Networking Academy

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Packet Tracer - Examine the ARP Table

Addressing Table

Device	Interface	MAC Address	Switch Interface
Router0	Gg0/0	0001.6458.2501	G0/1
	S0/0/0	N/A	N/A
Router1	G0/0	00E0.F7B1.8901	G0/1
	S0/0/0	N/A	N/A
10.10.10.2	Wireless	0060.2F84.4AB6	F0/2
10.10.10.3	Wireless	0060.4706.572B	F0/2
172.16.31.2	F0	000C.85CC.1DA7	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

Part 3: Examine the ARP Process in Remote Communications

Background

This activity is optimized for viewing PDUs. The devices are already configured. You will gather PDU information in simulation mode and answer a series of questions about the data you collect.

Instructions

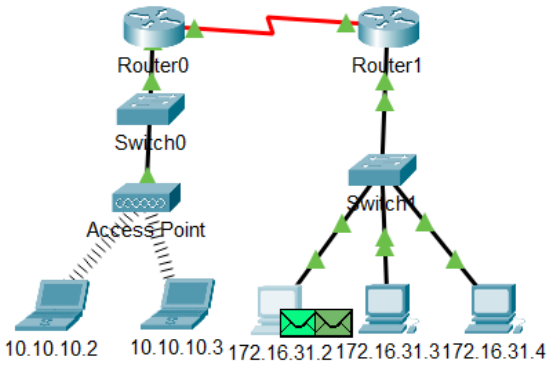
Part 1: Examine an ARP Request

Step 1: Generate ARP requests by pinging 172.16.31.3 from 172.16.31.2.

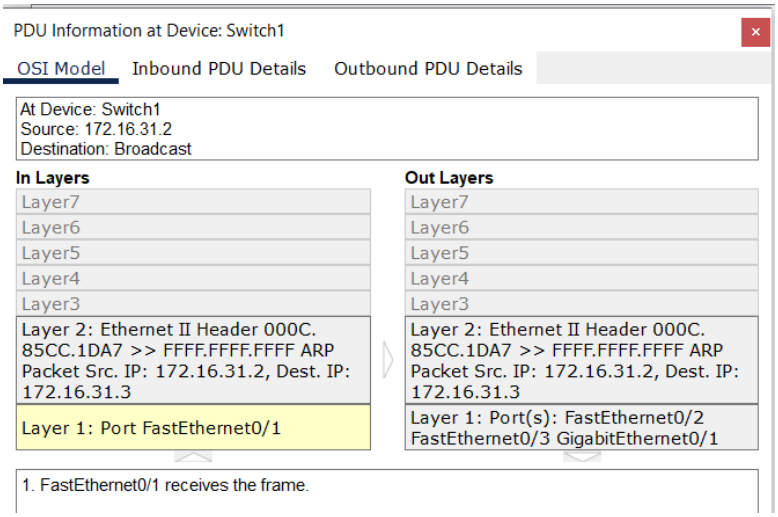
a. Click **172.16.31.2** and open the **Command Prompt**.

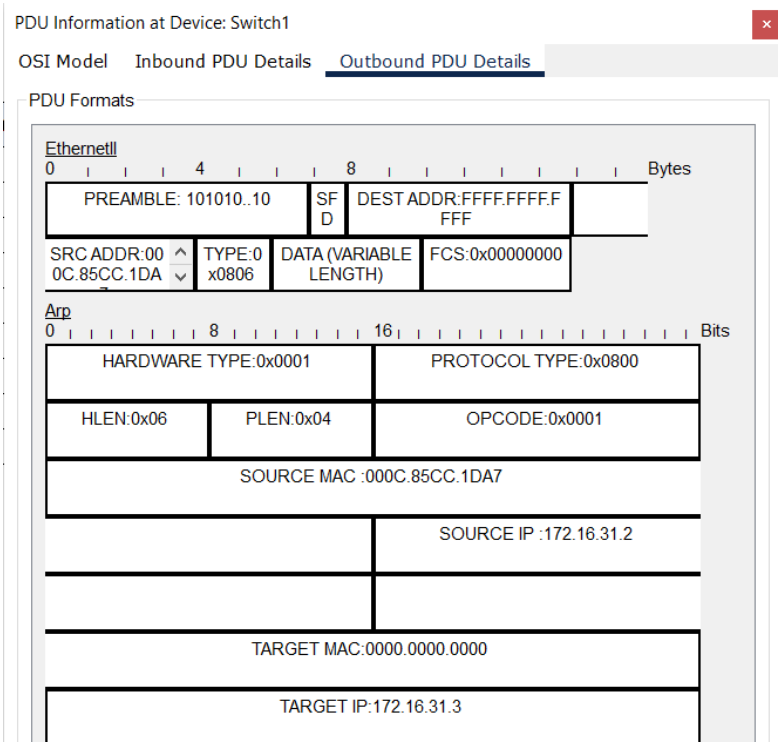
b. Enter the **arp -d** command to clear the ARP table.

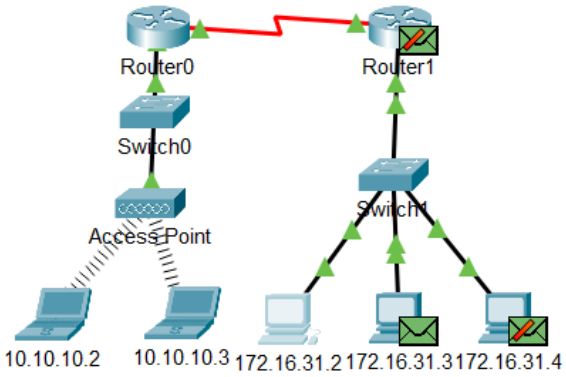
c. Enter **Simulation** mode and enter the command **ping 172.16.31.3**. Two PDUs will be generated. The **ping** command cannot complete the ICMP packet without knowing the MAC address of the destination. So the computer sends an ARP broadcast frame to find the MAC address of the destination.

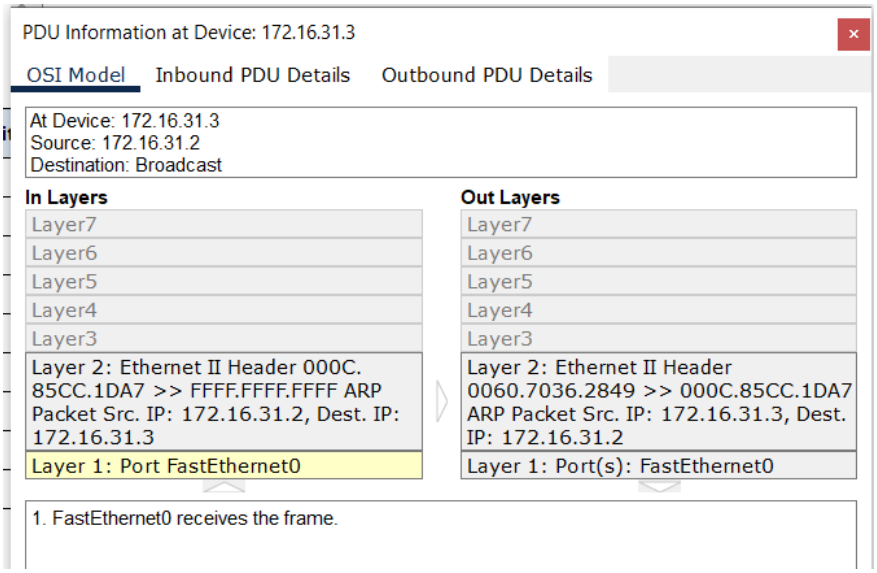


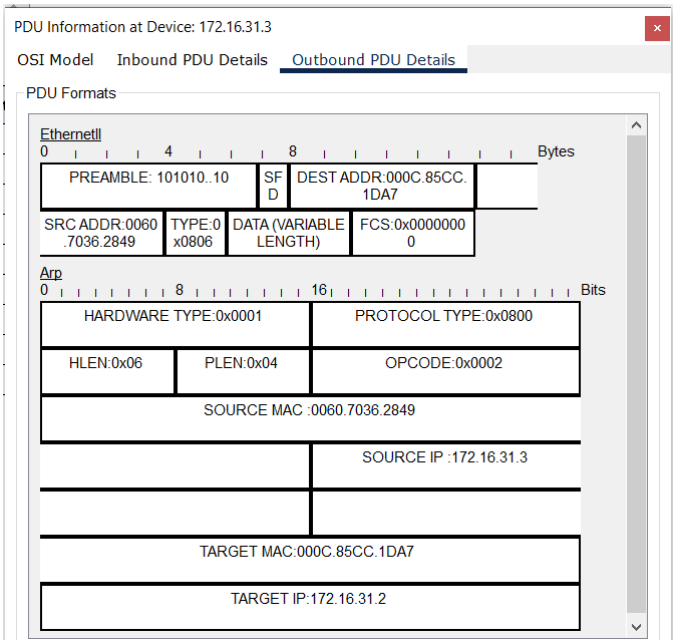
d. Click **Capture/Forward** once. The ARP PDU moves **Switch1** while the ICMP PDU disappears, waiting for the ARP reply. Open the PDU and record the destination MAC address.

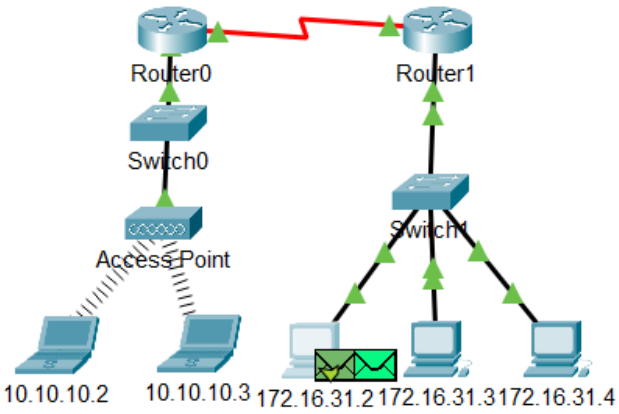












Is this address listed in the table above? No

e. Click **Capture/Forward** to move the PDU to the next device.

How many copies of the PDU did **Switch1** make? 3

What is the IP address of the device that accepted the PDU? 172.16.31.3

f. Open the PDU and examine Layer 2.

What happened to the source and destination MAC addresses?

Source became destination, FFFF.FFFF.FFFF turned into MAC address of 172.16.31.3

g. Click **Capture/Forward** until the PDU returns to **172.16.31.2**.

How many copies of the PDU did the switch make during the ARP reply? 1

Step 2: Examine the ARP table.

a. Note that the ICMP packet reappears. Open the PDU and examine the MAC addresses.

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

b. Switch back to **Realtime** and the ping completes.

c. Click **172.16.31.2** and enter the **arp –a** command.

To what IP address does the MAC address entry correspond?

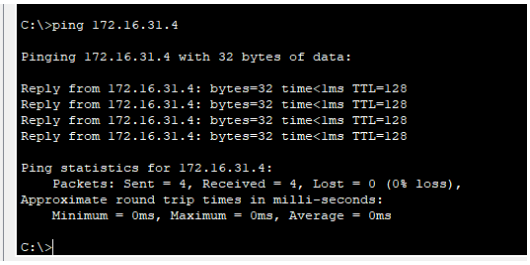
```
C:\>arp -a
  Internet Address      Physical Address      Type
  172.16.31.3           0060.7036.2849        dynamic

C:\>
```

In general, when does an end device issue an ARP request?
When it doesn't know about receiver's MAC address.

Part 2: Examine a Switch MAC Address Table

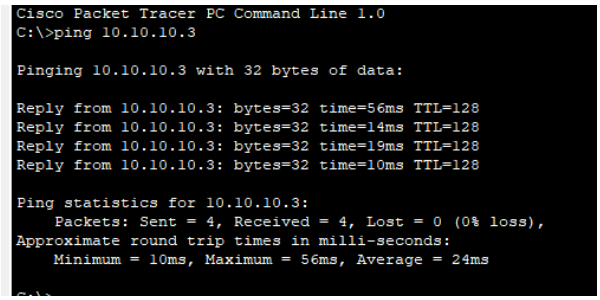
Step 1: Generate additional traffic to populate the switch MAC address table.

a. From **172.16.31.2**, enter the ping **172.16.31.4** command.



b. Click **10.10.10.**2 and open the **Command Prompt**.

c. Enter the **ping 10.10.10.3** command.



How many replies were sent and received? 4 sent and 4 received

Step 2: Examine the MAC address table on the switches.

a. Click **Switch1**and then the **CLI** tab. Enter the **show mac-address-table** command.

Do the entries correspond to those in the table above?

```
Switch>
Switch>
Switch>enable
Switch#show mac
Switch#show mac-ad
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
Switch#
```

b. Click **Switch0**, then the **CLI** tab. Enter the **show mac-address-table** command.

```
Switch0>enable
Switch0#show mac-
Switch0#show mac-address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

   1    0001.6458.2501    DYNAMIC     Gig0/1
   1    0060.2f84.4ab6    DYNAMIC     Fa0/2
   1    0060.4706.572b    DYNAMIC     Fa0/2
Switch0#
```

Do the entries correspond to those in the table above? Yes

Why are two MAC addresses associated with one port? Because both devices connected to one port through the Access Point

Part 3: Examine the ARP Process in Remote Communications

Step 1: Generate traffic to produce ARP traffic.

a. Click **172.16.31.2** and open the **Command Prompt**.

b. Enter the **ping 10.10.10.1** command.

```
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=2ms TTL=254
Reply from 10.10.10.1: bytes=32 time=2ms TTL=254
Reply from 10.10.10.1: bytes=32 time=11ms TTL=254
Reply from 10.10.10.1: bytes=32 time=51ms 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 = 2ms, Maximum = 51ms, Average = 16ms

C:\>
```

c. Type **arp –a**.

What is the IP address of the new ARP table entry?

```
C:\>arp -a
  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           0002.1640.8d75        dynamic

C:\>
```

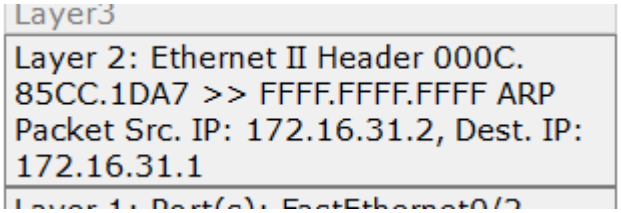
d. Enter **arp -d** to clear the ARP table and switch to **Simulation** mode.

e. Repeat the ping to 10.10.10.1.

How many PDUs appear? 2

f. Click **Capture/Forward**. Click the PDU that is now at **Switch1**.

What is the target destination IP destination address of the ARP request?



g. The destination IP address is not 10.10.10.1.

Why?

The gateway address of the router interface is stored in the IPv4 configuration of the hosts. If the receiving host is not on the same network, the source uses the ARP process to determine a MAC address for the router interface serving as the gateway.

Step 2: Examine the ARP table on Router1.

a. Switch to **Realtime** mode. Click **Router1** and then the **CLI** tab.

b. Enter privileged EXEC mode and then the **show mac-address-table** command.

How many MAC addresses are in the table? Why?

```
Router>enable
Router#show mac-add
Router#show mac-address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

Router#
```

Zero, This command means something completely different than the switch

command show mac address-table.

c. Enter the **show arp** command.

Is there an entry for **172.16.31.2**? Yes

```
Router#show arp
Protocol  Address          Age (min)  Hardware Addr   Type   Interface
Internet  172.16.31.1             -   00E0.F7B1.8901  ARPA
GigabitEthernet0/0
Internet  172.16.31.2             2   000C.85CC.1DA7  ARPA
GigabitEthernet0/0
Router#
```

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