

# Address Resolution Protocol

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- ❑ Address resolution problem
- ❑ Address resolution techniques
- ❑ ARP protocol
- ❑ Proxy ARP, Reverse ARP, and Inverse ARP

# Address Resolution Protocol (ARP)



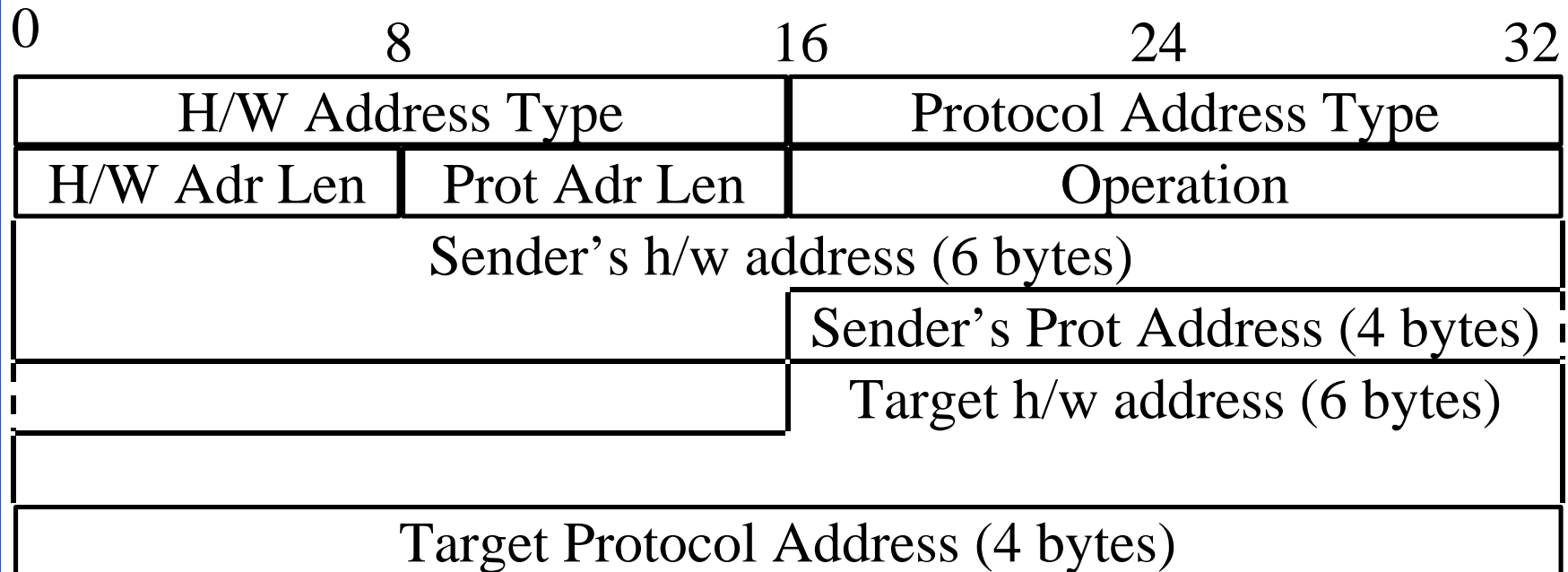
- ❑ Problem: Given an IP address find the MAC address
- ❑ Solution 1. Table Lookup:  
Searching or indexing to get MAC addresses

<b>IP Address</b>	<b>MAC Address</b>
197.15.3.1	0A:4B:00:00:07:08
197.15.3.2	0B:4B:00:00:07:00
197.15.3.3	0A:5B:00:01:01:03
197.15.3.4	04:06:07:08:09:10
197.15.3.5	06:07:09:08:03:01

## ARP (Cont)

- ❑ 2. Closed-Form Computation: Using local IEEE 802 addresses, e.g., Hardware Address  
= (IP\_address & 0xFF)!40:00:00:00:00:00
- ❑ 3. Message Exchange: ARP
  - ❑ The host broadcasts a request:  
“What is the MAC address of 127.123.115.08?”
  - ❑ The host whose IP address is 127.123.115.08 replies back: “The MAC address for 127.123.115.08 is 8A-5F-3C-23-45-56<sub>16</sub>”
- ❑ All three methods are allowed in TCP/IP networks.

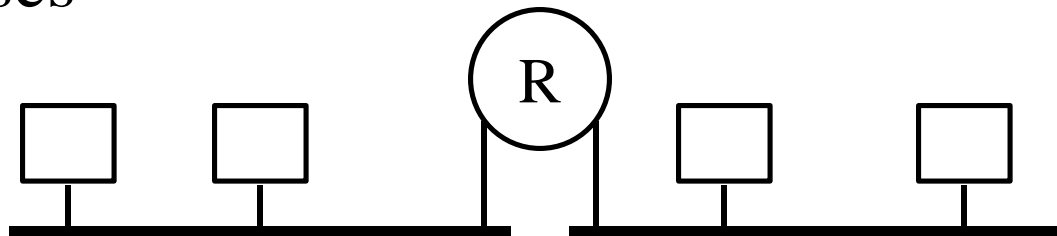
# ARP Message Format



- ❑ H/W Address type:
- ❑ Protocol Address type: 0x0800 = IP
- ❑ Operation: 1= Request, 2=Response
- ❑ ARP messages are sent directly to MAC layer

# ARP Processing

- ❑ ARP responses are cached.
- ❑ Entry replaced when
  - ❑ Cache table fills up (oldest removed)
  - ❑ After some time, e.g., 20 minutes
- ❑ Sender's address binding is stored in the cache of the target
- ❑ Proxy ARP: A router may act as a proxy for many IP addresses

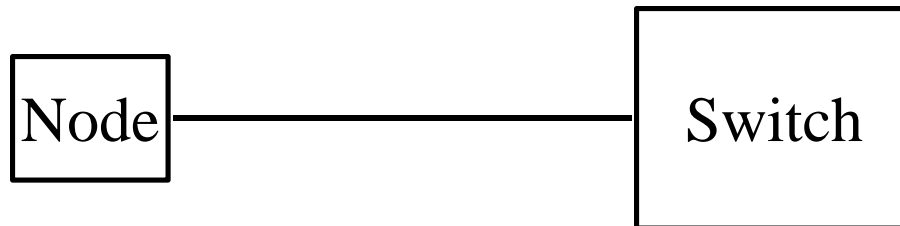


## Reverse ARP (RARP)

- ❑ What is the IP address of a given hardware address?
- ❑ Used by diskless systems to find their own IP address.
- ❑ Need RARP server to respond.
- ❑ Ref: RFC 903 and Comer's "Internetworking with TCP/IP, Vol 1, 3rd Ed

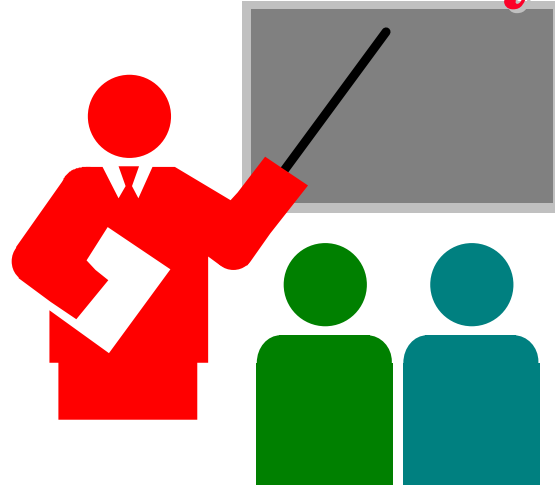
# Inverse ARP

- ❑ Used on point to point links
- ❑ Find IP address of the host on the other end
- ❑ Used in frame relay and ATM
- ❑ Ref: RFC 1293





# Summary



- ❑ ARP allows converting IP address to MAC addresses
- ❑ Proxy ARP, RARP, Inverse ARP