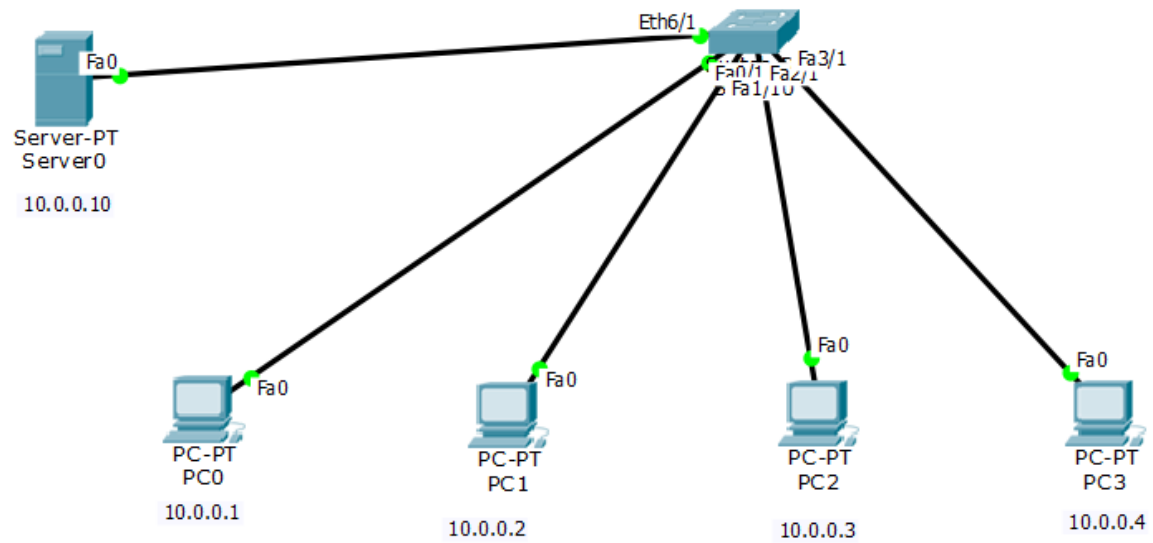


LAB 8:

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

Topology:



ARP Tables while pinging:

Ping from PC0 to Server0:

The screenshot shows the initial state of a network simulation in Cisco Packet Tracer. The network topology includes a central switch (S2611) connected to a server (Server-PT) and four PCs (PC-PT). The ARP tables for all devices are empty. A command prompt window on PC0 shows the command 'PC>ping 10.0.0.10' being entered.

ARP Table for Switch0

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for Server0

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for PC0

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for PC1

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for PC2

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for PC3

IP Address	Hardware Address	Interface
------------	------------------	-----------

Command Prompt

```
Packet Tracer PC Command Line 1.0
PC>ipconfig
No ARP Entries Found
PC>ping 10.0.0.10
Pinging 10.0.0.10 with 32 bytes of data:
```

The screenshot shows the state of the network simulation after the ping command. The ARP table for PC0 is now populated with the IP address 10.0.0.10, hardware address 000D.5896.A5C2, and interface FastEthernet0. The command prompt window on PC0 shows the output of the ping command, indicating that the ping was successful.

ARP Table for Switch0

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for Server0

IP Address	Hardware Address	Interface
10.0.0.1	000D.5896.A5C2	FastEthernet0

ARP Table for PC0

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for PC1

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for PC2

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for PC3

IP Address	Hardware Address	Interface
------------	------------------	-----------

Command Prompt

```
Packet Tracer PC Command Line 1.0
PC>ipconfig
No ARP Entries Found
PC>ping 10.0.0.10
Pinging 10.0.0.10 with 32 bytes of data:
```

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

Server-PT Server0 10.0.0.10

PC-PT PC0 10.0.0.1

PC-PT PC1 10.0.0.2

PC-PT PC2 10.0.0.3

PC-PT PC3 10.0.0.4

ARP Table for Switch0

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for Server0

IP Address	Hardware Address	Interface
10.0.0.1	00D0.5896.A3C2	FastEthernet0

ARP Table for PC0

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for PC2

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for PC3

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for PC1

IP Address	Hardware Address	Interface
------------	------------------	-----------

Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type	Info
	0.000	--	PC0	ICMP	
	0.000	--	PC0	ARP	
	0.001	PC0	Switch0	ARP	
	0.002	Switch0	PC1	ARP	
	0.002	Switch0	PC2	ARP	
	0.002	Switch0	PC3	ARP	
	0.002	Switch0	Server0	ARP	
	0.003	Server0	Switch0	ARP	

Reset Simulation Constant Delay Captured to: 0.003 s

Play Controls Back Auto Capture / Play Capture / Forward

Command Prompt

```
Packet Tracer PC Command Line 1.0
PC>arp -a
No ARP Entries Found
PC>ping 10.0.0.10
Pinging 10.0.0.10 with 32 bytes of data:
```

Time: 00:14:57.005 Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward

Connections

Automatically Choose Connection Type

Scenario 0 New Delete Toggle PDU List Window

Fire Last Status Source Destination Type Color

24°C Partly sunny

ENG IN 10:19 03-08-2023

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

Server-PT Server0 10.0.0.10

PC-PT PC0 10.0.0.1

PC-PT PC1 10.0.0.2

PC-PT PC2 10.0.0.3

PC-PT PC3 10.0.0.4

ARP Table for Switch0

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for Server0

IP Address	Hardware Address	Interface
10.0.0.1	00D0.5896.A3C2	FastEthernet0

ARP Table for PC0

IP Address	Hardware Address	Interface
10.0.0.10	00D0.8AEB.7409	FastEthernet0

ARP Table for PC2

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for PC3

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for PC1

IP Address	Hardware Address	Interface
------------	------------------	-----------

Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type	Info
	0.000	--	PC0	ICMP	
	0.001	PC0	Switch0	ARP	
	0.002	Switch0	PC1	ARP	
	0.002	Switch0	PC2	ARP	
	0.002	Switch0	PC3	ARP	
	0.002	Switch0	Server0	ARP	
	0.003	Server0	Switch0	ARP	
	0.004	Switch0	PC0	ARP	
	0.004	--	PC0	ICMP	

Reset Simulation Constant Delay Captured to: 0.004 s

Play Controls Back Auto Capture / Play Capture / Forward

Command Prompt

```
Packet Tracer PC Command Line 1.0
PC>arp -a
No ARP Entries Found
PC>ping 10.0.0.10
Pinging 10.0.0.10 with 32 bytes of data:
```

Time: 00:14:57.006 Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward

Connections

Automatically Choose Connection Type

Scenario 0 New Delete Toggle PDU List Window

Fire Last Status Source Destination Type Color

24°C Partly sunny

ENG IN 10:19 03-08-2023

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

Diagram showing a network topology with a central switch (Switch0) connected to four PCs (PC0, PC1, PC2, PC3) and a server (Server0). The switch is labeled R3/1. The PCs are labeled PC0, PC1, PC2, and PC3. The server is labeled Server0. The switch is connected to the PCs via Fa0/24, Fa0/23, Fa0/22, and Fa0/21. The server is connected to the switch via Fa0/20.

ARP Table for Switch0

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for Server0

IP Address	Hardware Address	Interface
10.0.0.1	00D0.5896.A5C2	FastEthernet0

ARP Table for PC0

IP Address	Hardware Address	Interface
10.0.0.10	00D0.8AEB.7409	FastEthernet0

Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type	Info
	0.001	PC0	Switch0	ARP	
	0.002	Switch0	PC1	ARP	
	0.002	Switch0	PC2	ARP	
	0.002	Switch0	PC3	ARP	
	0.002	Switch0	Server0	ARP	
	0.003	Server0	Switch0	ARP	
	0.004	PC0	Switch0	ICMP	
	0.005	PC0	Switch0	ICMP	

Reset Simulation: Constant Delay

Captured to: 0.005 s

Play Controls: Back Auto Capture / Play Capture / Forward

PC0 Command Prompt

```
PC> ipconfig
IP Address . . . . .: 10.0.0.10
Subnet Mask . . . . .: 255.255.255.0
Default Gateway . . . .: 10.0.0.1

PC> ping 10.0.0.10
Pinging 10.0.0.10 with 32 bytes of data:
```

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

Diagram showing a network topology with a central switch (Switch0) connected to four PCs (PC0, PC1, PC2, PC3) and a server (Server0). The switch is labeled R3/1. The PCs are labeled PC0, PC1, PC2, and PC3. The server is labeled Server0. The switch is connected to the PCs via Fa0/24, Fa0/23, Fa0/22, and Fa0/21. The server is connected to the switch via Fa0/20.

ARP Table for Switch0

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for Server0

IP Address	Hardware Address	Interface
10.0.0.1	00D0.5896.A5C2	FastEthernet0

ARP Table for PC0

IP Address	Hardware Address	Interface
10.0.0.10	00D0.8AEB.7409	FastEthernet0

Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type	Info
	0.002	Switch0	PC1	ARP	
	0.002	Switch0	PC2	ARP	
	0.002	Switch0	PC3	ARP	
	0.002	Switch0	Server0	ARP	
	0.003	Server0	Switch0	ARP	
	0.004	Switch0	PC0	ARP	
	0.004	PC0	Switch0	ICMP	
	0.005	PC0	Switch0	ICMP	
	0.006	Switch0	Server0	ICMP	

Reset Simulation: Constant Delay

Captured to: 0.006 s

Play Controls: Back Auto Capture / Play Capture / Forward

PC0 Command Prompt

```
PC> ipconfig
IP Address . . . . .: 10.0.0.10
Subnet Mask . . . . .: 255.255.255.0
Default Gateway . . . .: 10.0.0.1

PC> ping 10.0.0.10
Pinging 10.0.0.10 with 32 bytes of data:
```

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

Server-PT Server0 10.0.0.10

PC-PT PC0 10.0.0.1

PC-PT PC1 10.0.0.2

PC-PT PC2 10.0.0.3

PC-PT PC3 10.0.0.4

Switch0

ARP Table for Switch0

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for Server0

IP Address	Hardware Address	Interface
10.0.0.1	0000.5896.A5C2	FastEthernet0

ARP Table for PC0

IP Address	Hardware Address	Interface
10.0.0.10	0000.0AEB.7409	FastEthernet0

ARP Table for PC2

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for PC3

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for PC1

IP Address	Hardware Address	Interface
------------	------------------	-----------

Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type	Info
	0.002	Switch0	PC2	ARP	
	0.002	Switch0	PC3	ARP	
	0.002	Switch0	Server0	ARP	
	0.003	Server0	Switch0	ARP	
	0.004	Switch0	PC0	ARP	
	0.004	---	PC0	ICMP	
	0.005	PC0	Switch0	ICMP	
	0.006	Switch0	Server0	ICMP	
	0.007	Server0	Switch0	ICMP	

Reset Simulation: Constant Delay

Captured to: 0.007s

Play Controls: Back Auto Capture / Play Capture / Forward

PC0

Physical Config Desktop Custom Interface

Command Prompt

```

Packet Tracer: PC Command Line 1.0
PC>arp -a
No ARP Entries Found
PC>ping 10.0.0.10
Pinging 10.0.0.10 with 32 bytes of data:

```

Time: 00:14:37.009

Power Cycle Devices: PLAY CONTROLS: Back Auto Capture / Play Capture / Forward

Connections

Automatically Choose Connection Type

Scenario 0

New Delete

Toggle PDU List Window

Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

Server-PT Server0 10.0.0.10

PC-PT PC0 10.0.0.1

PC-PT PC1 10.0.0.2

PC-PT PC2 10.0.0.3

PC-PT PC3 10.0.0.4

Switch0

ARP Table for Switch0

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for Server0

IP Address	Hardware Address	Interface
10.0.0.1	0000.5896.A5C2	FastEthernet0

ARP Table for PC0

IP Address	Hardware Address	Interface
10.0.0.10	0000.0AEB.7409	FastEthernet0

ARP Table for PC2

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for PC3

IP Address	Hardware Address	Interface
------------	------------------	-----------

ARP Table for PC1

IP Address	Hardware Address	Interface
------------	------------------	-----------

Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type	Info
	0.002	Switch0	PC3	ARP	
	0.002	Switch0	Server0	ARP	
	0.003	Server0	Switch0	ARP	
	0.004	Switch0	PC0	ARP	
	0.004	---	PC0	ICMP	
	0.005	PC0	Switch0	ICMP	
	0.006	Switch0	Server0	ICMP	
	0.007	Server0	Switch0	ICMP	
	0.008	Switch0	PC0	ICMP	

Reset Simulation: Constant Delay

Captured to: 0.008s

Play Controls: Back Auto Capture / Play Capture / Forward

PC0

Physical Config Desktop Custom Interface

Command Prompt

```

Packet Tracer: PC Command Line 1.0
PC>arp -a
No ARP Entries Found
PC>ping 10.0.0.10
Pinging 10.0.0.10 with 32 bytes of data:
Reply from 10.0.0.10: bytes=32 time=92ms TTL=128

```

Time: 00:14:37.010

Power Cycle Devices: PLAY CONTROLS: Back Auto Capture / Play Capture / Forward

Connections

Automatically Choose Connection Type

Scenario 0

New Delete

Toggle PDU List Window

Cisco Packet Tracer Student - C:\Users\Admin\Desktop\18M21CS048\CN-lab\lab-8\lab8.cn.pkt

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

Switch0

Physical Config CLI

IOS Command Line Interface

```

Switch0#show mac address-table
Invalid input detected at '^' marker.

Switch0#show mac address-table
Mac Address Table
-----
Vlan  Mac Address      Type      Ports
-----
1      00d0.b89e.a5c2    DYNAMIC   Fa0/1
1      00d0.b8ab.7409    DYNAMIC   Ethe0/1

```

Simulation Panel

Event List

Via	Time(sec)	Last Device	At Device	Type	Info
2.019	PC0	Switch0	ICMP		
2.020	Switch0	Server0	ICMP		
2.021	Server0	Switch0	ICMP		
2.022	Switch0	PC0	ICMP		
3.025	PC0	Switch0	ICMP		
3.026	Switch0	Server0	ICMP		
3.027	Server0	Switch0	ICMP		
3.028	Switch0	PC0	ICMP		

Reset Simulation Constant Delay Captured to 3.028s

PC0

Physical Config Desktop Custom Interface

Command Prompt

```

Packet Tracer PC Command Line 1.0
PC>arp -a
No ARP Entries Found
PC>ping 10.0.0.10

Pinging 10.0.0.10 with 32 bytes of data:
Reply from 10.0.0.10: bytes=32 time=4ms TTL=128
Reply from 10.0.0.10: bytes=32 time=4ms TTL=128
Reply from 10.0.0.10: bytes=32 time=4ms TTL=128
Reply from 10.0.0.10: bytes=32 time=4ms TTL=128

Ping statistics for 10.0.0.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 4ms, Maximum = 4ms, Average = 4ms

PC>arp -a
Internet Address      Physical Address      Type
-----
10.0.0.10             00d0.b8ab.7409        dynamic

```

Time: 00:10:00.030 Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward

Connections

Scenario 0 Fire Last Status Source Destination Type Co

New Delete

Toggle PDU List Window

Automatically Choose Connection Type

Ping from PC0 to PC1:

Cisco Packet Tracer Student - C:\Users\Admin\Desktop\18M21CS048\CN-lab\lab-8\lab8.cn.pkt

File Edit Options View Tools Extensions Help

Logical [Root] New Cluster Move Object Set Tiled Background Viewport

Switch0

Physical Config CLI

IOS Command Line Interface

```

Switch0#show mac address-table
Invalid input detected at '^' marker.

Switch0#show mac address-table
Mac Address Table
-----
Vlan  Mac Address      Type      Ports
-----
1      00d0.b89e.a5c2    DYNAMIC   Fa0/1
1      00d0.b8ab.7409    DYNAMIC   Ethe0/1

```

Simulation Panel

Event List

Via	Time(sec)	Last Device	At Device	Type	Info
8.701	PC0	Switch0	ARP		
8.702	Switch0	PC1	ARP		
8.702	Switch0	PC2	ARP		
8.702	Switch0	PC3	ARP		
8.702	Switch0	Server0	ARP		
8.703	PC1	Switch0	ARP		
8.704	--	Switch0	DTP		
8.704	Switch0	PC0	ARP		
8.704	--	PC0	ICMP		

Reset Simulation Constant Delay Captured to 8.704s

Play Controls Back Auto Capture / Play Capture / Forward

PC0

Physical Config Desktop Custom Interface

Command Prompt

```

Packet Tracer PC Command Line 1.0
PC>arp -a
No ARP Entries Found
PC>ping 10.0.0.10

Pinging 10.0.0.10 with 32 bytes of data:
Reply from 10.0.0.10: bytes=32 time=4ms TTL=128
Reply from 10.0.0.10: bytes=32 time=4ms TTL=128
Reply from 10.0.0.10: bytes=32 time=4ms TTL=128
Reply from 10.0.0.10: bytes=32 time=4ms TTL=128

Ping statistics for 10.0.0.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 4ms, Maximum = 4ms, Average = 4ms

PC>arp -a
Internet Address      Physical Address      Type
-----
10.0.0.10             00d0.b8ab.7409        dynamic

```

Time: 00:15:05.706 Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward

Connections

Scenario 0 Fire Last Status Source Destination Type Co

New Delete

Toggle PDU List Window

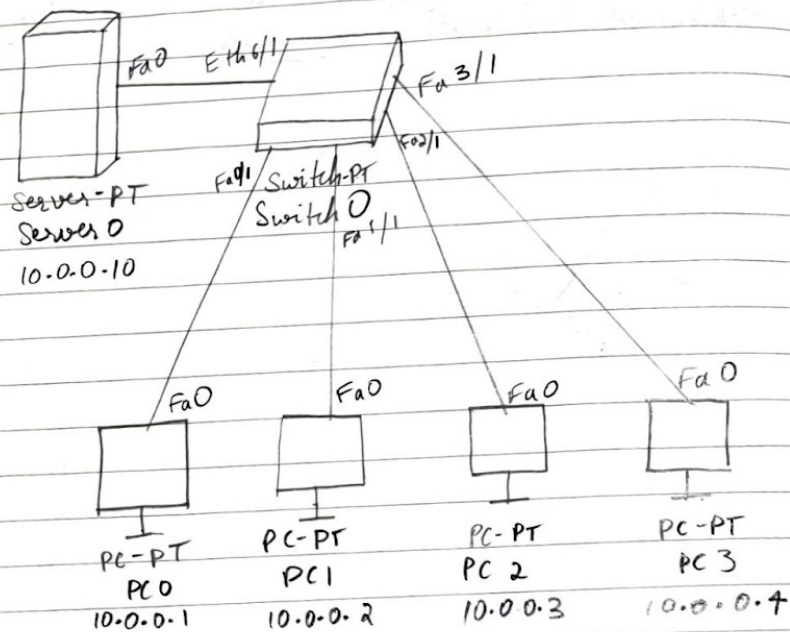
Automatically Choose Connection Type

3/8/23

Lab 8:

Aim: To construct simple LAN and understand the concept and operation of address resolution protocol (ARP)

Topology:



Procedure.

→ 1) Create a topology of 4 PCs and a server and a switch as shown in the diagram.

2) Set IP address of all devices as shown in the topology.

3) Use inspect tool to click on devices to open ARP tables of each device.

4) In command prompt of PC0, write arp -a to see arp table.

o/p: NO ARP Entries Found as no ping yet.

5) In CLI of switch, enter

Switch>enable

#show MAC

#show mac address-table

Now, mac address table is empty.

6) Go to Simulation mode.

ping the server from PC0

Click on capture button in simulation panel to go step by step. ~~chang~~

Alhaz

E Ping Output :-

```
PC > arp -a  
No ARP Entries found.  
PC > ping 10.0.0.10
```

Pinging 10.0.0.10 with 32 bytes of data:

```
Reply from 10.0.0.10: bytes=32 time=8ms TTL=128  
Reply from 10.0.0.10: bytes=32 time=4ms TTL=128  
Reply from 10.0.0.10: bytes=32 time=4ms TTL=128  
Reply from 10.0.0.10: bytes=32 time=4ms TTL=128
```

Ping statistics for 10.0.0.10:

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

```
PC > arp -a
```

Internet Address	Physical Address	Type
10.0.0.10	0000.0000.7409	dynamic

Observation:

- We can see mac address-table of switch in CLI
- We can observe that, when we ping and click on capture on simulation panel, ARP request is broadcasted and ARP reply is unicast.
- Then ICMP packets are sent.
- As and when capture is clicked, ARP table is updated accordingly for PC and server.