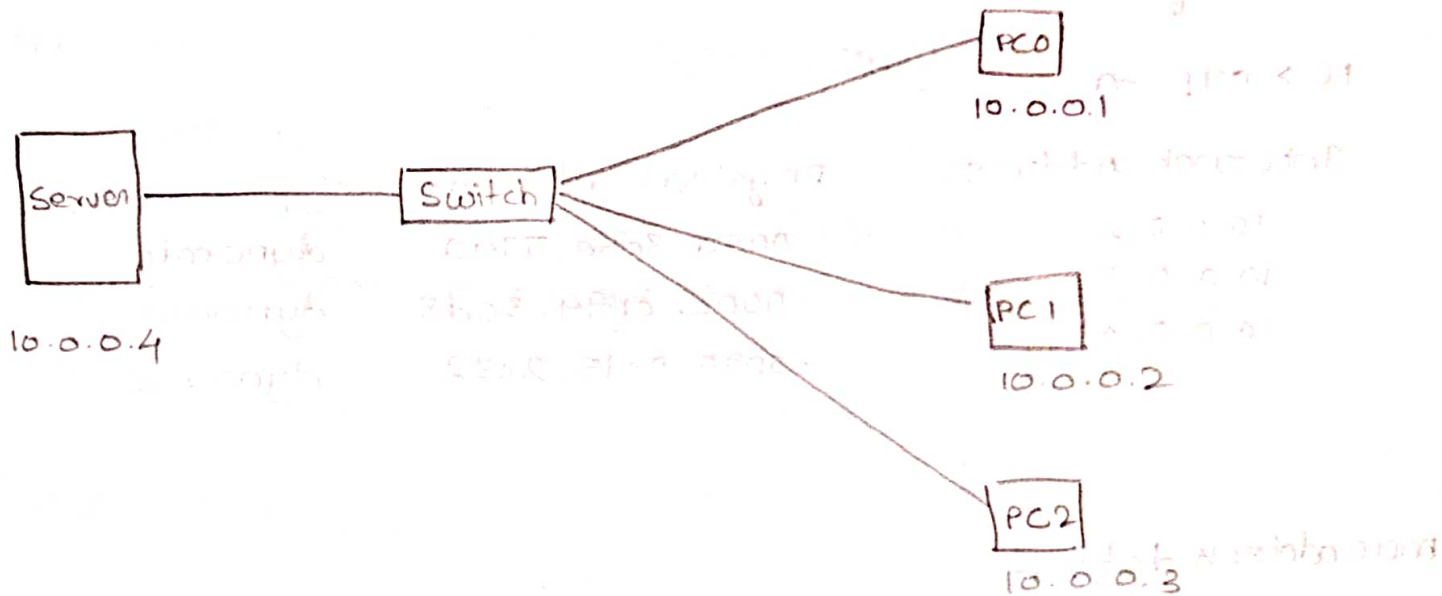


Lab 8

Aim: To understand the working of ARP

Topology:



Procedure:

- Connect a server, switch and PCs to form a simple LAN.
- set IP addresses of all the PCs and ~~services~~ servers
- Go to inspect and click on ARP table, which will be empty at the beginning.
- In simulation mode, ping the PCs using capture. Make sure that switch gets to know about every IP address by pinging them the devices.
- ~~As we~~ After pinging is completed, we can see that ARP tables are getting updated
- Go to command prompt of PC and give - arp -a

- It'll show the arp table of following PC
- Go to switch > CLI > show mac address-table to get all the addresses.

Output

arp table of PC0 —

PC > arp -a

Internet Address	Physical address	Type
10.0.0.2	0060.3e5e.7740	dynamic
10.0.0.3	000c.cf94.36d8	dynamic
10.0.0.4	0090.0c15.2c32	dynamic

mac address table —

switch > show mac address-table

Mac address Table

VLAN	Mac Address	Type	Port
1	000c.cf94.36d8	DYNAMIC	Fa2/1
1	0060.3e5e.7740	DYNAMIC	Fa1/1
1	0090.0c15.2c32	DYNAMIC	Fa3/1
1	00d0.584b.9966	DYNAMIC	Fa0/1

Observation

- ARP (address resolution protocol) is a protocol that connects dynamically changing IP address to a fixed mac address in a LAN.
- As we go on pinging the devices, we observe that ARP table gets updated dynamically.
- when we do show mac address-table, we can observe all device's mac address as we have pinged the devices to get to know about each other

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File Edit Options View Tools Extensions Help

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

10.0.0.4
Server-PT
Server0

10.0.0.1
PC-PT
PC0

10.0.0.2
PC-PT
PC1

10.0.0.3
PC-PT
PC2

Switch0

ARP Table for Server0

IP Address	Hardware Address	Interface
10.0.0.2	0060.3E5E.7740	FastEthernet0

ARP Table for PC0

IP Address	Hardware Address	Interface
10.0.0.2	0060.3E5E.7740	FastEthernet0

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	Server0	ARP	
	0.003	PC1	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

Event List Filters - Visible Events

ACL Filters: ARP, BGP, CD, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, LACP, NTP, NETFLOW, NTP, OSPF, OSPFv6, PAgp, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TFTP, Telnet, UDP, VTP

Edit Filters Show All/None

Time: 00:07:15.492 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 Time(sec) Periodic Num Ed

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File Edit Options View Tools Extensions Help

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

10.0.0.4 Server-PT Server0

10.0.0.1 PC-PT PC0

Switch0

PC0

Physical Config Desktop Custom Interface

Command Prompt

```
Ping statistics for 10.0.0.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
  Minimum = 4ms, Maximum = 8ms, Average = 5ms

DCping 10.0.0.4

Pinging 10.0.0.4 with 32 bytes of data:
Reply from 10.0.0.4: bytes=32 time=3ms TTL=128
Reply from 10.0.0.4: bytes=32 time=4ms TTL=128
Reply from 10.0.0.4: bytes=32 time=4ms TTL=128
Reply from 10.0.0.4: bytes=32 time=4ms TTL=128

Ping statistics for 10.0.0.4:
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
Invalid Command.

PC>arp -a
Internet Address      Physical Address      Type
10.0.0.2              0060.3e5e.7740        dynamic
10.0.0.3              000c.cf94.36d8        dynamic
10.0.0.4              0090.0c15.2c32        dynamic
```

ARP Table for Server0

IP Address	Hardware Address	Interface
10.0.0.1	00D0.584B.99B6	FastEthernet0
10.0.0.2	0060.3E5E.7740	FastEthernet0
10.0.0.3	000C.CF94.36D8	FastEthernet0

ARP Table for PC0

IP Address	Hardware Address	Interface
10.0.0.2	0060.3E5E.7740	FastEthernet0
10.0.0.3	000C.CF94.36D8	FastEthernet0
10.0.0.4	0090.0C15.2C32	FastEthernet0

ARP Table for PC2

IP Address	Hardware Address	Interface
10.0.0.1	00D0.584B.99B6	FastEthernet0
10.0.0.2	0060.3E5E.7740	FastEthernet0
10.0.0.4	0090.0C15.2C32	FastEthernet0

Simulation Panel

Event List

Vis. Time(sec) Last Device At Device Type Info

Reset Simulation ☒ Constant Delay Captured to: (no captures)

Play Controls

Back Auto Capture / Play Capture / Forward

Event List Filters - Visible Events

ACL Filter: ARP, BGP, CDP, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, ISDP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TFTP, Telnet, UDP, VTP

Edit Filters Show All/None

Destination Type Color Time(sec) Periodic Num Edit Delete

Simulation

24°C Partly sunny

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File Edit Options View Tools Extensions Help

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

```
graph LR
    S[Server-PT 10.0.0.4] --- S0[Switch0]
    S0 --- P1[PC-PT 10.0.0.1]
    S0 --- P2[PC-PT 10.0.0.2]
    S0 --- P3[PC-PT 10.0.0.3]
```

Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type	Info

PC1

Physical Config Desktop Custom Interface

Command Prompt

```
Reply from 10.0.0.3: bytes=32 time=4ms TTL=128
Reply from 10.0.0.3: bytes=32 time=4ms TTL=128

Ping statistics for 10.0.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 4ms, Maximum = 8ms, Average = 5ms

PC>ping 10.0.0.4

Pinging 10.0.0.4 with 32 bytes of data:
Reply from 10.0.0.4: bytes=32 time=8ms TTL=128
Reply from 10.0.0.4: bytes=32 time=4ms TTL=128
Reply from 10.0.0.4: bytes=32 time=4ms TTL=128
Reply from 10.0.0.4: bytes=32 time=4ms TTL=128

Ping statistics for 10.0.0.4:
    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
10.0.0.1              00d0.584b.95b6       dynamic
10.0.0.3              000c.cf94.36d8       dynamic
10.0.0.4              0090.0c15.2c32       dynamic

PC>
```

ARP Table for Server0

IP Address	Hardware Address	Interface
10.0.0.1	00D0.584B.95B6	FastEthernet0
10.0.0.2	0060.3E5E.7740	FastEthernet0
10.0.0.3	000C.CF94.36D8	FastEthernet0

ARP Table for PC0

IP Address	Hardware Address	Interface
10.0.0.2	0060.3E5E.7740	FastEthernet0
10.0.0.3	000C.CF94.36D8	FastEthernet0
10.0.0.4	0090.0C15.2C32	FastEthernet0

ARP Table for PC1

IP Address	Hardware Address	Interface
10.0.0.1	00D0.584B.95B6	FastEthernet0
10.0.0.3	000C.CF94.36D8	FastEthernet0
10.0.0.4	0090.0C15.2C32	FastEthernet0

ARP Table for PC2

IP Address	Hardware Address	Interface
10.0.0.1	00D0.584B.95B6	FastEthernet0
10.0.0.2	0060.3E5E.7740	FastEthernet0
10.0.0.4	0090.0C15.2C32	FastEthernet0

Simulation

Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete

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File Edit Options View Tools Extensions Help

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

Switch0

IOS Command Line Interface

```
up
%LINK-6-CHANGED: Interface FastEthernet1/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/1, changed state to up
%LINK-6-CHANGED: Interface FastEthernet2/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/1, changed state to up
%LINK-6-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       000c.2f94.36d8   DYNAMIC   Fa2/1
1       00d0.3e5e.7740   DYNAMIC   Fa1/1
1       0090.0c15.2c32   DYNAMIC   Fa3/1
1       00d0.584b.99b6   DYNAMIC   Fa0/1
Switch>
```

Copy Paste

SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VDP

Edit Filters Show All/None

Event List Simulation

Destination Type Color Time(sec) Periodic Num Edit Delete

Time: 0:00:00

Auto Capture / Play Capture / Forward

NEW Device

Toggle PDU List Window

Automatically Choose Connection Type

24°C Partly sunny

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ARP Table for Server0

IP Address	Hardware Address	Interface
10.0.0.1	00D0.584B.99B6	FastEthernet0
10.0.0.2	0060.3E5E.7740	FastEthernet0
10.0.0.3	000C.F94.36D8	FastEthernet0

ARP Table for PC0

IP Address	Hardware Address	Interface
10.0.0.2	0060.3E5E.7740	FastEthernet0
10.0.0.3	000C.F94.36D8	FastEthernet0
10.0.0.4	0090.0C15.2C32	FastEthernet0

ARP Table for PC1

IP Address	Hardware Address	Interface
10.0.0.1	00D0.584B.99B6	FastEthernet0
10.0.0.3	000C.F94.36D8	FastEthernet0
10.0.0.4	0090.0C15.2C32	FastEthernet0

ARP Table for PC2

IP Address	Hardware Address	Interface
10.0.0.1	00D0.584B.99B6	FastEthernet0
10.0.0.2	0060.3E5E.7740	FastEthernet0
10.0.0.4	0090.0C15.2C32	FastEthernet0