

Aim

To construct a simple Local Area Network (LAN) using Cisco Packet Tracer and demonstrate how the Address Resolution Protocol (ARP) resolves IPv4 addresses into MAC addresses by capturing and analyzing ARP request and ARP reply packets.

Problem statement

Construct simple LAN and understand the concept and operation of Address Resolution Protocol(ARP) using Cisco Packet Tracer. Utilize PCs, 8 port switch and LAN cable

Scope of the solution

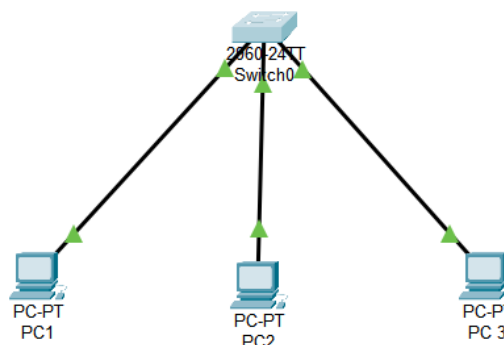
- Build a small LAN with 3 PCs and an 8-port layer-2 switch in Cisco Packet Tracer.
- Configure static IPv4 addresses for the PCs in the same subnet.
- Use Packet Tracer's Simulation mode to capture ARP request and response.
- Verify ARP entries on PCs and the MAC-address table on the switch.
- Produce a .pkt file and a short demo video showing the ARP process.

Required components

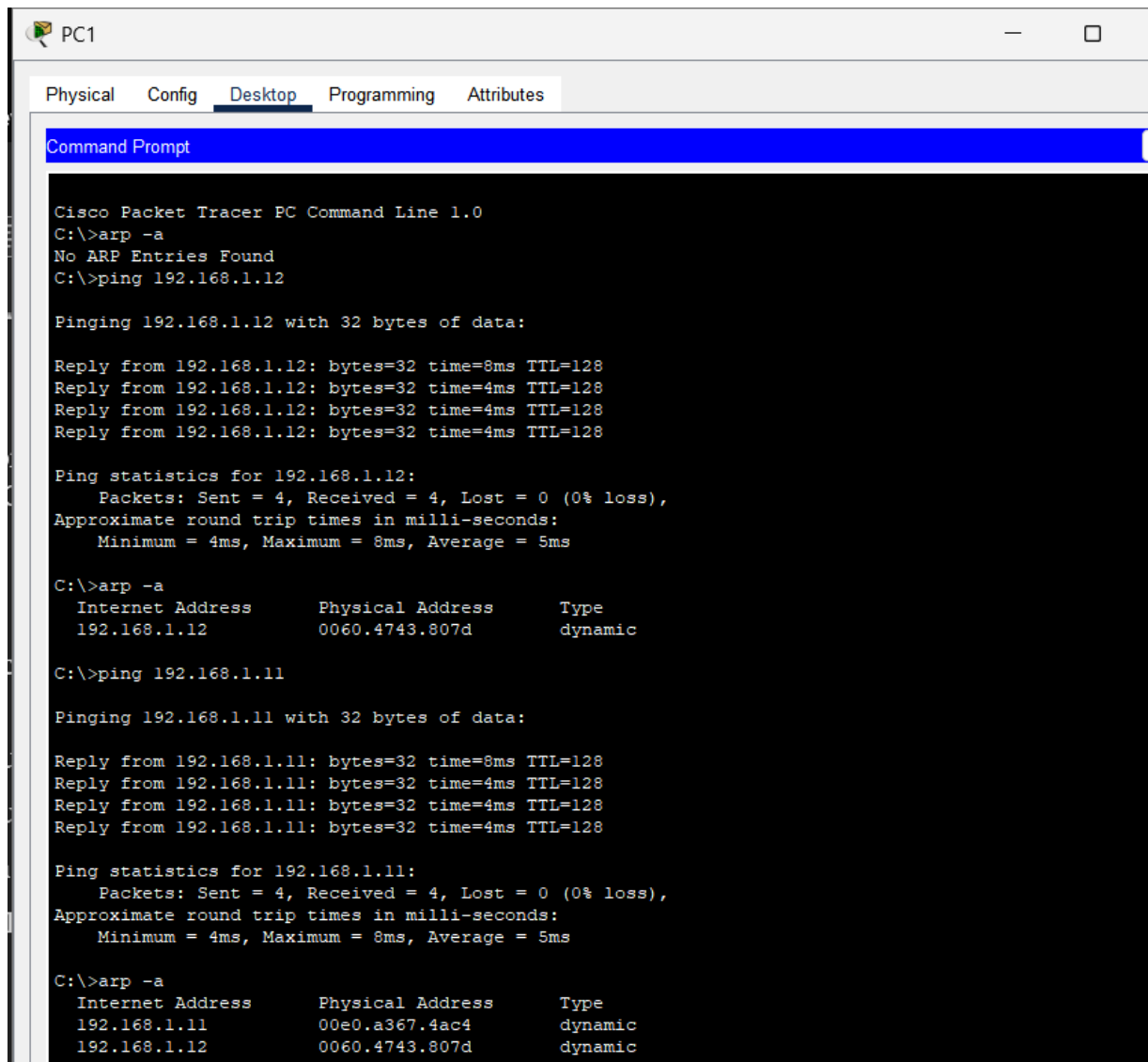
- **Software:** Cisco Packet Tracer
- **Hardware (simulated):** 3 × PC, 1 × 8-port Switch (e.g., 2960), Copper straight-through cables.

Simulated Network

Topology:



Command Prompt on PC1:

A screenshot of the PC1 configuration window in Cisco Packet Tracer. The 'Desktop' tab is selected, showing a 'Command Prompt' application. The command prompt displays the output of several network commands: 'arp -a' (showing no entries), 'ping 192.168.1.12' (successful with 4 replies), 'arp -a' (showing the entry for 192.168.1.12), 'ping 192.168.1.11' (successful with 4 replies), and 'arp -a' (showing entries for both 192.168.1.11 and 192.168.1.12).

```
PC1
Physical Config Desktop Programming Attributes
Command Prompt

Cisco Packet Tracer PC Command Line 1.0
C:\>arp -a
No ARP Entries Found
C:\>ping 192.168.1.12

Pinging 192.168.1.12 with 32 bytes of data:

Reply from 192.168.1.12: bytes=32 time=8ms TTL=128
Reply from 192.168.1.12: bytes=32 time=4ms TTL=128
Reply from 192.168.1.12: bytes=32 time=4ms TTL=128
Reply from 192.168.1.12: bytes=32 time=4ms TTL=128

Ping statistics for 192.168.1.12:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 4ms, Maximum = 8ms, Average = 5ms

C:\>arp -a
    Internet Address      Physical Address      Type
    192.168.1.12          0060.4743.807d       dynamic

C:\>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

Reply from 192.168.1.11: bytes=32 time=8ms TTL=128
Reply from 192.168.1.11: bytes=32 time=4ms TTL=128
Reply from 192.168.1.11: bytes=32 time=4ms TTL=128
Reply from 192.168.1.11: bytes=32 time=4ms TTL=128

Ping statistics for 192.168.1.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 4ms, Maximum = 8ms, Average = 5ms

C:\>arp -a
    Internet Address      Physical Address      Type
    192.168.1.11          00e0.a367.4ac4       dynamic
    192.168.1.12          0060.4743.807d       dynamic
```

Verification of ARP entries on PCs and the MAC-address table on the switch:

```
Switch#show mac address-table
      Mac Address Table
-----
Vlan  Mac Address      Type      Ports
----  -
1     0060.4743.807d     DYNAMIC   Fa0/3
1     0090.21e2.95c4     DYNAMIC   Fa0/1
1     00e0.a367.4ac4     DYNAMIC   Fa0/2
```