

BỘ GIÁO DỤC VÀ ĐÀO TẠO

TRƯỜNG ĐẠI HỌC CÔNG NGHỆ

KHOA CÔNG NGHỆ THÔNG TIN



BÁO CÁO

Connecting a Wired and Wireless LAN & Examine the ARP Table



Sinh viên thực hiện: Phạm Tiến Sơn

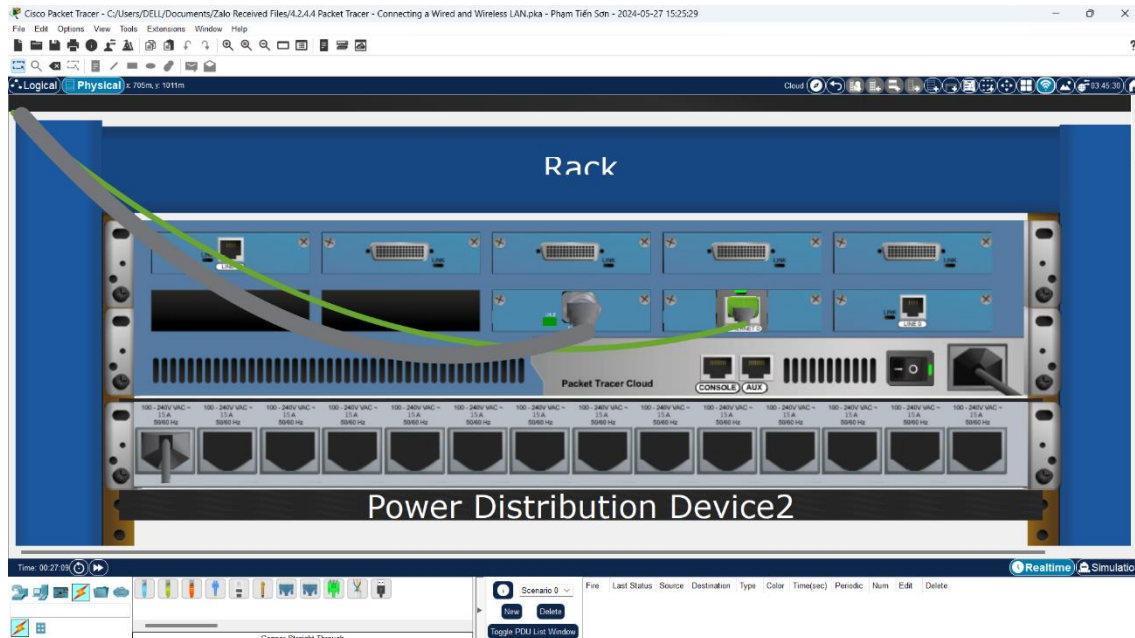
Lớp học phần: INT2213 20

27, tháng 05 năm 2024

I. Connecting a Wired and Wireless

1. How many wires are connected to the switch in the blue rack?

2



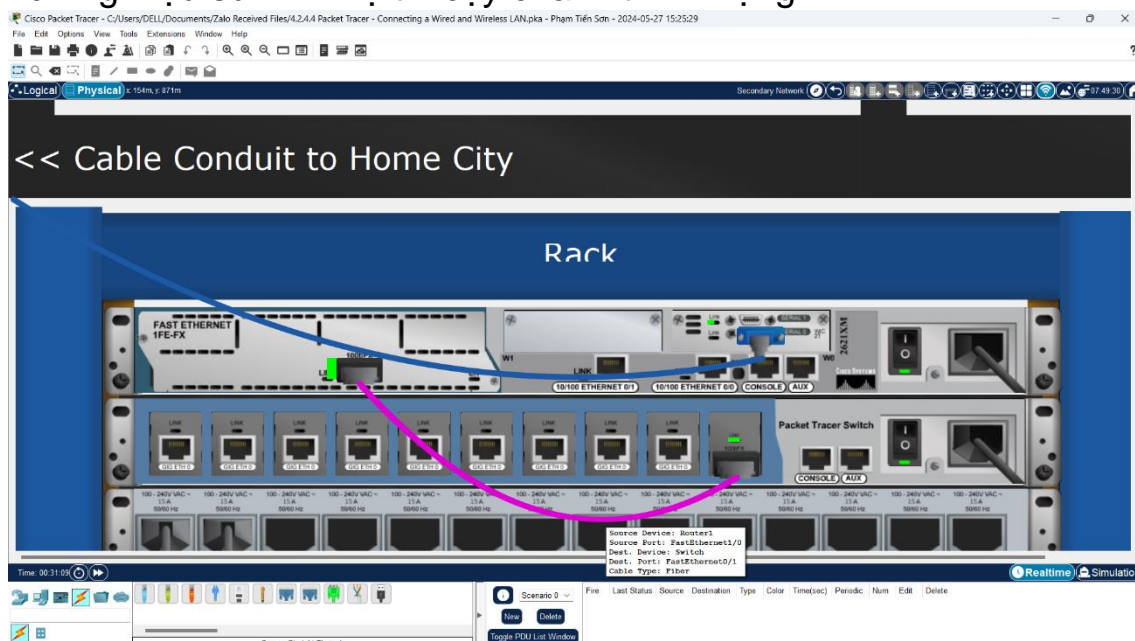
2. What is located on the table to the right of the blue rack?

Configuration Terminal



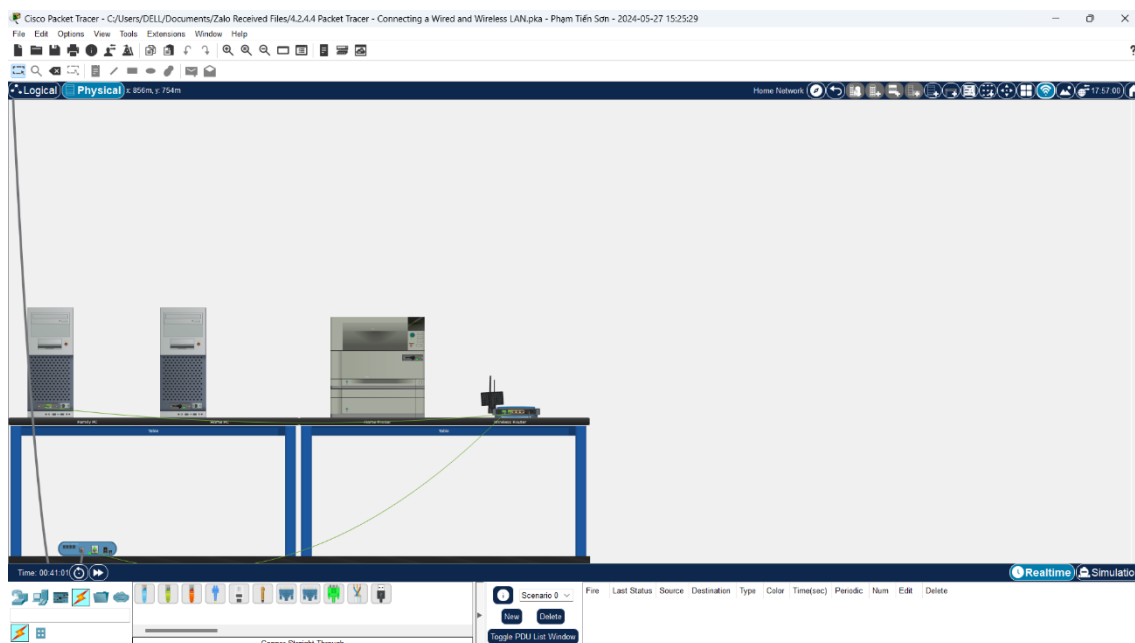
3. Why are there two orange cables connected to each device?
 Hai dây cáp màu cam được kết nối với mỗi thiết bị đại diện cho cáp quang. Cáp quang thường đi theo cặp, một dây dùng để truyền tín hiệu và một dây dùng để nhận tín hiệu. Điều này giúp đảm bảo rằng dữ liệu có thể được truyền đi và nhận lại một cách đồng thời, tăng

cường hiệu suất và độ tin cậy của kết nối mạng.



4. Why is there an oval mesh covering the home network?

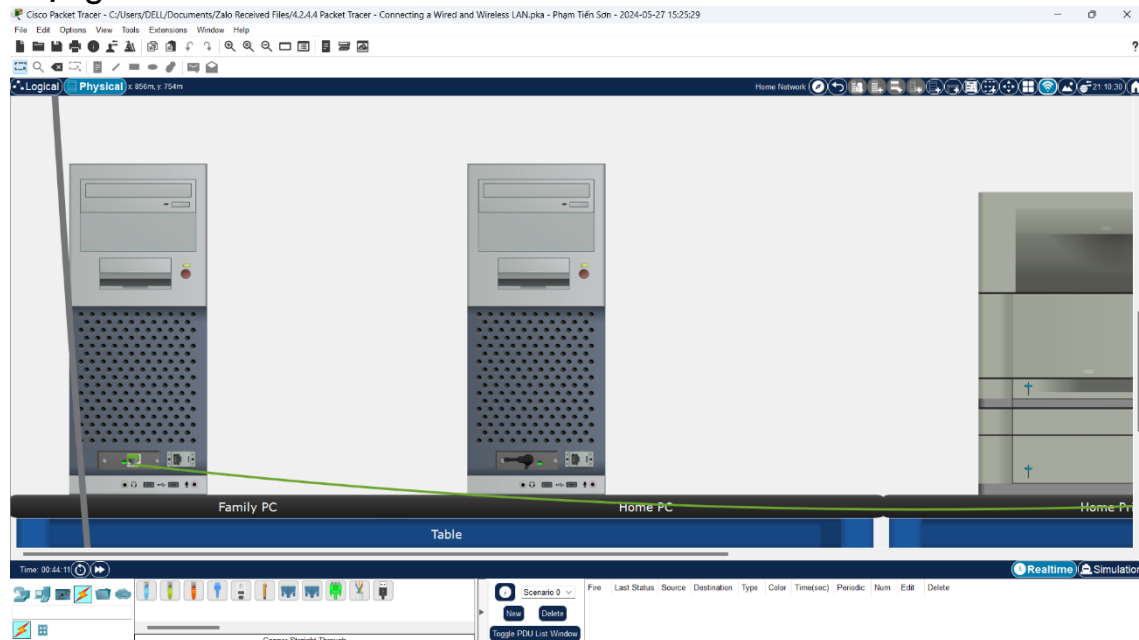
Hình lưới oval bao phủ mạng gia đình thường biểu thị phạm vi của mạng không dây. Điều này có nghĩa là tất cả các thiết bị trong phạm vi này có thể kết nối với mạng không dây.



5. Why is there no rack to hold the equipment?

Trong môi trường mạng gia đình, thường không cần thiết phải sử dụng giá đỡ (rack) để giữ các thiết bị mạng. Điều này là do các mạng gia đình thường chỉ cần một số lượng nhỏ các thiết bị mạng

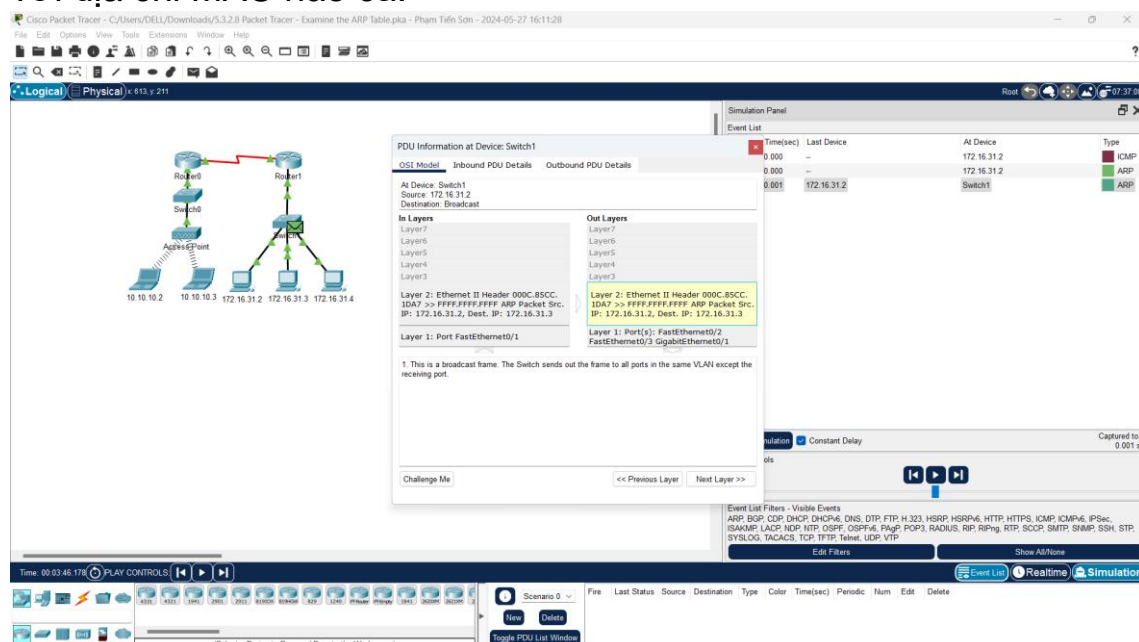
(như modem, router, và switch), và những thiết bị này thường được thiết kế để đặt trên bàn hoặc kệ mà không cần giá đỡ. Trong khi đó, giá đỡ thường được sử dụng trong các môi trường doanh nghiệp hoặc trung tâm dữ liệu, nơi cần quản lý một lượng lớn các thiết bị mạng.



II. Examine the ARP Table

1. Is this address listed in the table above?

Không. Địa chỉ broadcast là FFFF.FFFF.FFFF.FFFF không phù hợp với địa chỉ MAC nào cả.



2. How many copies of the PDU did Switch1 make?

3

The simulation shows a network topology with Router0, Router1, Switch0, Switch1, and an Access Point. The Event List on the right shows the following events:

Vis.	Time(sec)	Last Device	At Device	Type
	0.000		172.16.31.2	ICMP
	0.000		172.16.31.2	ARP
	0.001	172.16.31.2	Switch1	ARP
	0.002	Switch1	172.16.31.3	ARP
	0.002	Switch1	172.16.31.4	ARP
	0.002	Switch1	Router1	ARP

3. What is the IP address of the device that accepted the PDU?

172.16.31.3

The simulation shows the PDU information at device 172.16.31.3. The PDU details show the following information:

Ethernet II		Bytes	
PREAMBLE: 10101010	TYPE: 0	DEST ADDR: FFFF.FFFF.FF	FF
SRC ADDR: 000C.85C0.1DA7	DATA (VARIABLE LENGTH)	FCS: 0x00000000	

The PDU details also show the following information:

ARP		Bits	
HARDWARE TYPE: 0x0001	PROTOCOL TYPE: 0x0800		
HLLEN: 0x06	PLEN: 0x04	OPCODE: 0x0001	
SOURCE MAC: 000C.85C0.1DA7		SOURCE IP: 172.16.31.2	
TARGET MAC: 0000.0000.0000		TARGET IP: 172.16.31.3	

4. What happened to the source and destination MAC addresses?

Địa chỉ MAC nguồn trở thành địa chỉ MAC đích, và địa chỉ MAC đích FFFF.FFFF.FFFF được chuyển đổi thành địa chỉ MAC của

172.16.31.3

Cisco Packet Tracer - C:\Users\DELL\Downloads\5.3.2.8 Packet Tracer - Examine the ARP Table.pka - Phạm Tiến Sơn - 2024-05-27 16:11:28

File Edit Options View Tools Extensions Window Help

Logical Physical 1032, y 724

Root 18:52:30

Simulation Panel

Event List

Time(sec)	Last Device	At Device	Type
0.000	-	172.16.31.2	ICMP
0.000	-	172.16.31.2	ARP
0.001	172.16.31.2	Switch1	ARP
0.002	Switch1	172.16.31.3	ARP
0.002	Switch1	172.16.31.4	ARP
0.002	Switch1	Router1	ARP

Constant Delay Captured to: 0.002 s

Visible Events

ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, IoT, IoT TCP, LACP, LLDP, Meraki, NDP, NETFLOW, NTP, OSPF, OSPFv6, RADIUS, PPP, PPPoE, PTP, RADIUS, REP, RIP, RIPng, RTP, SCOP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Event List Realtime Simulation

Time: 00:15:48.047 PLAY CONTROLS

Scenario 0

New Delete

Toggle PDU List Window

(Select a Device to Drag and Drop to the Workspace)

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
Layer7
Layer6
Layer5
Layer4
Layer3

Out Layers
Layer7
Layer6
Layer5
Layer4
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 1: Port FastEthernet0

1. The ARP process replies to the request with the receiving port's MAC address.
2. The device encapsulates the PDU into an Ethernet frame.

Challenge Me << Previous Layer Next Layer >>

5. How many copies of the PDU did the switch make during the ARP reply?

1

Cisco Packet Tracer - C:\Users\DELL\Downloads\5.3.2.8 Packet Tracer - Examine the ARP Table.pka - Phạm Tiến Sơn - 2024-05-27 16:11:28

File Edit Options View Tools Extensions Window Help

Logical Physical 976, y 389

Root 19:53:30

Simulation Panel

Event List

Time(sec)	Last Device	At Device	Type
0.000	-	172.16.31.2	ICMP
0.000	-	172.16.31.2	ARP
0.001	172.16.31.2	Switch1	ARP
0.002	Switch1	172.16.31.3	ARP
0.002	Switch1	172.16.31.4	ARP
0.002	Switch1	Router1	ARP
0.003	172.16.31.3	Switch1	ARP

Reverse Simulation Constant Delay Captured to: 0.003 s

Play Controls

Event List Filters - Visible Events

ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, IoT, IoT TCP, LACP, LLDP, Meraki, NDP, NETFLOW, NTP, OSPF, OSPFv6, RADIUS, PPP, PPPoE, PTP, RADIUS, REP, RIP, RIPng, RTP, SCOP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Event List Realtime Simulation

Time: 00:15:48.048 PLAY CONTROLS

Scenario 0

New Delete

Toggle PDU List Window

(Select a Device to Drag and Drop to the Workspace)

6. Do the MAC addresses of the source and destination align with their IP addresses?

File Edit Options View Tools Extensions Window Help

C:\Users\DELL\Downloads\5.3.2.8 Packet Tracer - Examining the ARP Table.pka - Pham Tien Son - 2024-07-27 16:11:28

Logical Physical 714 / 364 Root 16:22:30

PT Activity: 00:46:55

Packet Tracer - Examine the ARP Table

Addressing Table

Device	Interface	MAC Address	Switch Interface
Router0	Gig0/0	0001.645D.2501	G0/1
	Ser0/0/0	N/A	N/A
Router1	Gig0/0	00E3.F7B1.8901	G0/1
	Ser0/0	N/A	N/A
10.10.10.2	Wireless	0060.2F84.4A06	F0/2
10.10.10.3	Wireless	0060.4706.572B	F0/2
172.16.31.2	F0	000C.C056.1FA1	F0/1
172.16.31.3	F0	0060.7036.2849	F0/2
172.16.31.4	G0	0002.1640.8D75	F0/3

Objectives

Part 1: Examine an ARP Request
Part 2: Examine a Switch MAC Address Table

Time Elapsed: 00:46:55

☐ Tap ☒ Click

1/1 Challenge Me

PDU Information at Device: 172.16.31.2

OSI Model Outbound PDU details

Ak Device: 172.16.31.2
Source: 172.16.31.2
Destination: 172.16.31.3

In Layers

- Layer7
- Layer6
- Layer5
- Layer4
- Layer3
- Layer2
- Layer1

Out Layers

- Layer7
- Layer6
- Layer5
- Layer4
- Layer3
- Layer2: Ethernet II Header 000C.85CC.IDA? >> 0060.7036.2849
- Layer1: Port(s): FastEthernet0

1 The ARP process takes out this packet from the buffer and resends it.
2 The device encapsulates the PDU into an Ethernet frame.

Simulation Panel

All Device	Type
172.16.31.2	ICMP
172.16.31.2	ARP
Switch1	ARP
172.16.31.3	ARP
172.16.31.4	ARP
Router1	ARP
Switch1	ARP
172.16.31.2	ARP
172.16.31.2	ICMP

Play Controls

Event List Filters - Visible Events

- ARP: BGP, Bluetooth, CARP, DHCP, DHCPv6, DNS, DTCP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, iSCSI, LACP, LLDP, MLAG, NTP, NETFLOW, NTP, OSPF, OSPFv6, RADIUS, PPP, PPPoE, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLINK, TACACS, TCP, TFTP, Telnet, UDP, USB, VTY

Show All Items

Edit Scenario 0

New Delete

Toggle PDU List Window

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

Time: 00:15:48.048 PLAY CONTROLS

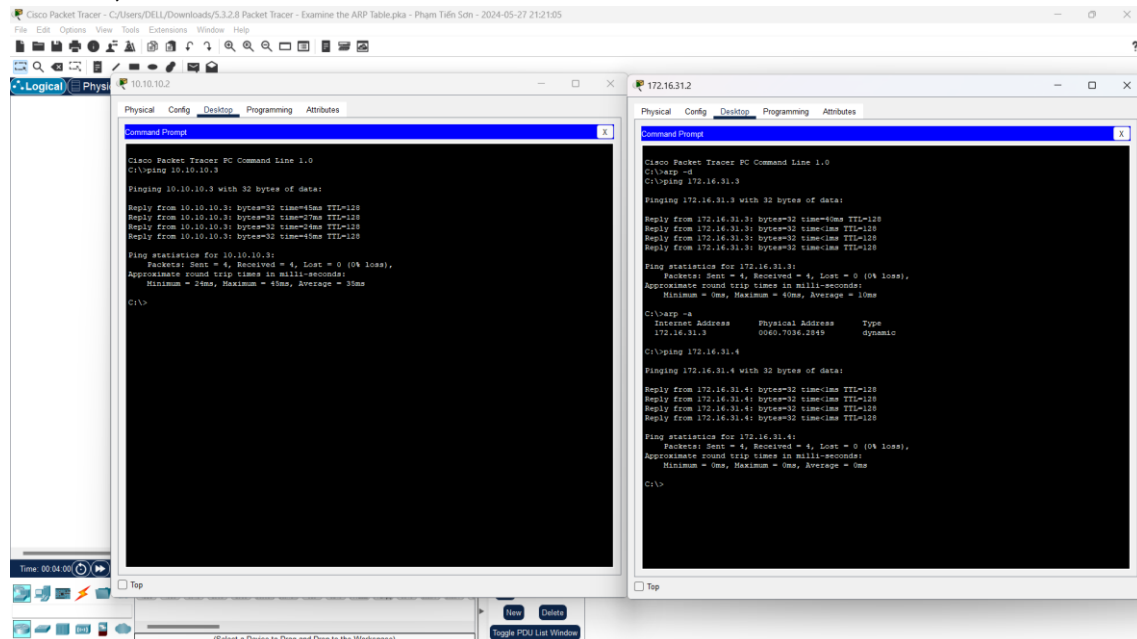
(Select a Device to Drag and Drop to the Workspace)

Scenario 0 Realtime Simulation

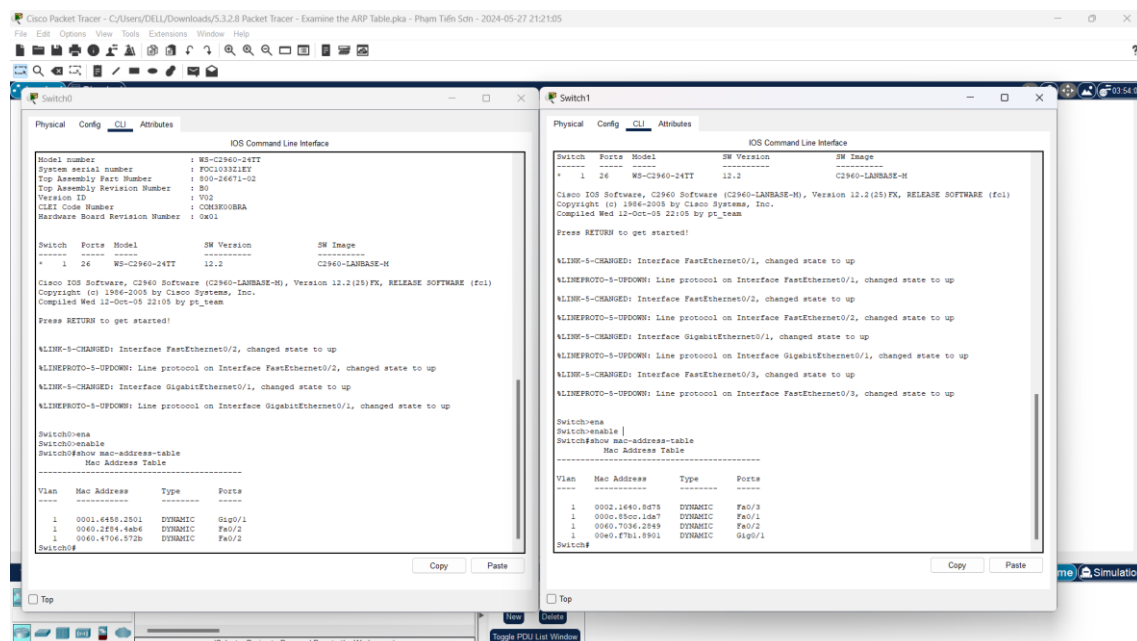
[illegible]

9. Enter the ping 10.10.10.3 command. How many replies were sent and received?

4 sent, 4 received.



10. Click Switch1 and then the CLI tab. Enter the show mac-address-table command. Do the entries correspond to those in the table above?
Có.



11. Click Switch0, then the CLI tab. Enter the show mac-address-table command. Do the entries correspond to those in the table above?

Có.

Switch1

```

Switch#show mac-address-table
-----
Vlan    Mac Address      Type      Ports
-----
1       0002.1440.8d75   DYNAMIC   Fa0/3
1       0000.85cc.1da7   DYNAMIC   Fa0/1
1       0060.7036.2849   DYNAMIC   Fa0/2
1       00e0.f7b1.8901   DYNAMIC   Gig0/1
Switch#
  
```

Switch0

```

Switch0#show mac-address-table
-----
Vlan    Mac Address      Type      Ports
-----
1       0001.6458.2501   DYNAMIC   Gig0/1
1       0060.2f59.4ab6   DYNAMIC   Fa0/2
1       0060.4706.572b   DYNAMIC   Fa0/2
Switch0#
  
```

Packet Tracer - Examine the ARP Table

Addressing Table

Device	Interface	MAC Address	Switch Interface
Router0	Gig0/0	0001.6458.2501	Gig0/1
	Sig0/0	N/A	N/A
Router1	Gig0	00E0.F7B1.8901	Gig0/1
	Sig0/0	N/A	N/A
10.10.10.2	Wireless	0060.2F5A.4AB6	Fa0/2
10.10.10.3	Wireless	0060.4706.572B	Fa0/2
172.16.31.2	F0	000C.85CC.1DA7	Fa0/1
172.16.31.3	F0	0060.7036.2849	Fa0/2
172.16.31.4	G0	0002.1440.8D75	Fa0/3

Objectives

Part 1: Examine an ARP Request

Part 2: Examine a Switch MAC Address Table

Time Elapsed: 00:30:32

Top Dock Check Results Back 5/1 Next

12. Why are two MAC addresses associated with one port?
 Có hai địa chỉ MAC được liên kết với một cổng vì cả hai thiết bị đều kết nối với một cổng thông qua Access Point.

13. What is the IP address of the new ARP table entry?
 172.16.31.1

Network Diagram

The diagram shows a network topology with two routers (Router0 and Router1) connected to a central switch (Switch0). Router0 is connected to Switch0 via its GigabitEthernet0/0 interface. Router1 is connected to Switch0 via its GigabitEthernet0/0 interface. Switch0 has two FastEthernet interfaces (Fa0/2 and Fa0/3) connected to the same Access Point. The Access Point has two wireless interfaces (Wlan0 and Wlan1) connected to the same set of four laptops. The laptops have IP addresses 10.10.10.2, 10.10.10.3, 172.16.31.2, and 172.16.31.4.

Command Prompt

```

C:\>ipconfig
Internet Address      Physical Address      Type
-----
172.16.31.3           0060.7036.2849       dynamic

C:\>ping 172.16.31.4
Pinging 172.16.31.4 with 32 bytes of data:
Reply from 172.16.31.4: bytes=32 time=1ms TTL=128
Reply from 172.16.31.4: bytes=32 time=1ms TTL=128
Reply from 172.16.31.4: bytes=32 time=1ms TTL=128
Reply from 172.16.31.4: bytes=32 time=1ms TTL=128
Ping statistics for 172.16.31.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 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=128
Reply from 10.10.10.1: bytes=32 time=1ms TTL=128
Reply from 10.10.10.1: bytes=32 time=1ms TTL=128
Reply from 10.10.10.1: bytes=32 time=1ms TTL=128
Ping statistics for 10.10.10.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>ipconfig
Internet Address      Physical Address      Type
-----
172.16.31.1           00e0.f7b1.8901       dynamic
172.16.31.3           0060.7036.2849       dynamic
172.16.31.4           0002.1440.8d75       dynamic
C:\>
  
```

14. Repeat the ping to 10.10.10.1. How many PDUs appear?

The network topology shows two routers, Router0 and Router1, connected by a link. Router0 is connected to Switch0, which is connected to AccessPoint0. Router1 is connected to Switch1, which is connected to AccessPoint1. The IP addresses for the devices are: Router0 (10.10.10.2), Router1 (172.16.31.2), Switch0 (10.10.10.3), Switch1 (172.16.31.3), AccessPoint0 (10.10.10.4), and AccessPoint1 (172.16.31.4).

The Command Window shows the following output:

```

C:\>ping 172.16.31.4
Pinging 172.16.31.4 with 32 bytes of data:
Reply from 172.16.31.4: bytes=32 time=1ms TTL=128
Reply from 172.16.31.4: bytes=32 time=1ms TTL=128
Reply from 172.16.31.4: bytes=32 time=1ms TTL=128
Reply from 172.16.31.4: bytes=32 time=1ms TTL=128

Ping statistics for 172.16.31.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 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=254
Reply from 10.10.10.1: bytes=32 time=1ms TTL=254
Reply from 10.10.10.1: bytes=32 time=1ms TTL=254
Reply from 10.10.10.1: bytes=32 time=1ms TTL=254

Ping statistics for 10.10.10.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\>arp -a
Interface: 0
Internet Address      Physical Address      Type
172.16.31.2          00e0.72b1.4901       dynamic
172.16.31.3          00e0.72b1.2549       dynamic
172.16.31.4          00e0.1440.5d75       dynamic

C:\>arp -n
Pinging 10.10.10.1 with 32 bytes of data:
  
```

15. Click Capture/Forward. Click the PDU that is now at Switch1. What is the target destination IP destination address of the ARP request? 172.16.31.1

The network topology is the same as in the previous screenshot. The PDU capture window shows the following information:

PDU Information at Device: Switch1

OSI Model: Inbound PDU Details

PDU Format:

Ethernet II		ARP	
PREAMBLE: 10101010	DEST ADDR: FFFF.FFFF.FF		
SRC ADDR: 800C.1D47	TYPE: 0		
LEN: 0x06	DATA (VARIABLE LENGTH)		
FCS: 0x00000000			
HARDWARE TYPE: 0x0001		PROTOCOL TYPE: 0x0800	
LEN: 0x06	PLEN: 0x04	OPCODE: 0x0001	
SOURCE MAC: 000C.1D47			
SOURCE IP: 172.16.31.2			
TARGET MAC: 0000.0000.0000			
TARGET IP: 172.16.31.1			

The Event List shows the following events:

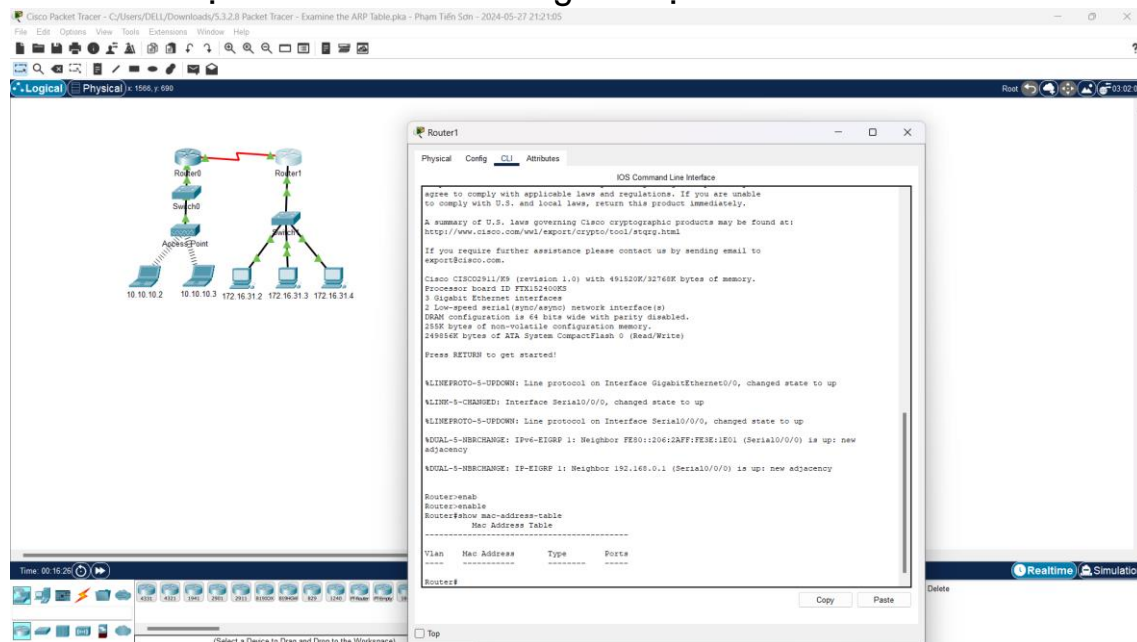
Vis.	Time(sec)	Last Device
0.000	-	-
0.000	-	-
0.001	172.16.31.2	-

16. The destination IP address is not 10.10.10.1. Why?

Địa chỉ IP đích không phải là 10.10.10.1 vì địa chỉ gateway của giao diện router được lưu trữ trong cấu hình IPv4 của các máy chủ. Nếu máy chủ nhận không nằm trong cùng một mạng, nguồn sẽ sử dụng

quá trình ARP để xác định địa chỉ MAC cho giao diện router phục vụ như gateway.

17. Enter privileged EXEC mode and then the show mac-address-table command. How many MAC addresses are in the table? Why? Không. Điều này là do lệnh show mac-address-table trên router có ý nghĩa hoàn toàn khác so với lệnh show mac address-table trên switch. Trên router, lệnh này không hiển thị bảng địa chỉ MAC như trên switch, mà thay vào đó, nó sẽ hiển thị thông tin về các địa chỉ MAC đã được cấu hình trên các giao diện của router.



18. Enter the show arp command. Is there an entry for 172.16.31.2? Có.

The screenshot shows a Cisco Packet Tracer workspace with a network topology. On the left, a switch is connected to two PCs (10.10.10.2 and 10.10.10.3) and a wireless access point. On the right, Router1 is connected to two PCs (172.16.31.2 and 172.16.31.3) and a wireless access point. The Router1 CLI window is open, showing the output of the 'show arp' command.

```

Router1
Physical Config CLI Attributes
IOS Command Line Interface
http://www.cisco.com/wl/export/crypto/tool/stpg.html
If you require further assistance please contact us by sending email to
export@cisco.com.
Cisco IOS029311/K9 (revision 1.0) with 491520K/32768K bytes of memory.
Processor board ID FTX15240K5
1 Gigabit Ethernet interface(s)
1 low-speed serial(sync/asynch) network interface(s)
DRAM configuration is 64 bits wide with parity disabled.
256K bytes of non-volatile configuration memory.
249956K bytes of ATA System CompactFlash 0 (Read/Write)

Press RETURN to get started!

VLINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
VLINE-5-CHANGED: Interface Serial0/0/0, changed state to up
VLINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
NDL-5-NBCHCHANGE: IPv6-IGMP 1: Neighbor FE80::106:12AF:FE3E:1E01 (Serial0/0/0) is up: new adjacency
NDL-5-NBCHCHANGE: IP-IGMP 1: Neighbor 192.168.0.1 (Serial0/0/0) is up: new adjacency

Router#enable
Router#enable
Router#show mac-address-table
Mac Address Table
-----
Vlan    Mac Address      Type      Ports
-----
Router#show arp
Protocol Address          Age (min)  Hardware Addr  Type   Interface
Internet 172.16.31.1      -         0800.F7B1.5901  ARP     GigabitEthernet0/0
Internet 172.16.31.2      6         080C.85CC.1DA7  ARP     GigabitEthernet0/0
Router#
  
```

19. What happens to the first ping in a situation where the router responds to the ARP request? It times out.