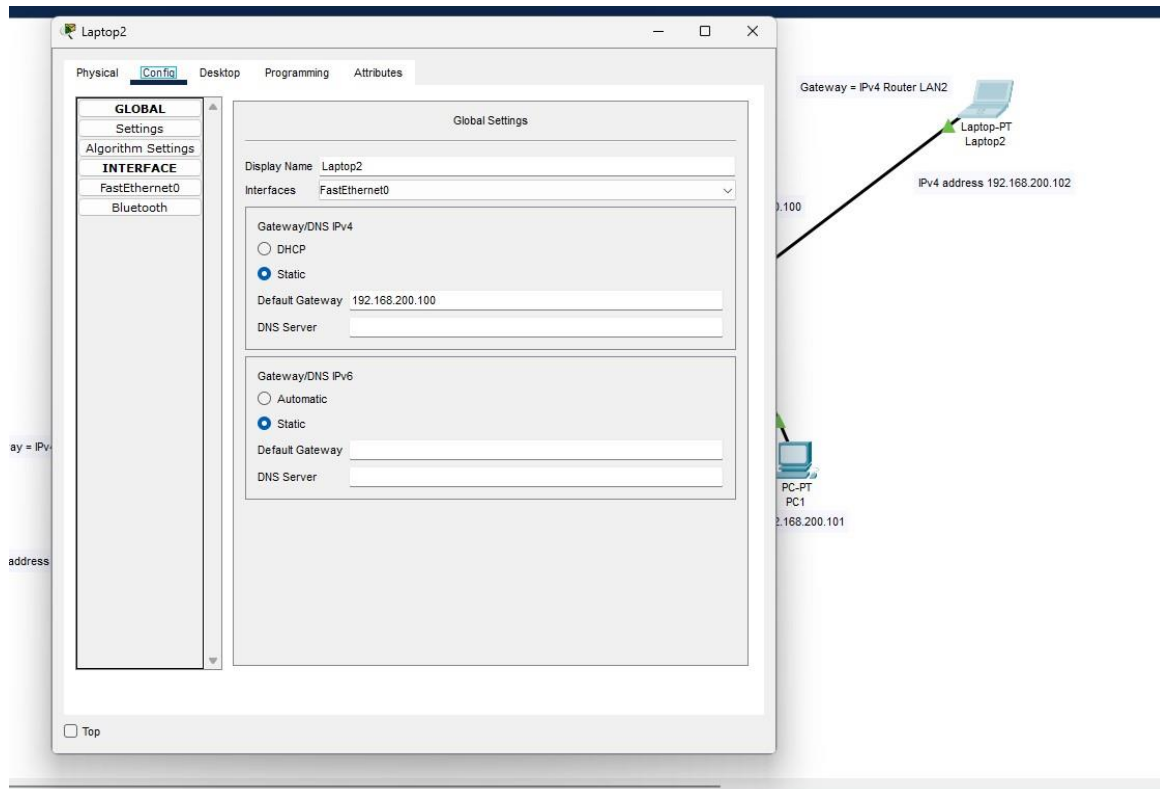
0.4 Configurazione IP Router GigaEther0. Sono andato a configurare la GigaEther0 aggiungendo un IPv4 address, in questo caso 192.168.100.100 come il Gateway Laptop0 e ad accendere il router



0.5 Configurazione IP Laptop2 FastEther. Sono andato a configurare la FastEther aggiungendo un IPv4 address, in questo caso 192.168.200.102. MAC address 0090.0C28.214C



0.6 Configurazione Gateway Laptop2. Configurazione del gateway con indirizzo 192.168.200.100, in comunicazione con IPv4 Router GigaEther1



0.7 Configurazione IP Router GigaEther1. Sono andato a configurare la GigaEther1 aggiungendo un IPv4 address, in questo caso 192.168.200.100 come il Gateway Laptop2 e ad accendere il router

The screenshot displays the configuration of Router1 in Cisco Packet Tracer. The 'Config' tab is active, showing the configuration for the GigabitEthernet0/0/1 interface. The IP Address is set to 192.168.200.100 and the Subnet Mask is 255.255.255.0. The interface is enabled, and the status is 'On'. The Tx Ring Limit is set to 10.

Below the configuration, the 'Equivalent IOS Commands' are listed:

```

Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/1
Router(config-if)#
  
```

The network diagram on the right shows the topology. Router1 (ISR4331) is connected to a 2960-LTT Switch. The switch is connected to Laptop2 (PT) and PC1 (PT). The IP address for Router1 LAN2 is 192.168.200.100, and the IP address for Laptop2 is 192.168.200.102.

0.8 Ping Laptop0 to PC0 and Laptop2

The screenshot shows the network diagram in Cisco Packet Tracer. The topology includes Router1 (ISR4331), a 2960-LTT Switch, and several devices: Laptop0 (PT), Laptop1 (PT), Laptop2 (PT), PC0 (PT), and PC1 (PT). The IP addresses are: Laptop0 (192.168.100.102), Laptop1 (192.168.100.103), Laptop2 (192.168.200.102), PC0 (192.168.100.103), and PC1 (192.168.200.101).

The terminal window for Laptop0 shows the results of a ping command:

```

C:\>ping 192.168.200.102
Pinging 192.168.200.102 with 32 bytes of data:
Reply from 192.168.200.102: bytes=32 time=1ms TTL=127
Reply from 192.168.200.102: bytes=32 time=1ms TTL=127
Reply from 192.168.200.102: bytes=32 time=1ms TTL=127
Reply from 192.168.200.102: bytes=32 time=1ms TTL=127
Ping statistics for 192.168.200.102:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>ping 192.168.100.103
Pinging 192.168.100.103 with 32 bytes of data:
Reply from 192.168.100.103: bytes=32 time=1ms TTL=128
Reply from 192.168.100.103: bytes=32 time=1ms TTL=128
Reply from 192.168.100.103: bytes=32 time=1ms TTL=128
Reply from 192.168.100.103: bytes=32 time=1ms TTL=128
Ping statistics for 192.168.100.103:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>
  
```

PING. Sono andato a far pingare il Laptop0 prima con il PC0, stessa rete, indirizzo 192.168.100.103 e poi con il Laptop2, altra rete, indirizzo 192.168.200.102

```
C:\>ping 192.168.200.102

Pinging 192.168.200.102 with 32 bytes of data:

Reply from 192.168.200.102: bytes=32 time<1ms TTL=127
Reply from 192.168.200.102: bytes=32 time=12ms TTL=127
Reply from 192.168.200.102: bytes=32 time=1ms TTL=127
Reply from 192.168.200.102: bytes=32 time=10ms TTL=127

Ping statistics for 192.168.200.102:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 12ms, Average = 5ms

C:\>ping 192.168.100.103

Pinging 192.168.100.103 with 32 bytes of data:

Reply from 192.168.100.103: bytes=32 time=13ms TTL=128
Reply from 192.168.100.103: bytes=32 time<1ms TTL=128
Reply from 192.168.100.103: bytes=32 time=1ms TTL=128
Reply from 192.168.100.103: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.100.103:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 13ms, Average = 3ms

C:\>
```

Mittente Laptop0 to Router. A livello 2 è cambiato il MAC address. Una volta che il frame è partito dal mittente con MAC 0004.9A2E.E58A passando per il Router è cambiato in MAC 0001.C7D5.2301. Quando un pacchetto attraversa un router o uno switch l'indirizzo MAC del mittente viene cambiato con quello dell'interfaccia del router dalla quale esce il pacchetto.

Laptop-PTMAC 0090.0C28.214C

PDU Information at Device: Laptop0

OSI ModelOutbound PDU Details

At Device: Laptop0
Source: Laptop0
Destination: 192.168.200.102

In Layers

Layer7
Layer6
Layer5
Layer4

Layer3

Layer2
Layer1

Out Layers

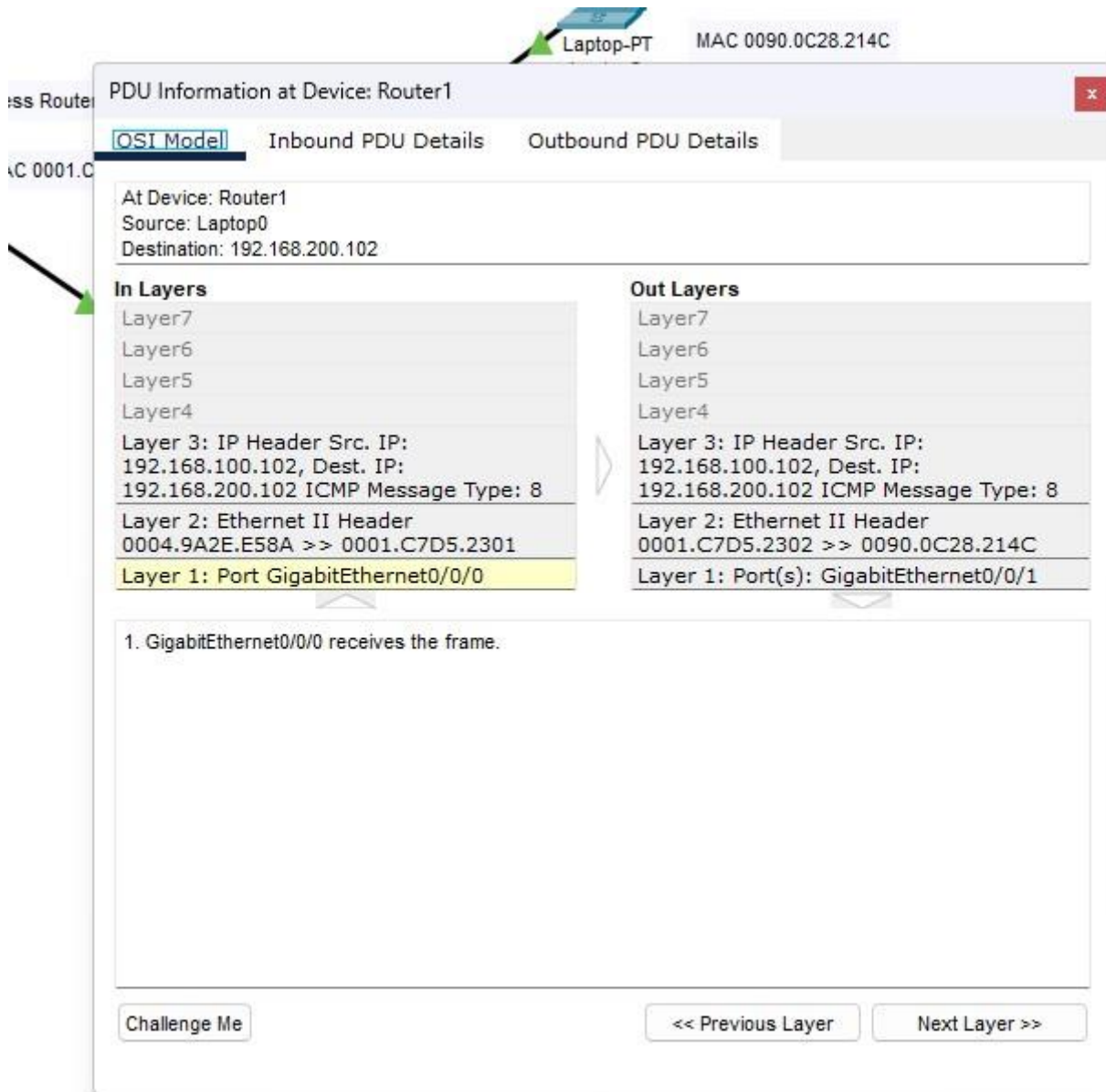
Layer7
Layer6
Layer5
Layer4
Layer 3: IP Header Src. IP:
192.168.100.102, Dest. IP:
192.168.200.102 ICMP Message Type: 8
Layer 2: Ethernet II Header
0004.9A2E.E58A >> 0001.C7D5.2301
Layer 1: Port(s): FastEthernet0

1. The Ping process starts the next ping request.
2. The Ping process creates an ICMP Echo Request message and sends it to the lower process.
3. The source IP address is not specified. The device sets it to the port's IP address.
4. The destination IP address 192.168.200.102 is not in the same subnet and is not the broadcast address.
5. The default gateway is set. The device sets the next-hop to default gateway.

Challenge Me

<< Previous LayerNext Layer >>

Router. Cambio MAC tra le LAN. Quando un frame raggiunge il router l'indirizzo MAC destinazione viene sostituito con il MAC del destinatario. In questo caso da MAC 0001.C7D5.2302 diventa MAC 0090.0C28.214C (Laptop2)



In conclusione, gli indirizzi MAC subiscono modifiche quando attraversano LAN o dispositivi di interconnessione come Router man mano che il pacchetto si muove dal mittente al destinatario.