ARP Lab

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**Purpose:** Our purpose is to examine and understand how the Address Resolution Protocol (ARP) aids in the transmission of packets by updating and maintaining the ARP cache.

**Equipment/Supplies Used:**

Windows 7  
VMWare/Ubuntu 13.14  
Lab Computers

**Methodology:**

Our first task was to fully understand the step we were on. Only after we fully understood the step did we start to work through it on the computer. We completed each step twice, making sure there were no inconsistencies between tests. Inconsistencies or unusual behavior would warrant a third test. We then documented the results and moved onto the next step.

**Raw results:**

Ipconfig on Windows 7  
-Using IP address 199.17.161.177

1.2:  
arp –a : List the ARP cache  
arp –d : Flushes the ARP cache

First run on arp –a:  
199.17.162.1  
199.17.162.129  
  
1.3:

After pinging 199.17.161.32, it is now in the ARP cache

1.4-1.5:

Ping 199.17.161.14  
-199.17.161.14 in ARP cache  
-MAC Address suggests vendor Netics, Inc.  
Ping 199.17.171.8  
-199.17.161.1 in ARP cache  
Ping 199.17.162.232  
-199.17.161.1 in ARP cache

Part 2

2.1-2.2

Ping 199.17.161.32  
-199.17.161.32 in ARP cache  
-MAC Address that of Dell, Inc.  
Ping 199.17.171.8  
-Router’s IP cached  
-Router’s MAC address suggests Cisco  
Ping 199.17.161.14  
-Router’s IP cached  
-Random IP in cache: 199.17.162.129  
Ping 199.17.162.232   
-199.17.162.232 cached  
-MAC Address is VMWare  
  
2.3  
  
Node doesn’t exist, host unreachable  
199.17.162.255 still gets cached

2.4

Ping 74.125.225.48  
-Nothing is cached  
-Routing handled by router  
-Same thing with 98.139.183.24

2.5  
  
Routing table full  
-Default route  
-2 VMWare routes

2.6

Ping 199.17.161.32  
-Routes through default gateway  
  
Added host specific route to 199.17.161.32  
-Now 199.17.161.32 in ARP cache after ping   
-199.17.161.14 in ARP cache after ping  
  
Now adding a net specific route to 199.17.161.0  
-199.17.161.14 in ARP cache after ping

Part 3

3.1

Ipconfig produces 2 separate addresses  
-Link-local starts with fe80::  
-Public starts with 2001:

Netsh interface ipv6 show interface  
-Shows all current interfaces connected  
-Local Area Connection, index 11, is lowest metric

Netsh interface ipv6 show neighbors  
-display neighbor cache  
-ipv6’s version of arp –a

After pinging fe80:78fa:78fa:39c1:3d97:38f0%11  
-added to neighbor cache

Netsh interface ipv6 show addresses  
-shows current IP address leases and their lifetime

Netsh interface ipv6 show route  
-similar to netstat –r  
  
netsh interface ipv6 show site prefixes  
-shows the site prefixes that are being broadcast by the router  
-2001:468:1942:2::/64

Part 4

Ifconfig  
-eth0 199.17.162.29  
-2 ipv6 addresses  
 2001:468:1942:2:200:29ff:fe81:862c/64  
 2001:468:1942:C414:567f:6649:2ce5/64

Arp command same as arp –a  
-only 199.17.162.1

Ping 199.17.161.14  
-Nothing in cache, besides 199.17.162.1  
Ping 199.17.171.8  
-Nothing in cache, besides 199.17.162.1  
Ping 199.17.162.232  
-199.17.162.232 added to ARP cache

4.2

After pinging the windows interface from the Ubuntu interface, the Ubuntu IP address was in the Windows 7’s ARP cache. Likewise, the Windows IP address is was in the Ubuntu ARP cache

After clearing both of the ARP caches, the process was then repeated, pinging from the Windows side. The results were the same, both were in each other’s ARP cache.

4.3

Changed IP of Windows side to 199.17.161.177

Repeated step 4.2

Only the routers were in both of the ARP caches  
-the packets were routed, not transmitted over the same physical segment

The netstat –r was much smaller than windows  
-only included default, link local, router

Ip -6 addr show  
- lo ::1/128  
-eth0 2001:468:1942:2:7dfe:920a:9486:8c5/64

Ip -6 route show  
-showed router’s link local address  
  
Boot neighbor computer to get link local IPv6 address  
After pinging link local address, it showed in neighbor cache  
-along with router