

EXPERIMENT 9

AIM:

To construct simple LAN and understand the concept and operation of Address Resolution Protocol (ARP)

OBSERVATION:

3-8-23

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TOPOLOGY:

Diagram illustrating the network topology for the experiment. A central switch (Switch-PT) is connected to a server (Server-PT) and four PCs (PC-PT, PC1, PC2, PC3). The IP addresses assigned are: Server-PT (10.0.0.1), PC-PT (10.0.0.2), PC1 (10.0.0.3), PC2 (10.0.0.4), and PC3 (10.0.0.5). The connections are labeled as 'Copper straight through'.

PROCEDURE:

1. Create a topology consisting of 4 PC's, 1 server and a switch.
2. Name Give IP address to all of the PC's and server - Server → 10.0.0.1, PC0 → 10.0.0.2, PC1 → 10.0.0.3, PC2 → 10.0.0.4, PC3 → 10.0.0.5
3. Connect all the PC's and the server to a switch using a copper-straight through wire.
4. Select the inspect tool from the tool bar

and open the ARP tables of all the devices.

5. Then, pinging the devices from the command prompt of other devices and click on capture in the simulation mode to know the packet routing.

6. With every ping, the arp tables of devices get filled with MAC addresses of the corresponding devices.

7. Even the switch learns about the MAC addresses of all devices during pinging process.

8. Once you have pinged all the devices, you can check the arp table of each device in command prompt of PCs.

>arp -a

Internet address	Physical address	Type
10.0.0.1	0060.47a4.a043	Dynamic
10.0.0.2	0060.47c5.1427	Dynamic
10.0.0.3	0005.5e01.0b46	Dynamic

9. In the switch → CLI, you can check the MAC addresses of the devices as follows

Switch > show mac address-table

VLAN	MAC address	Type	Ports
1	0005.5eac.0b46	Dynamic	Fa 3/1
1	0006.8546.bacc	Dynamic	Fa 3/1
1	0060.47a4.a032	Dynamic	Fa 0/1
1	0060.47e5.1424	Dynamic	Fa 1/1

OUTPUT:

```

R1# ping 10.0.0.2
Pinging 10.0.0.2 with 32 bytes of data:

```

Reply from 10.0.0.2 : bytes=32 time=0ms TTL=125

Reply from 10.0.0.2 : bytes=32 time=2ms TTL=125

Reply from 10.0.0.2 : bytes=32 time=3ms TTL=125

Reply from 10.0.0.2 : bytes=32 time=1ms TTL=125.

Ping statistics for 10.0.0.2

Packets : Sent=4, Received=4, Lost=0 (0% loss)

Approximate round trip times in milli-seconds:

Minimum=0ms, Maximum=3ms, Average=1ms

OBSERVATION:

Every time when a ping is done from a end device to another, it gets to know about the MAC address of the other end device and stores it in the ARP table.

The ARP tables are show table:

ARP table for Server 0

IP address	Hardware Address	Interface
10.0.0.2	0060.47c5.1424	FastEthernet0
10.0.0.3	0005.5eal.0b4b	FastEthernet0
10.0.0.4	00dc.854b.6acc	FastEthernet0

ARP table for PC0

IP address	Hardware Address	Interface
10.0.0.1	0060.47a4.a043	FastEthernet0
10.0.0.3	0005.5eal.0b4b	FastEthernet0
10.0.0.4	00dc.854b.6acc	FastEthernet0

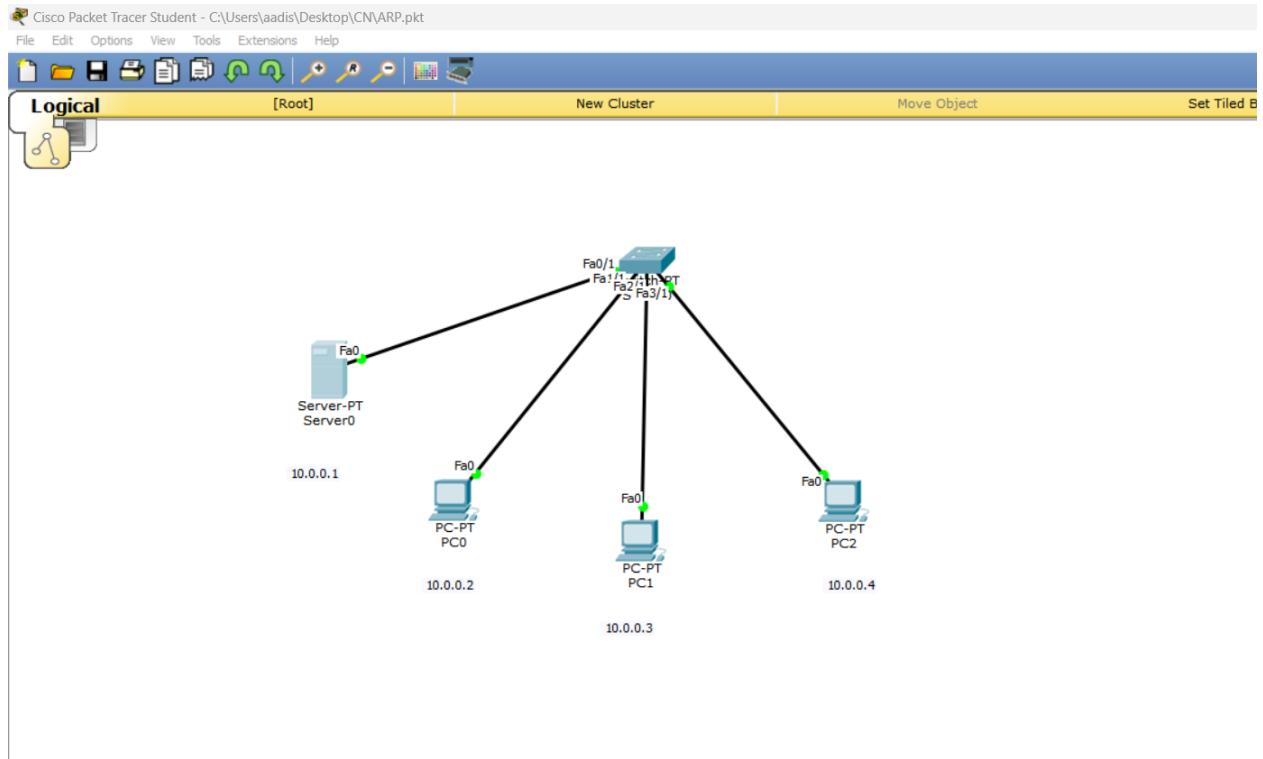
ARP table for PC1

IP address	Hardware Address	Interface
10.0.0.1	0060.47a4.a043	FastEthernet0
10.0.0.2	0060.47c5.1424	FastEthernet0

ARP table for PC2

IP address	Hardware Address	Interface
10.0.0.1	0060.47a4.a043	FastEthernet0
10.0.0.2	0060.47c5.1424	FastEthernet0

Result:



Switch0

Physical Config CLI

IOS Command Line Interface

```
up
%LINK-5-CHANGED: Interface FastEthernet1/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/1, changed state to up
%LINK-5-CHANGED: Interface FastEthernet2/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/1, changed state to up
%LINK-5-CHANGED: Interface FastEthernet3/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet3/1, changed state to up

Switch>show mac address-table
      Mac Address Table
-----
Vlan    Mac Address      Type      Ports
----    -
1       0003.e4e0.80e5   DYNAMIC   Fa2/1
1       0007.ec98.34e8   DYNAMIC   Fa3/1
1       000a.41db.4158   DYNAMIC   Fa0/1
1       000b.be99.d829   DYNAMIC   Fa1/1
Switch>
```

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