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TP3

NETWORKS

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PART1:

1) Checking The Connectivity:

```
C:\>ping 10.10.10.3

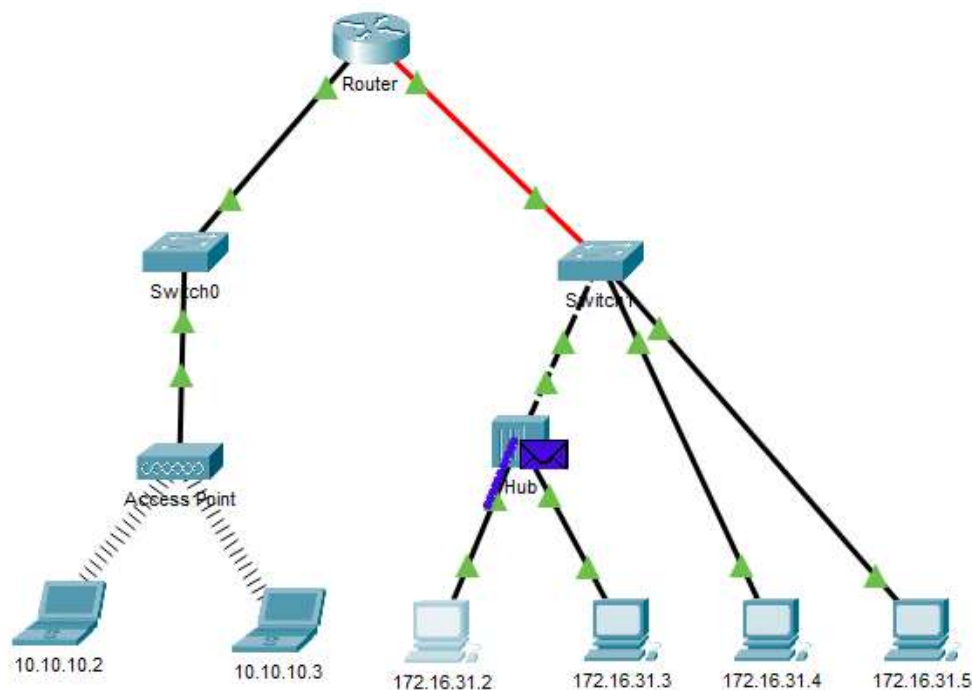
Pinging 10.10.10.3 with 32 bytes of data:

Request timed out.
Reply from 10.10.10.3: bytes=32 time=12ms TTL=127
Reply from 10.10.10.3: bytes=32 time=38ms TTL=127
Reply from 10.10.10.3: bytes=32 time=21ms TTL=127

Ping statistics for 10.10.10.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 12ms, Maximum = 38ms, Average = 23ms
```

2) repeating the same ping in simulation mode and examining the addresses:

Test	At Device	Dest. MAC	Src MAC	Src IPv4	Dest IPv4
Ping from 172.16.31.2 to 10.10.10.3	172.16.31.2	00D0:BA8E:741A	000C:85CC:1DA7	172.16.31.2	10.10.10.3
	Hub	--	--	--	--
	Switch1	00D0:BA8E:741A	000C:85CC:1DA7	--	--
	Router	0060:4706:572B	00D0:588C:2401	172.16.31.2	10.10.10.3
	Switch0	0060:4706:572B	00D0:588C:2401	--	--
	Access Point	--	--	--	--
	10.10.10.3	0060:4706:572B	00D0:588C:2401	172.16.31.2	10.10.10.3



At Device: 172.16.31.2
Source: 172.16.31.2
Destination: 10.10.10.3

In Layers

Layer7
Layer6
Layer5
Layer4

Layer3

Layer2

Out Layers

Layer7
Layer6
Layer5
Layer4

Layer 3: IP Header Src. IP: 172.16.31.2,
Dest. IP: 10.10.10.3 ICMP Message Type: 8

Layer 2: Ethernet II Header 000C.85CC.
1DA7 >> 00D0.BA8E.741A

At Device: Hub
Source: 172.16.31.2
Destination: 10.10.10.3

In Layers

Layer7
Layer6
Layer5
Layer4
Layer3
Layer2

Layer 1: Port FastEthernet1

Out Layers

Layer7
Layer6
Layer5
Layer4
Layer3
Layer2

Layer 1: Port(s): FastEthernet0
FastEthernet2

At Device: Switch1
Source: 172.16.31.2
Destination: 10.10.10.3

In Layers

Layer7
Layer6
Layer5
Layer4
Layer3
Layer 2: Ethernet II Header 000C.85CC. 1DA7 >> 00D0.BA8E.741A
Layer 1: Port GigabitEthernet3/1

Out Layers

Layer7
Layer6
Layer5
Layer4
Layer3
Layer 2: Ethernet II Header 000C.85CC. 1DA7 >> 00D0.BA8E.741A
Layer 1: Port(s): FastEthernet0/1

At Device: Router
Source: 172.16.31.2
Destination: 10.10.10.3

In Layers

Layer7
Layer6
Layer5
Layer4
Layer 3: IP Header Src. IP: 172.16.31.2, Dest. IP: 10.10.10.3 ICMP Message Type: 8
Layer 2: Ethernet II Header 000C.85CC. 1DA7 >> 00D0.BA8E.741A
Layer 1: Port FastEthernet1/0

Out Layers

Layer7
Layer6
Layer5
Layer4
Layer 3: IP Header Src. IP: 172.16.31.2, Dest. IP: 10.10.10.3 ICMP Message Type: 8
Layer 2: Ethernet II Header 00D0.588C. 2401 >> 0060.4706.572B
Layer 1: Port(s): FastEthernet0/0

At Device: Switch0
Source: 172.16.31.2
Destination: 10.10.10.3

In Layers

Layer7
Layer6
Layer5
Layer4
Layer3
Layer 2: Ethernet II Header 00D0.588C. 2401 >> 0060.4706.572B
Layer 1: Port FastEthernet0/1

Out Layers

Layer7
Layer6
Layer5
Layer4
Layer3
Layer 2: Ethernet II Header 00D0.588C. 2401 >> 0060.4706.572B
Layer 1: Port(s): FastEthernet0/2

At Device: Access Point
 Source: 172.16.31.2
 Destination: 10.10.10.3

In Layers

Layer7
Layer6
Layer5
Layer4
Layer3
Layer2
Layer 1: Port Port 0

Out Layers

Layer7
Layer6
Layer5
Layer4
Layer3
Layer2
Layer 1: Port(s): Port 1

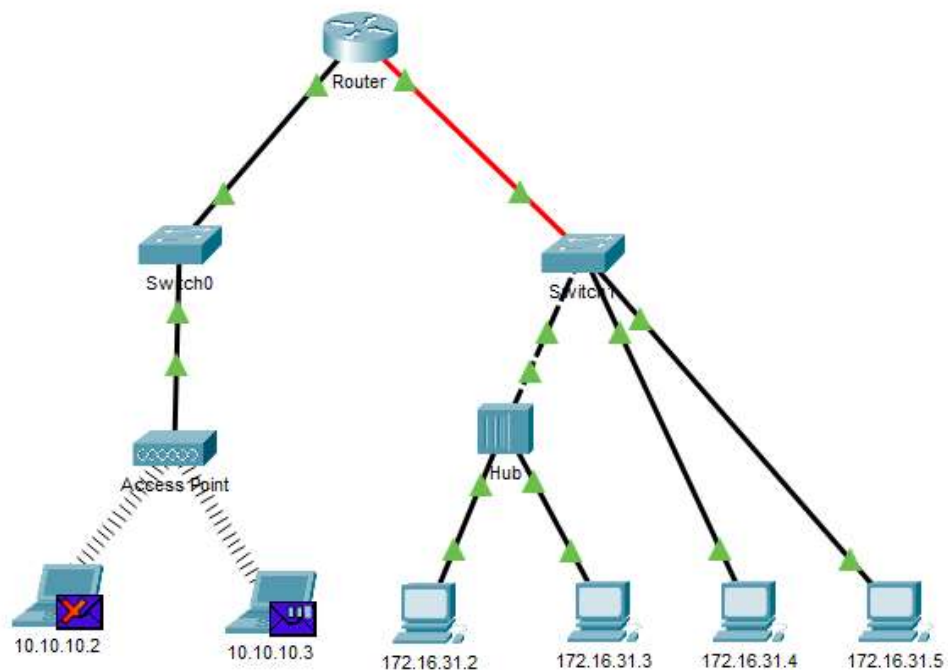
At Device: 10.10.10.3
 Source: 172.16.31.2
 Destination: 10.10.10.3

In Layers

Layer7
Layer6
Layer5
Layer4
Layer 3: IP Header Src. IP: 172.16.31.2, Dest. IP: 10.10.10.3 ICMP Message Type: 8
Layer 2: Wireless
Layer 1: Port Wireless0

Out Layers

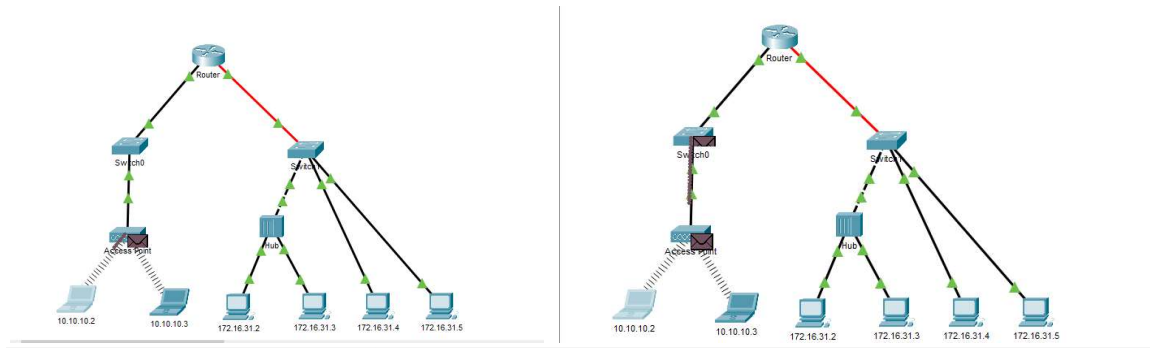
Layer7
Layer6
Layer5
Layer4
Layer 3: IP Header Src. IP: 10.10.10.3, Dest. IP: 172.16.31.2 ICMP Message Type: 0
Layer 2: Wireless
Layer 1: Port(s):



We can see that the d source and destination mac addresses are the same as the addresses in the table .

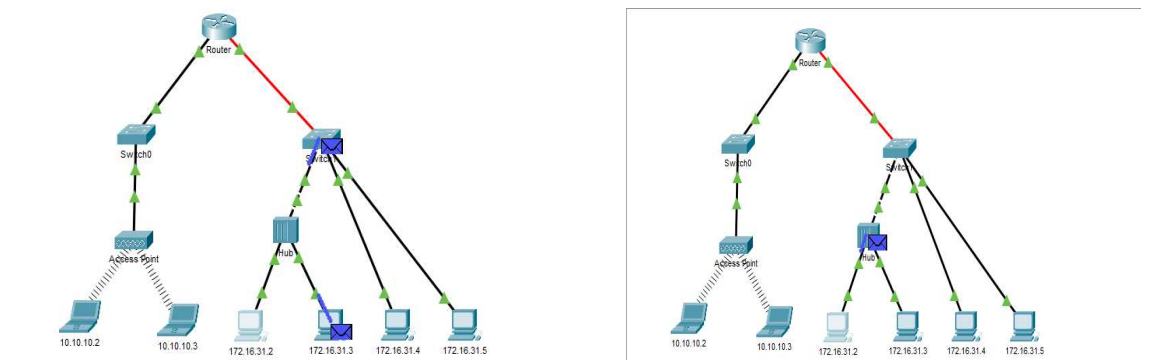
Pinging from different devices in the network interpreting the destinations of packets and the mac address changes:

Pinging from 10.10.10.2 to 10.10.10.3 :



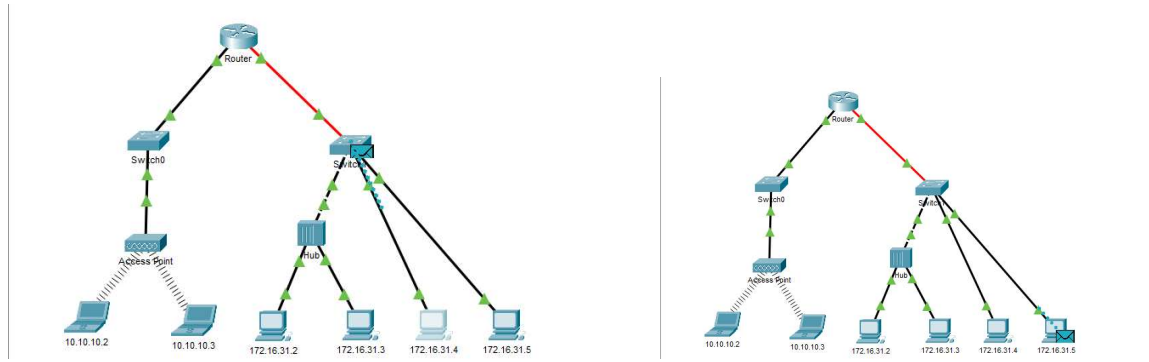
Laptop 10.10.10.2 , Laptop 10.10.10.3 , switch 0 , access point

Pinging from 172.16.31.2 to 172.16.31.3 :



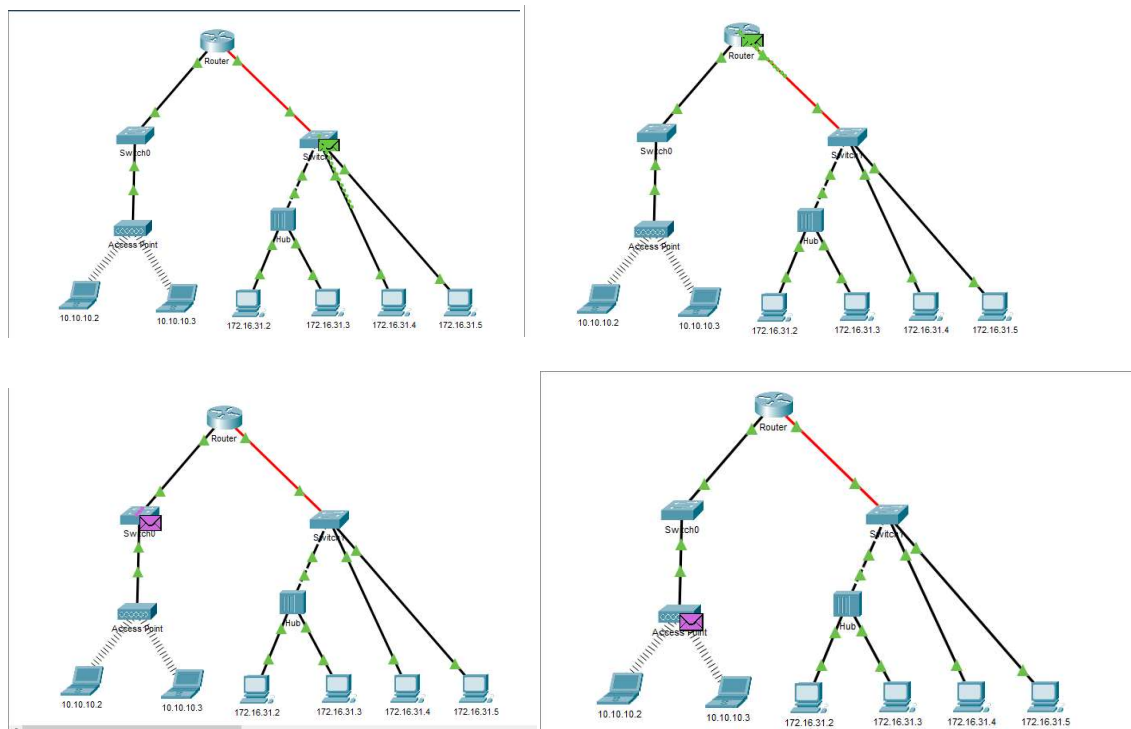
PC 172.16.31.2 , PC 172.16.31.3 , hub , switch 1

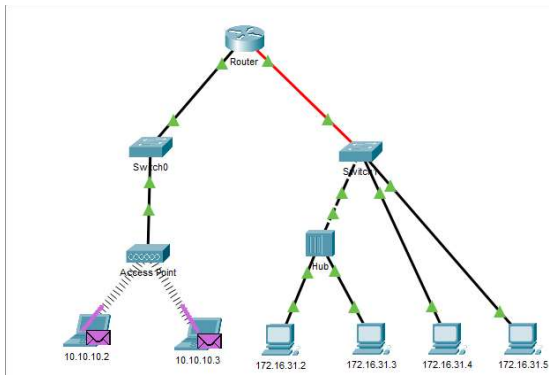
Pinging from 172.16.31.4 to 172. 16.31.5 :



PC 172.16.31.4 , PC 172.16.31.5 , switch 1

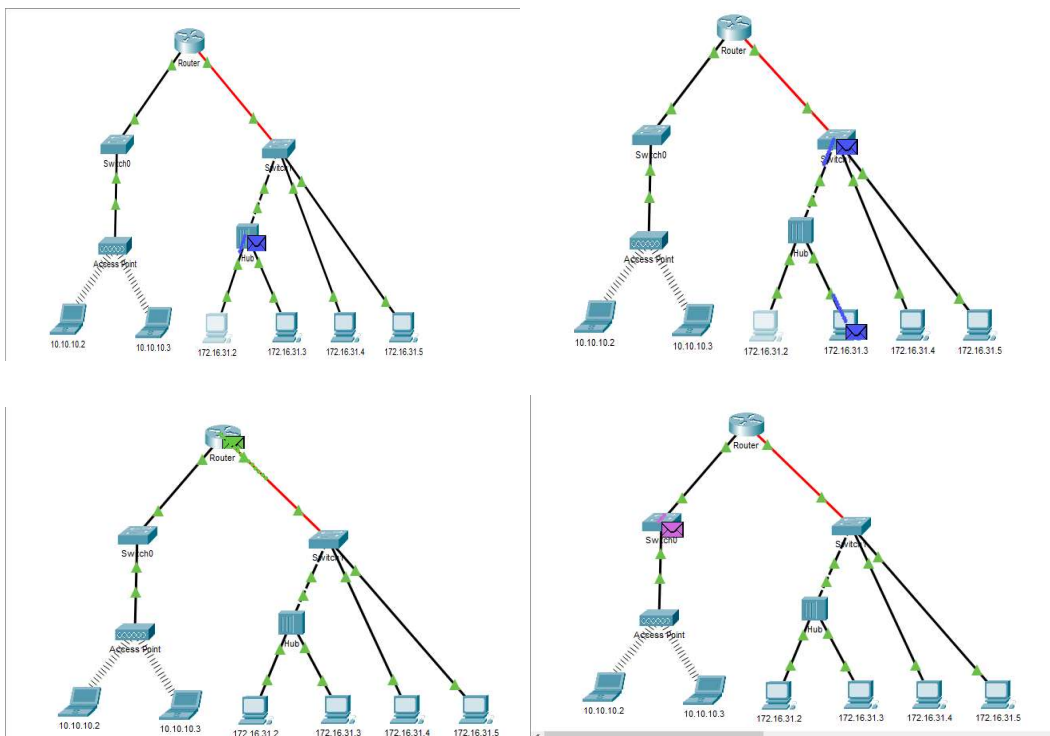
Pinging from 172.16.31.4 to 10.10.10.2 :

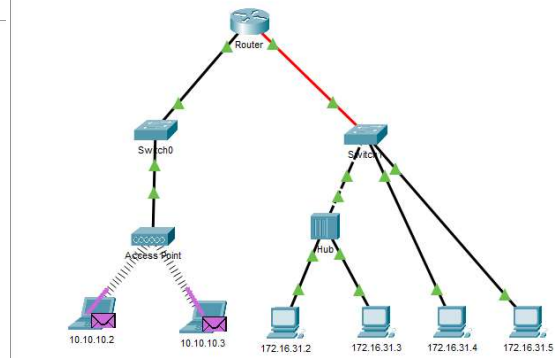
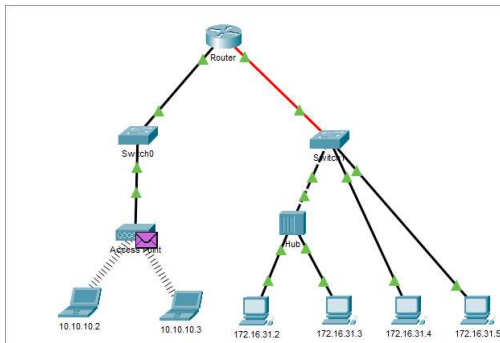




PC 172.16.31.4 , switch 1 , router , switch 0 , access point, Laptop 10.10.10.2 , Laptop 10.10.10.3

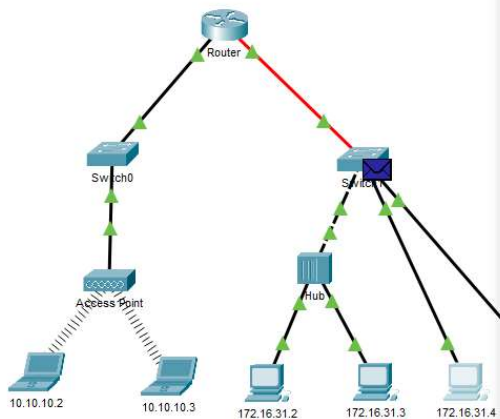
Pinging from 172.16.31.3 to 10.10.10.2 :



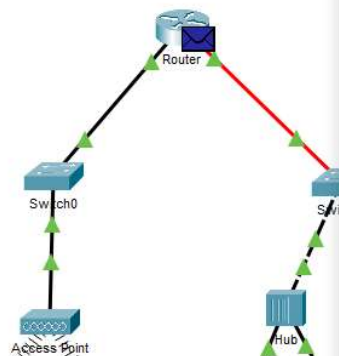


PC 172.16.31.3 , PC 172.16.31.2 , switch 1 , router , switch 0 ,
access point, Laptop 10.10.10.2 , Laptop 10.10.10.3

THE MAC ADDRESS CHANGES WHEN THE PACKETS REACH THE ROUTER

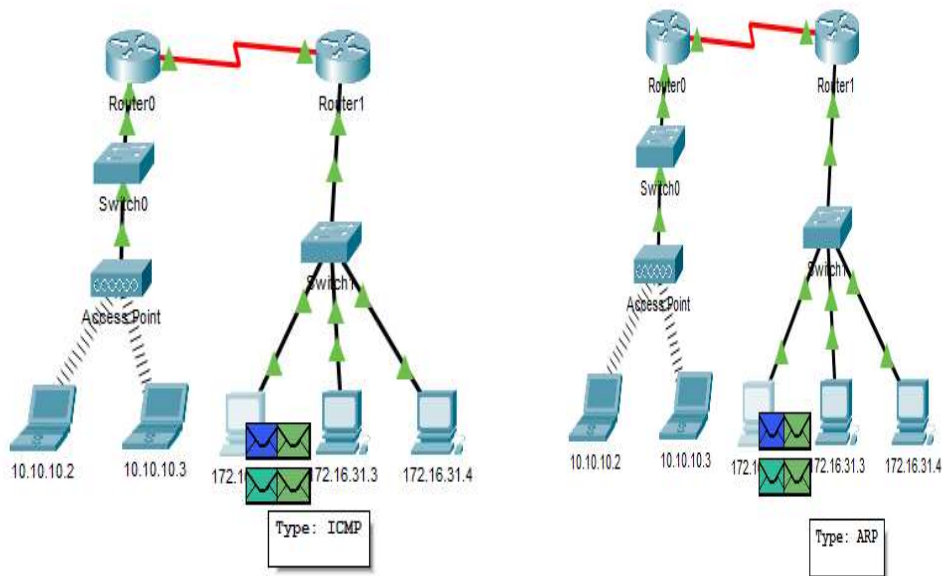


At Device: Switch1 Source: 172.16.31.4 Destination: 10.10.10.2	
In Layers	Out Layers
Layer7	Layer7
Layer6	Layer6
Layer5	Layer5
Layer4	Layer4
Layer3	Layer3
Layer 2: Ethernet II Header 000C.CF0B.BC80 >> 00D0.BA8E.741A	Layer 2: Ethernet II Header 000C.CF0B.BC80 >> 00D0.BA8E.741A
Layer 1: Port GigabitEthernet2/1	Layer 1: Port(s): FastEthernet0/1
1. The frame source MAC address was found in the MAC table of Switch. 2. This is a unicast frame. Switch looks in its MAC table for the destination MAC address.	



Source: 172.16.31.4 Destination: 10.10.10.2	
In Layers	Out Layers
Layer7	Layer7
Layer6	Layer6
Layer5	Layer5
Layer4	Layer4
Layer 3: IP Header Src. IP: 172.16.31.4, Dest. IP: 10.10.10.2 ICMP Message Type: 8	Layer 3: IP Header Src. IP: 172.16.31.4, Dest. IP: 10.10.10.2 ICMP Message Type: 8
Layer 2: Ethernet II Header 000C.CF0B.BC80 >> 00D0.BA8E.741A	Layer 2: Ethernet II Header 00D0.588C. 2401 >> 0060.2F84.4AB6
Layer 1: Port FastEthernet1/0	Layer 1: Port(s): FastEthernet0/0
1. FastEthernet1/0 receives the frame.	

PART2:



Examining the destination mac address when the arp packet passes through switch 1:

The screenshot shows a network simulation interface. On the left, a network diagram is visible. The main panel displays packet details for an ARP request. The source IP is 172.16.31.2 and the destination is Broadcast. The packet is captured on FastEthernet0/1 of Switch1. The destination MAC address is 000C.85CC.1DA7.

Source: 172.16.31.2
Destination: Broadcast

In Layers:

- Layer7
- Layer6
- Layer5
- Layer4
- Layer3
- Layer2: Ethernet II Header 000C.85CC.1DA7 >> FFFF.FFFF.FFFF ARP Packet Src. IP: 172.16.31.2, Dest. IP: 172.16.31.3
- Layer 1: Port FastEthernet0/1

Out Layers:

- Layer7
- Layer6
- Layer5
- Layer4
- Layer3
- Layer2: Ethernet II Header 000C.85CC.1DA7 >> FFFF.FFFF.FFFF ARP Packet Src. IP: 172.16.31.2, Dest. IP: 172.16.31.3
- Layer 1: Port(s): FastEthernet0/2, FastEthernet0/3, GigabitEthernet0/1

Event List:

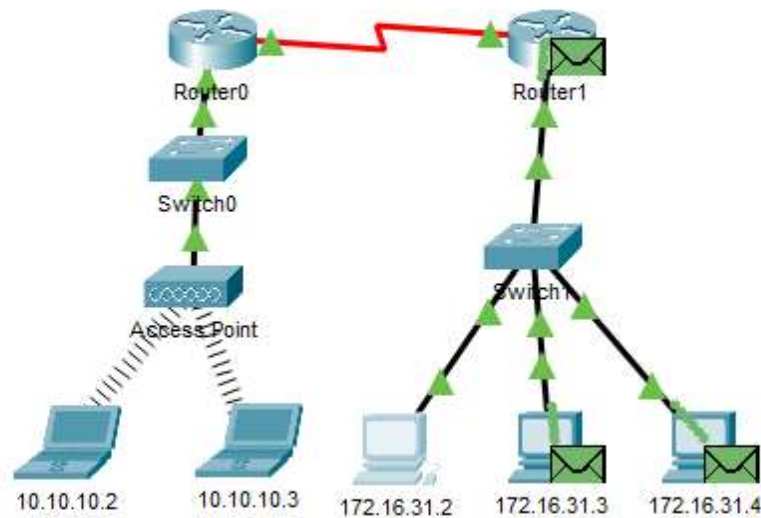
Vis.	Time(sec)	Last Device
	0.000	--
	0.000	--
	0.000	--
	0.000	--
	0.001	172.16.31.2

Play Controls: [Reset Simulation] [Constant Delay] [Captured to: 0.001 s]

Event List Filters - Visible Events: ARP, BGP, CDP, DHCP, DHCPv6, DNS, DTP, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, LACP, NDP, NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPv2, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP

Simulation Panel: [Event List] [Realtime] [Simulation]

AFTER CLICKING CAPTURE FORWARD ONCE AGAIN



THE SWITCH 1 SENDS 3 COPIES .

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PDU Information at Device: 172.16.31.3

OSI Model Inbound PDU Details Outbound PDU Details

At Device: 172.16.31.3
Source: 172.16.31.2
Destination: Broadcast

In Layers	Out Layers
Layer7	Layer7
Layer6	Layer6
Layer5	Layer5
Layer4	Layer4
Layer3	Layer3

Layer 2: Ethernet II Header 000C.85CC.1DA7 >> FFFF.FFFF.FFFF ARP Packet Src. IP: 172.16.31.2, Dest. IP: 172.16.31.3

Layer 2: Ethernet II Header 0060.7036.2849 >> 000C.85CC.1DA7 ARP Packet Src. IP: 172.16.31.3, Dest. IP: 172.16.31.2

Layer 1: Port FastEthernet0

Layer 1: Port(s): FastEthernet0

1. FastEthernet0 receives the frame.

PC 172.16.31.3 ACCEPTS THE PACKET

Running the “show mac-address-table Command”:

```
Switch#show mac-address-table
      Mac Address Table
-----
Vlan    Mac Address      Type      Ports
----    -
1       0002.1640.8d75    DYNAMIC   Fa0/3
1       000c.85cc.1da7    DYNAMIC   Fa0/1
1       0060.7036.2849    DYNAMIC   Fa0/2
1       00e0.f7b1.8901    DYNAMIC   Gig0/1
```

VLAN : Indicates which vlan does the mac address belongs to

Mac Address : mac addresses that the switch is connected to

TYPE: how did the switch learn the address

PORTS : the ports that the mac address device is connected to in the switch

Pinging from PC 172.16.31.2 to 10.10.10.1 and examining the destination mac addresswhen the ping is completed:

Before completing the ping

PDU Information at Device: 172.16.31.2



[OSI Model](#)

Outbound PDU Details

At Device: 172.16.31.2
Source: 172.16.31.2
Destination: 10.10.10.1

In Layers

Layer7
Layer6
Layer5
Layer4
Layer3
Layer2
Layer1

Out Layers

Layer7
Layer6
Layer5
Layer4
Layer 3: IP Header Src. IP: 172.16.31.2, Dest. IP: 10.10.10.1 ICMP Message Type: 8
Layer 2: Ethernet II Header 000C.85CC.1DA7 >> 00E0.F7B1.8901
Layer 1: Port(s):

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 10.10.10.1 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.

AFTER completing the ping

PDU Information at Device: 172.16.31.2



[OSI Model](#)

Inbound PDU Details

At Device: 172.16.31.2
Source: 172.16.31.2
Destination: 10.10.10.1

In Layers

Layer7
Layer6
Layer5
Layer4
Layer 3: IP Header Src. IP: 10.10.10.1, Dest. IP: 172.16.31.2 ICMP Message Type: 0
Layer 2: Ethernet II Header 00E0.F7B1.8901 >> 000C.85CC.1DA7
Layer 1: Port FastEthernet0

Out Layers

Layer7
Layer6
Layer5
Layer4
Layer3
Layer2
Layer1