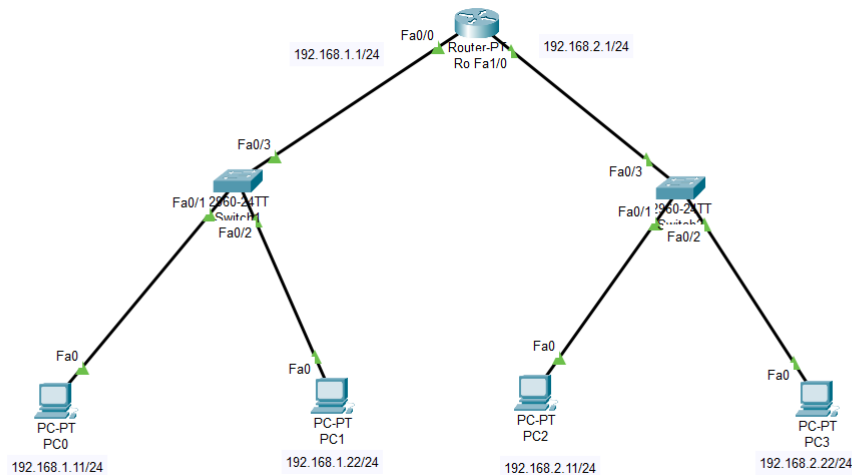# CS305 Lab 14 Practice

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Practice 13.2 -1: (ARP & Switch)

Build the network as below topology, do the following test on simulation mode of Packet-Tracer

- **Clear the arp table on PC0, then invoke"ping"on PC0 to reach PC1.**

```
C:\>arp -a
  Internet Address      Physical Address      Type
  192.168.1.22          0030.f22a.44b0        dynamic

C:\>arp -d
C:\>arp -a
No ARP Entries Found
C:\>
```

```
C:\>ping 192.168.1.22

Pinging 192.168.1.22 with 32 bytes of data:

Reply from 192.168.1.22: bytes=32 time<1ms TTL=128
Reply from 192.168.1.22: bytes=32 time<1ms TTL=128
Reply from 192.168.1.22: bytes=32 time=1ms TTL=128
Reply from 192.168.1.22: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.22:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

- **Describe the transmission path of arp request and arp reply.**

Firstly, If PC0 wants to ping PC1, he needs to send an ICMP packet to PC1. However, the link layer part of the packet requires the MAC address of PC1. Therefore, PC0 searches its arp table but finds that there is no entry corresponding to PC1(we use arp -d to delete any arp entries). Therefore, he will send an arp request from Fa0, his only outbound link. After receiving the arp request, the switch checks that the destination address is the broadcast address (FF-FF-FF-FF-FF-FF). So it forwards the frame to all other outgoing ports.
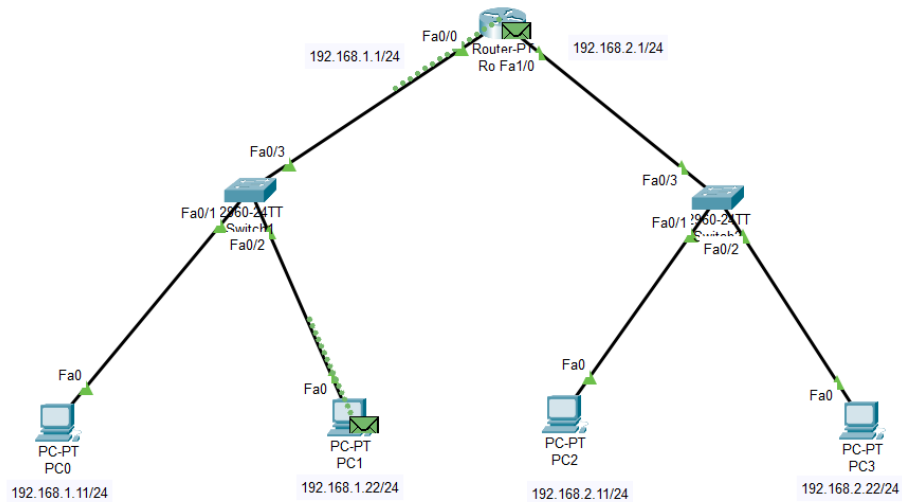
Then, the arp request packet is then received by arp modules in all network devices on the LAN. Each of these ARP modules checks whether its IP address matches the destination IP address in the ARP packet. The matching one sends back to the query host a response ARP packet with the desired mapping **(PC1 sends an arp reply to PC0)**.
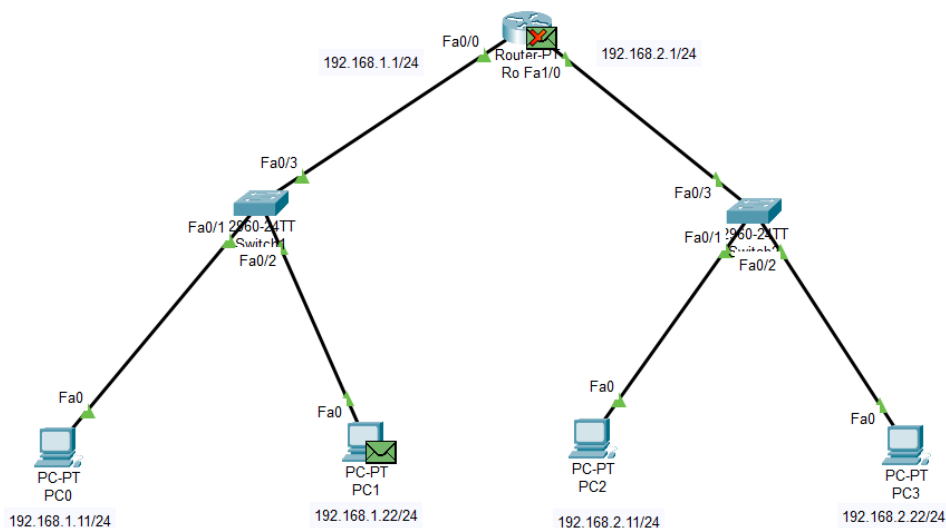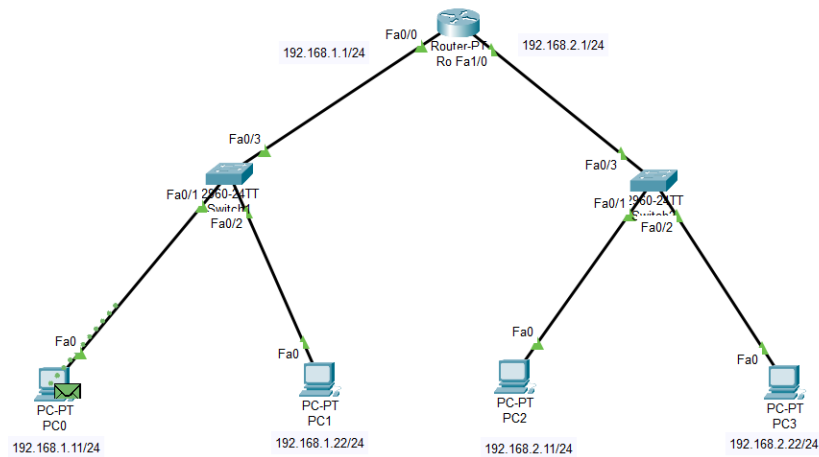
Finally, the query host PC0 is able to update its ARP table and send its ICMP request data packet encapsulated in a link layer frame whose destination MAC is the MAC address of the host PC1 that responded to the previous ARP request.

- **What does switch do after receive the arp request or arp reply: send back, forward or drop ?**

  The arp request is broadcast to all the outbound links except the interface from which the request is sent.

  Answer: send forward

- **What does router do after receive the arp request or arp reply: send back, forward or drop ?**

  Because it finds that the ip address corresponding to the arp request does not match its own ip address, it discards the request.

  Answer: drop