ARP Table

Lab Objective:

Learn how to interrogate a router ARP table.

Lab Purpose:

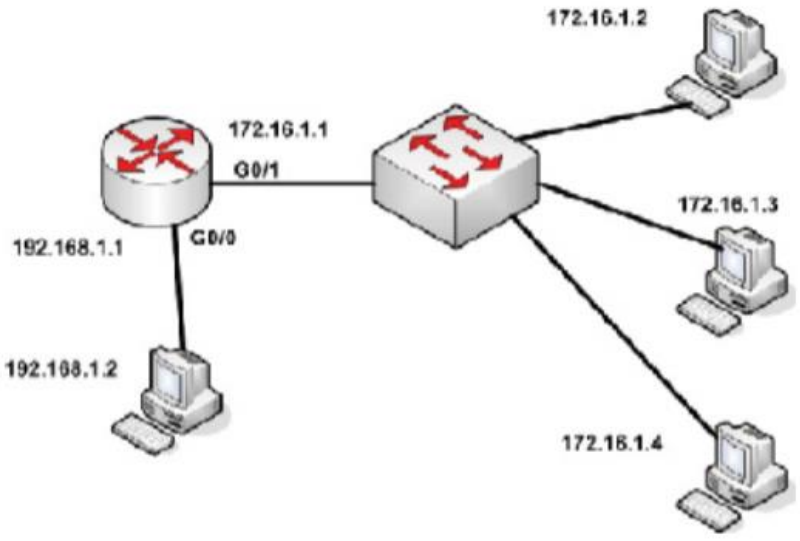
ARP maps a known IP address to an unknown MAC address. It allows a router to encapsulate a packet correctly before forwarding.

Lab Tool:

Packet Tracer

Lab Topology:

Please use the following topology to complete this lab exercise:



Lab Walkthrough:

Connect a router to a switch. Add hosts as indicated in the diagram. You will need a crossover able for the one directly connected to the router. Check the router ARP table (which will be empty) and then configure IP addresses as per the diagram.

Router#configure terminal

Router(config)#hostname R0

R0(config)#exit

R0#show arp

R0(config)#int g0/0

R0(config-if)#ip add 192.168.1.1 255.255.255.0

R0(config-if)#no shut

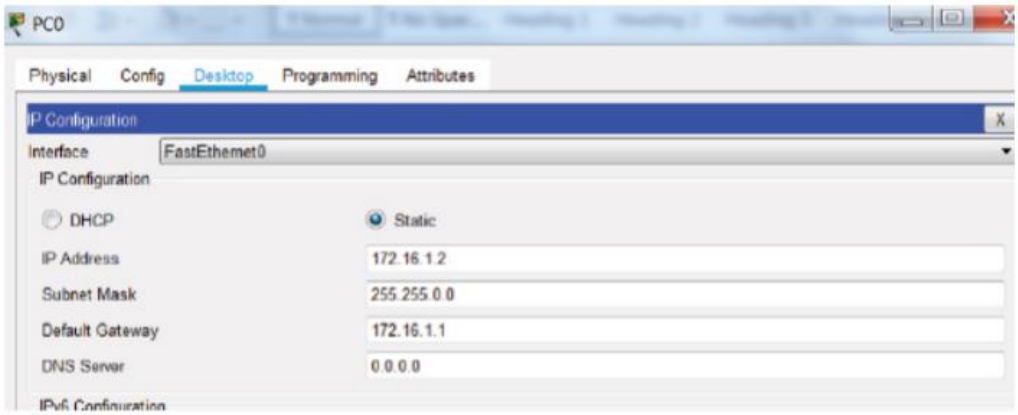
R0(config-if)#int gig0/1

R0(config-if)#ip add 172.16.1.1 255.255.0.0

R0(config-if)#no shut

Task 2:

Configure the hosts with an IP address and the default gateway, which should be the router interface it connects to. Here is the configuration for one PC. Remember that there are two networks, so choose the correct gateway IP address.



Task 3:

Ping each of the four hosts. The first ping packet will fail as the ARP request-and-response process takes place.

```
R0#ping 192.168.1.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.2, timeout
is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max
= 0/0/0 ms
```

```
R0#ping 172.16.1.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.1.2, timeout
is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max
= 0/0/1 ms
```

Note: Please also ping 172.16.1.3 and 172.16.1.4

Task 4:

Check the ARP table. A dash (-) indicates that the entry is directly connected and will never time out. Other entries will eventually time out.

```
R0#show arp
Protocol  Address     Age (min)  Hardware Addr   Type
Interface
Internet  172.16.1.1  -  0004.9AE0.1E02  ARPA
GigabitEthernet0/1
```

```
Internet 172.16.1.2  0  0005.5EAA.50BD ARPA
GigabitEthernet0/1
Internet 172.16.1.3  0  000D.BD1B.81C4 ARPA
GigabitEthernet0/1
Internet 172.16.1.4  0  00D0.5833.253B ARPA
GigabitEthernet0/1
Internet 192.168.1.1 -  0004.9AE0.1E01 ARPA
GigabitEthernet0/0
Internet 192.168.1.2 0  00E0.B01A.8E89 ARPA
GigabitEthernet0/0
```

Task 5:

After a minute or so, issue the command again and check the age column.

```
R0#show arp
Protocol  Address     Age (min)  Hardware Addr   Type
Interface
Internet 172.16.1.1  -  0004.9AE0.1E02 ARPA
GigabitEthernet0/1
Internet 172.16.1.2  1  0005.5EAA.50BD ARPA
GigabitEthernet0/1
Internet 172.16.1.3  1  000D.BD1B.81C4 ARPA
GigabitEthernet0/1
```

```
Internet 172.16.1.4  1  00D0.5833.253B ARPA
GigabitEthernet0/1
Internet 192.168.1.1 -  0004.9AE0.1E01 ARPA
GigabitEthernet0/0
Internet 192.168.1.2 1  00E0.B01A.8E89 ARPA
GigabitEthernet0/0
```

Notes:

As a packet travels across the network, the IP source and destination addresses never change. The MAC address source and destination change between hops.

Once done with the packet tracer lab above, open Wireshark, start capturing packets. After one minute or 2, stop the capture and in the filter area, enter: arp and hit enter.

Then go to your computer, open Command Prompt, and run the following command.

arp -a

```
C:\Users\ReyesR1>arp -a

Interface: 10.0.0.246 --- 0x14
  Internet Address      Physical Address      Type
  10.0.0.1              5c-76-95-61-66-3b     dynamic
  10.0.0.18             e4-75-dc-54-6f-e2     dynamic
  10.0.0.146            08-97-98-51-01-e9     dynamic
  10.0.0.209            1c-93-c4-6c-64-a7     dynamic
  10.0.0.255            ff-ff-ff-ff-ff-ff     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.1.60            01-00-5e-00-01-3c     static
  224.0.1.187           01-00-5e-00-01-bb     static
  230.86.6.15           01-00-5e-56-06-0f     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static

Interface: 10.1.33.156 --- 0x30
  Internet Address      Physical Address      Type
  10.1.32.5                                   static
  192.168.50.173                              static
  192.168.59.92                               static
  192.168.60.44                               static
  192.168.62.16                               static
  224.0.0.22                                  static
  224.0.0.251                                 static
  224.0.1.60                                  static
  224.0.1.187                                 static
  230.86.6.15                                 static
  239.255.255.250                             static
  255.255.255.255                             static

C:\Users\ReyesR1>
```