### **Addressing Table**

| **Device** | **Interface** | **MAC Address** | **Switch Interface** |
| --- | --- | --- | --- |
| Router0 | Gg0/0 | 0001.6458.2501 | G0/1 |
| *Router0* | S0/0/0 | N/A | N/A |
| Router1 | G0/0 | 00E0.F7B1.8901 | G0/1 |
| *Router1* | 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.**

*Open a command prompt*

1. Click **172.16.31.2** and open the **Command Prompt**.
2. Enter the **arp -d** command to clear the ARP table.

*Close a command prompt*

1. 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.
2. 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.

#### Question:

Is this address listed in the table above?

***Type your answers here.***

**No**

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

#### Question:

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**

1. Open the PDU and examine Layer 2.

#### Question:

What happened to the source and destination MAC addresses?

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

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

#### Question:

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

**1**

### **Step 2:** **Examine the ARP table.**

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

#### Question:

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

**Yes**

1. Switch back to **Realtime** and the ping completes.
2. Click **172.16.31.2** and enter the **arp** **–a** command.

#### Question:

To what IP address does the MAC address entry correspond?

**172.16.31.3**

In general, when does an end device issue an ARP request?

**When it does not know the receiver’s MAC address.**

## **Part 2:** **Examine a Switch MAC Address Table**

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

*Open a command prompt*

1. From **172.16.31.2**, enter the ping **172.16.31.4** command.
2. Click **10.10.10.**2 and open the **Command Prompt**.
3. Enter the **ping 10.10.10.3** command.

#### Question:

How many replies were sent and received?

**4 sent, 4 received.**

*Close a command prompt*

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

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

#### Question:

Do the entries correspond to those in the table above?

**Yes**

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

#### Questions:

Do the entries correspond to those in the table above?

**Yes**

Why are two MAC addresses associated with one port?

**Because both devices connect to one port through the Access Point.**

## **Part 3:** **Examine the ARP Process in Remote Communications**

### **Step 1:** **Generate traffic to produce ARP traffic.**

*Open a command prompt*

1. Click **172.16.31.2** and open the **Command Prompt**.
2. Enter the **ping 10.10.10.1** command.
3. Type **arp –a**.

#### Question:

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

**172.16.31.1**

1. Enter **arp -d** to clear the ARP table and switch to **Simulation** mode.
2. Repeat the ping to 10.10.10.1.

#### Question:

How many PDUs appear?

**2**

*Close a command prompt*

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

#### Question:

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

**172.16.31.1**

1. The destination IP address is not 10.10.10.1.

#### Question:

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.**

1. Switch to **Realtime** mode. Click **Router1** and then the **CLI** tab.
2. Enter privileged EXEC mode and then the **show mac-address-table** command.

#### Question:

How many MAC addresses are in the table? Why?

**Zero. This command means something completely different than the switch command show mac address-table.**

1. Enter the **show arp** command.

#### Questions:

Is there an entry for **172.16.31.2**?

**Yes**

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

**It times out.**