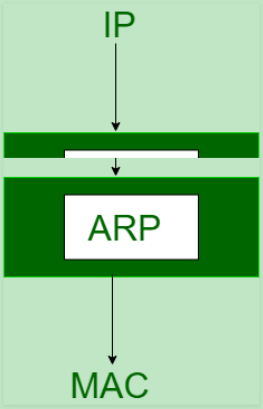
Dropping jaws in 3,2,1..... Happy New Year Geeks! Enter Now

ADS BY ADRECOVER

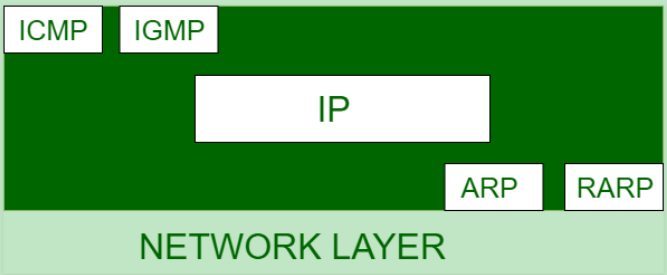

How Address Resolution Protocol (ARP) works?

Difficulty Level : Medium • Last Updated : 07 Sep, 2020

Most of the computer programs/applications use **logical address (IP address)** to send/receive messages, however the actual communication happens over the **physical address (MAC address)** i.e from layer 2 of OSI model. So our mission is to get the destination MAC address which helps in communicating with other devices. This is where ARP comes into the picture, its functionality is to translate IP address to physical address.



The acronym ARP stands for **Address Resolution Protocol** which is one of the most important protocols of the Network layer in the OSI model.
Note: ARP finds the hardware address, also known as Media Access Control (MAC) address, of a host from its known IP address.



Let's look at how ARP works.

COURSES

Data Structures and Algorithms – Self Paced Course
View Details

Free Coding Round Contests – Test Series
View Details

ADS BY ADRECOVER


MOST POPULAR IN COMPUTER

Imagine a device wants to communicate with the other over the internet. What ARP does? Is it broadcast a packet to all the devices of the source network.
The devices of the network peel the header of the data link layer from the **protocol data unit (PDU)** called frame and transfers the packet to the network layer (layer 3 of OSI) where the network ID of the packet is validated with the destination IP's network ID of the packet and if it's equal then it responds to the source with the MAC address of the destination, else the packet reaches the gateway of the network and broadcasts packet to the devices it is connected with and validates their network ID

The above process continues till the second last network device in the path to reach the destination where it gets validated and ARP, in turn, responds with the destination MAC address.

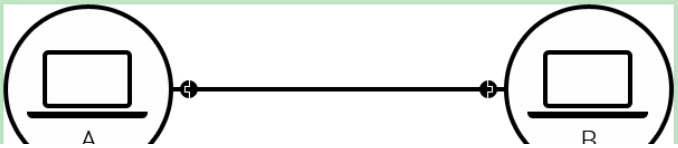
The important terms associated with ARP are :

1. **ARP Cache:** After resolving MAC address, the ARP sends it to the source where it stores in a table for future reference. The subsequent communications can use the MAC address from the table
2. **ARP Cache Timeout:** It indicates the time for which the MAC address in the ARP cache can reside
3. **ARP request:** This is nothing but broadcasting a packet over the network to validate whether we came across destination MAC address or not.
    1. The physical address of the sender.
    2. The IP address of the sender.
    3. The physical address of the receiver is FF:FF:FF:FF:FF:FF or 1's.
    4. The IP address of the receiver
4. **ARP response/reply:** It is the MAC address response that the source receives from the destination which aids in further communication of the data.

- **CASE-1:** The sender is a host and wants to send a packet to another host on the same network.
    - Use ARP to find another host's physical address
- **CASE-2:** The sender is a host and wants to send a packet to another host on another network.
    - Sender looks at its routing table.
    - Find the IP address of the next hop (router) for this destination.
    - Use ARP to find the router's physical address
- **CASE-3:** the sender is a router and received a datagram destined for a host on another network.
    - Router check its routing table.
    - Find the IP address of the next router.
    - Use ARP to find the next router's physical address.
- **CASE-4:** The sender is a router that has received a datagram destined for a host in the same network.
    - Use ARP to find this host's physical address.

NOTE: An ARP request is a broadcast, and an ARP response is a Unicast.

Test Yourself :



NETWORKS

Caesar Cipher in Cryptography

Socket Programming in Python

UDP Server-Client implementation in C

Congestion Control techniques in Computer Networks

Socket Programming in Java

MOST VISITED IN GATE CS

ACID Properties in DBMS

Normal Forms in DBMS

Cache Memory in Computer Organization

Types of Operating Systems

Page Replacement Algorithms in Operating Systems

ADS BY ADRECOVER

Jazz Islam World

Islam World

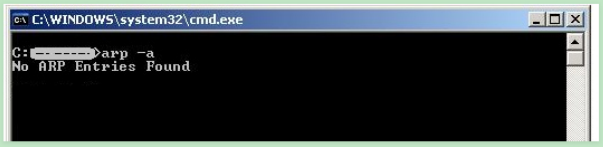
Islam World se Quran Pak ke Tilawat suniye aur Sawab kamain

کھولیں

Connect two PC, say A and B with cross cable. Now you can see the working of ARP by typing these commands:

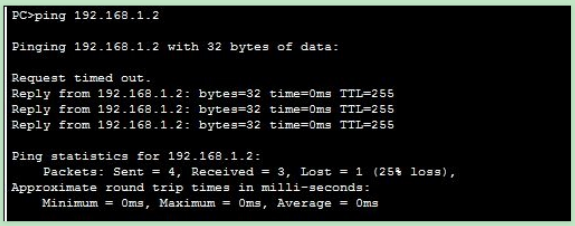
1. **A** > arp -a

There will be no entry in table because they never communicated with each other.

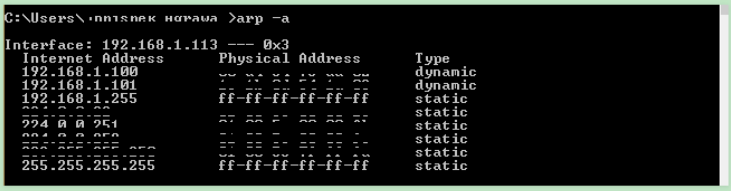


2. **A** > ping 192.168.1.2

IP address of destination is 192.168.1.2
Reply comes from destination but one packet is lost because of ARP processing.



Now, entries of ARP table can be seen by typing the command.
This is how ARP table looks like:



This article is contributed by **Vivek Reddy**. If you like GeeksforGeeks and would like to contribute, you can also write an article using contribute.geeksforgeeks.org or mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

Please write comments if you find anything incorrect, or you want to share more information about the topic discussed above.

Attention reader! Don't stop learning now. Get hold of all the important CS Theory concepts for SDE interviews with the **CS Theory Course** at a student-friendly price and become industry ready.

01 ARP, Reverse ARP(RARP), Inverse ARP (InARP), Proxy ARP and Gratuitous ARP
09, Oct 17

02 Address Resolution in DNS (Domain Name Server)
17, Apr 18

03 Difference between ARP and RARP
03, Jun 19

04 Difference Between Network Address Translation (NAT) and Port Address Translation (PAT)
24, May 19

05 Difference between 3-address instruction and 1-address instruction
20, Apr 20

06 Difference between 3-address instruction and 0-address instruction
15, May 20

07 Difference between 3-address instruction and 2-address instructions
18, Jun 20

08 Difference between 2-address instruction and 1-address instructions
17, May 20

Like 0

Previous
Matrix Comsec Interview Experience

Next
Largest area rectangular sub-matrix with equal number of 1's and 0's

Article Contributed By :

GeeksforGeeks

Vote for difficulty
Current difficulty : Medium

Easy | Normal | Medium | Hard | Expert

Improved By : VaibhavRai3, priteshverma

Article Tags : Computer Networks , GATE CS

Practice Tags : Computer Networks

Improve Article | Report Issue

Writing code in comment? Please use ide.geeksforgeeks.org, generate link and share the link here.

3 Comments GeeksforGeeks Disqus' Privacy Policy Login

Recommend Tweet Share Sort by Newest

Join the discussion…

LOG IN WITH OR SIGN UP WITH DISQUS

Name

Andie Go Giap • 2 months ago
This is good read and touch up on good old ADMIN ROOT PROXY - Month of emails a massed from hostmaster@example.com - webmaster@example.com - postmaster@exasmple.com

Reply • Share ›