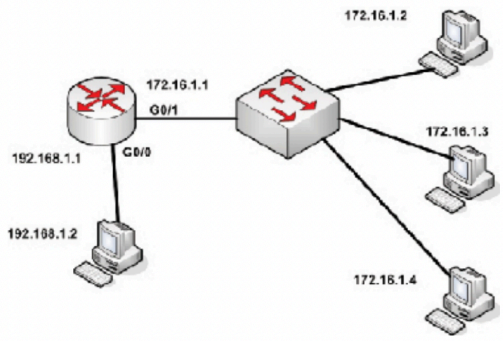
Lab 12. ARP Table

Lab Tool:

Packet Tracer

Lab Topology:

Please use the following topology to complete this lab exercise:



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 Walkthrough:

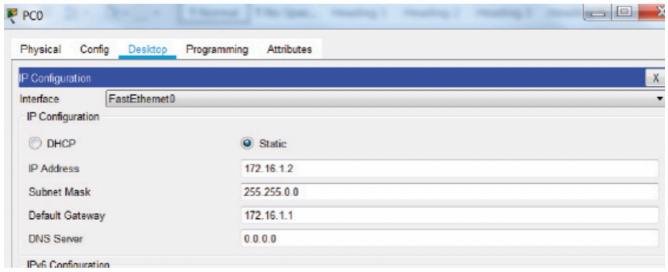
Task 1:

Connect a router to a switch. Add hosts as indicated in the diagram. You will need a crossover cable 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. I'm sure you know how to change the router hostname by now.

```
R0#show arp
R0#config t
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 g0/1
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

R0#ping 172.16.1.3

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.1.3, timeout is 2
seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max =
0/0/0 ms

R0#ping 172.16.1.4

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.1.4, timeout is 2
seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max =
0/0/1 ms
```

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.