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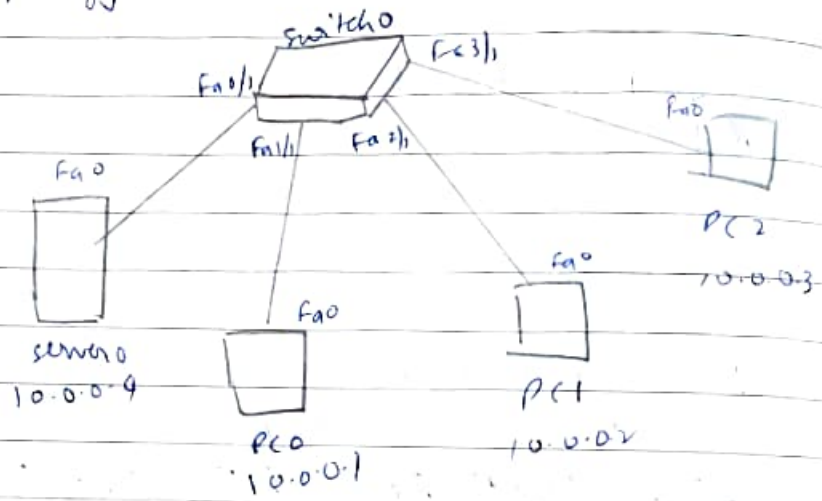
Experiment - 8

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

Topology:-



Procedure:-

i) ~~Setup~~ up the topology as shown above, using copper straight through wire

ii) Set the IP address as shown above

iii) Click on inspect tool and select the end devices one by one and select the ARP tables.

iv) Now, click on any end device and → desktop → command prompt

PC> arp -a

No ARP Entries Found

This will be the result.

v) Now ping each device from every other device and observe the changes in the ARP Table.

vi) After this, go to CLI of switch and type

show mac address-table and observe.

Result:

PC(a)

PC>arp -a

No ARP Entries found

PC>ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.1: bytes=32 time=1ms TTL=120
Reply from 10.0.0.1: bytes=32 time=9ms TTL=120
Reply from 10.0.0.1: bytes=32 time=0ms TTL=120
Reply from 10.0.0.1: bytes=32 time=4ms TTL=120

Ping statistics for 10.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 9ms, Average = 5ms.

Now similarly ping all other devices for same results.

PC> arp -a

Internet Address	Physical Address	Type
10.0.0.1	0001.9683.7660	dynamic
10.0.0.4	0090.2B73.E0A9	dynamic
10.0.0.2	0001.9796.E267	dynamic

We get similar results for other devices.

Now in switch CLI,
Switch> show mac address-table

Mac Address Table

Vlan	Mac Address	Type	Port
1	0001.9683.7660	DYNAMIC	Fa1/1
1	0001.9796.1267	DYNAMIC	Fa2/1
1	0090.2673.1000	DYNAMIC	Fa0/1
1	0010.a349.9156	DYNAMIC	Fa3/1

observation:

i) In the beginning no ARP entries will be found.

ii) As we start pinging, the entries get added.

iii) ARP converts an ever-changing Internet Protocol (IP) address to a fixed physical machine address, also known as media access control (MAC) address, in a local-area network (LAN).

iv) The switch starts recognizing the devices even if it is pinging or received data.

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Cisco Packet Tracer Student

File Edit Options View Tools Extensions Help

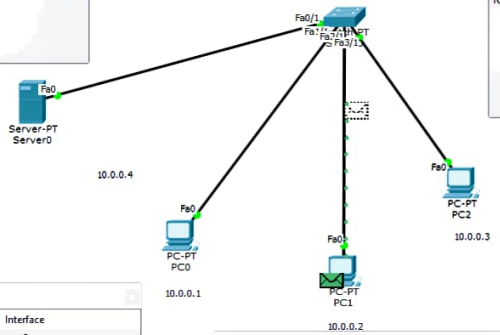
Logical [Root] New Cluster Move Object Set Tiled Background Viewport

ARP Table for Server0

IP Address	Hardware Address	Interface
10.0.0.1	0001.9683.7660	FastEthernet0
10.0.0.2	0001.9796.E267	FastEthernet0
10.0.0.3	00E0.A349.98B4	FastEthernet0

ARP Table for PC2

IP Address	Hardware Address	Interface
10.0.0.1	0001.9683.7660	FastEthernet0
10.0.0.2	0001.9796.E267	FastEthernet0
10.0.0.4	0090.2B73.E0A4	FastEthernet0



ARP Table for PC0

IP Address	Hardware Address	Interface
10.0.0.2	0001.9796.E267	FastEthernet0
10.0.0.3	00E0.A349.98B4	FastEthernet0
10.0.0.4	0090.2B73.E0A4	FastEthernet0

ARP Table for PC1

IP Address	Hardware Address	Interface
10.0.0.1	0001.9683.7660	FastEthernet0
10.0.0.3	00E0.A349.98B4	FastEthernet0
10.0.0.4	0090.2B73.E0A4	FastEthernet0

Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type	Info
	17.502	--	PC1	ICMP	
	17.503	PC1	Switch0	ICMP	
	17.504	Switch0	PC0	ICMP	
	17.505	PC0	Switch0	ICMP	
	17.506	Switch0	PC1	ICMP	
	17.510	--	PC2	ICMP	
	17.511	PC2	Switch0	ICMP	
	17.512	Switch0	PC1	ICMP	
	17.513	PC1	Switch0	ICMP	

Reset Simulation | Constant Delay | Capturing...

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, HSRP, 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, TCP, TFTP, Telnet, UDP, VTP

Edit Filters | Show All/None

Time: 00:08:08.202 Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward

Event List Simulation

Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete

Switch0

Physical Config CLI

IOS Command Line Interface

```
   1    0090.2b73.e0a4    DYNAMIC     Fa0/1
   1    00e0.a349.98b4    DYNAMIC     Fa3/1
Switch>arp -a
          ^
% Invalid input detected at '^' marker.

Switch>show mac address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

   1    0001.9683.7660    DYNAMIC     Fa1/1
   1    0001.9796.e267    DYNAMIC     Fa2/1
   1    0090.2b73.e0a4    DYNAMIC     Fa0/1
   1    00e0.a349.98b4    DYNAMIC     Fa3/1
Switch>show mac address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

   1    0001.9683.7660    DYNAMIC     Fa1/1
   1    0001.9796.e267    DYNAMIC     Fa2/1
   1    0090.2b73.e0a4    DYNAMIC     Fa0/1
   1    00e0.a349.98b4    DYNAMIC     Fa3/1
Switch>
```

PC0

Physical | Config | Desktop | Custom Interface

Command Prompt

```
Packet Tracer PC Command Line 1.0
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
  10.0.0.3              00e0.a349.98b4        dynamic
  10.0.0.4              0090.2b73.e0a4        dynamic

PC>
```

PC1

Physical | Config | Desktop | Custom Interface

Command Prompt

```
Packet Tracer PC Command Line 1.0
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
  10.0.0.4              0090.2b73.e0a4        dynamic

PC>ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.1: bytes=32 time=8ms TTL=128
Reply from 10.0.0.1: bytes=32 time=4ms TTL=128
Reply from 10.0.0.1: bytes=32 time=4ms TTL=128
Reply from 10.0.0.1: bytes=32 time=4ms TTL=128

Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 4ms, Maximum = 8ms, Average = 5ms

PC>
```

PC2

Physical | Config | Desktop | Custom Interface

Command Prompt

```
Packet Tracer PC Command Line 1.0
PC>arp -a
No ARP Entries Found
PC>ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.1: bytes=32 time=8ms TTL=128
Reply from 10.0.0.1: bytes=32 time=4ms TTL=128
Reply from 10.0.0.1: bytes=32 time=4ms TTL=128
Reply from 10.0.0.1: bytes=32 time=4ms TTL=128

Ping statistics for 10.0.0.1:
    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              0001.9683.7660        dynamic

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>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Reply from 10.0.0.2: bytes=32 time=8ms TTL=128
Reply from 10.0.0.2: bytes=32 time=4ms TTL=128
Reply from 10.0.0.2: bytes=32 time=4ms TTL=128
Reply from 10.0.0.2: bytes=32 time=4ms TTL=128

Ping statistics for 10.0.0.2:
    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              0001.9683.7660        dynamic
  10.0.0.2              0001.9796.e267        dynamic
  10.0.0.4              0090.2b73.e0a4        dynamic

PC>
```