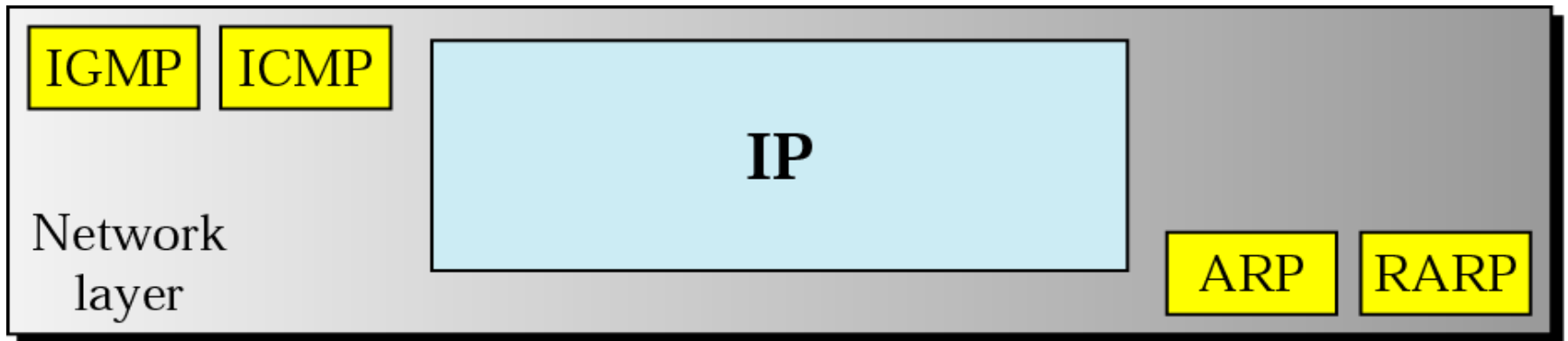


# Address Resolution Protocol

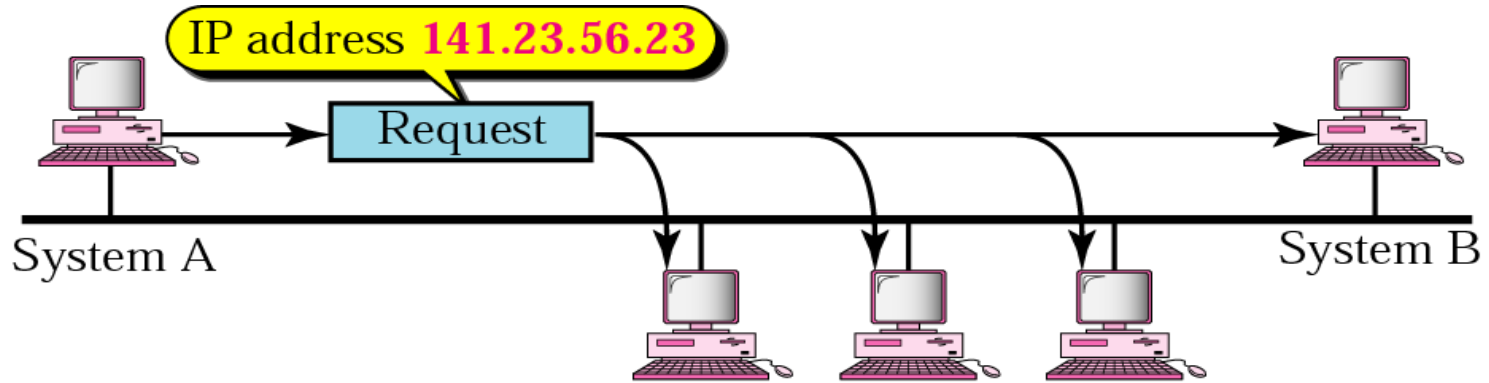
# Protocols at network layer



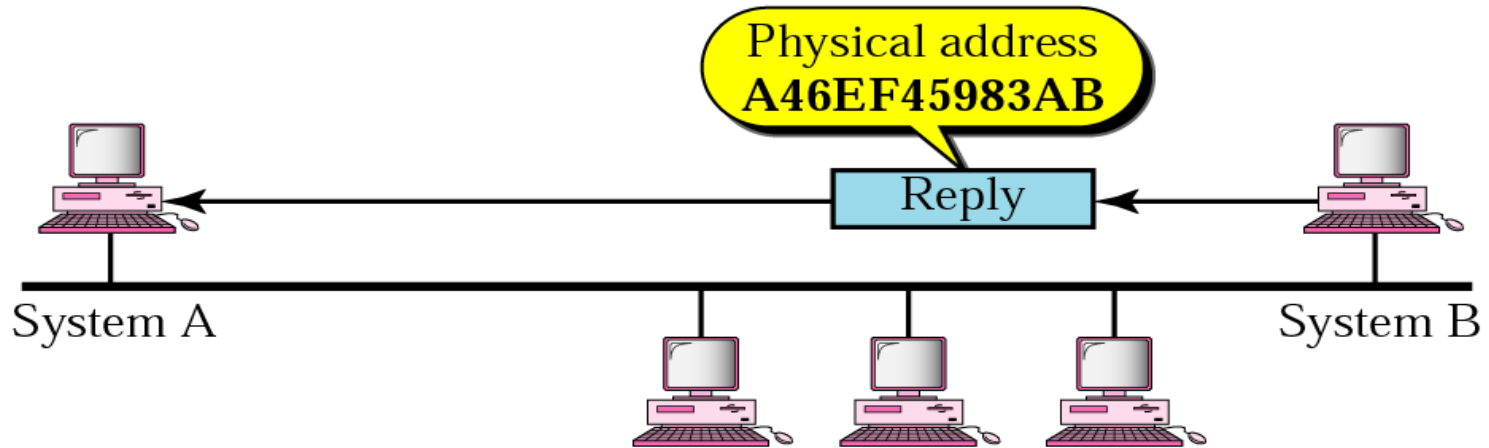
# ARP operation

- ARP is used to extract the MAC address for a station
- Each host on a network build up a table of mappings between IP addresses and link-level addresses
- the entries are timed out periodically and removed.
- Timeout happens on the order of every 15 minutes
- The set of mappings stored in a host is known as the ARP cache or ARP table

# ARP operation

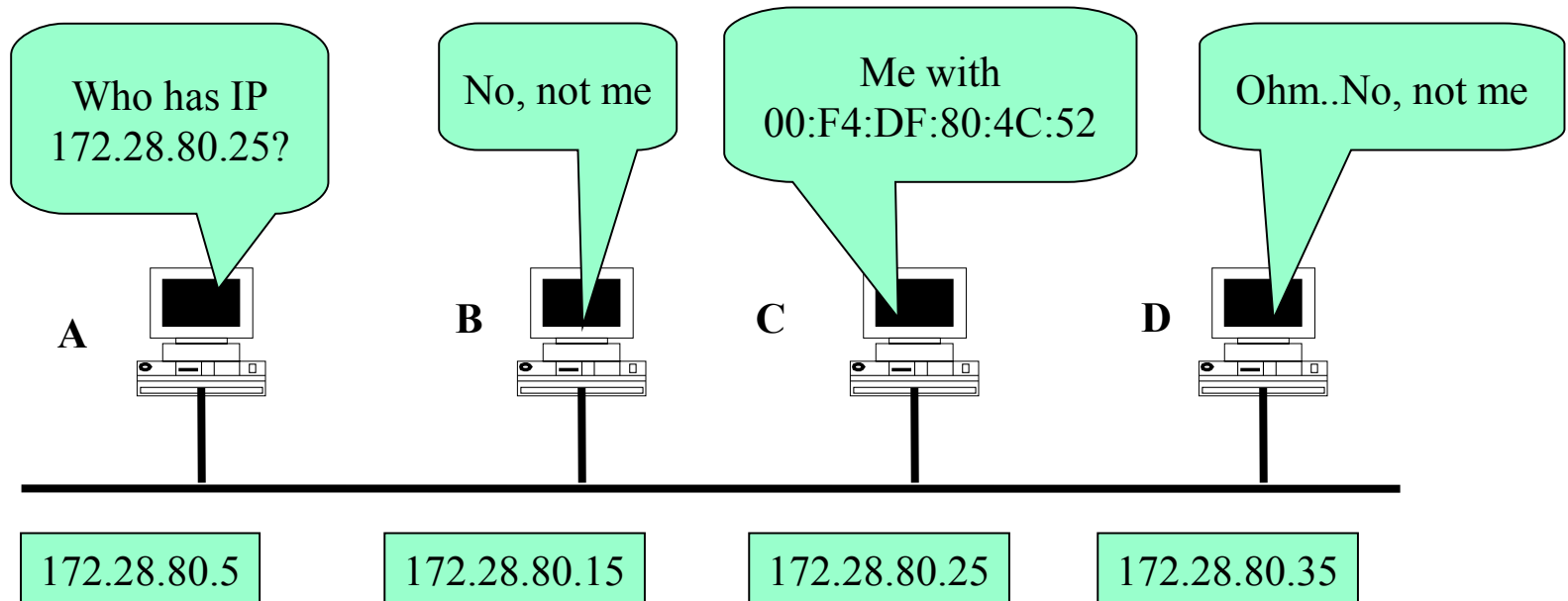


a. ARP request is broadcast



b. ARP reply is unicast

# ARP Operation



# Packet Format

0	8	16	31
Hardware type = 1		ProtocolType = 0x0800	
HLen = 48	PLen = 32		Operation
SourceHardwareAddr (bytes 0-3)			
SourceHardwareAddr (bytes 4-5)		SourceProtocolAddr (bytes 0-1)	
SourceProtocolAddr (bytes 2-3)		TargetHardwareAddr (bytes 0-1)	
TargetHardwareAddr (bytes 2-5)			
TargetProtocolAddr (bytes 0-3)			

# Packet Format

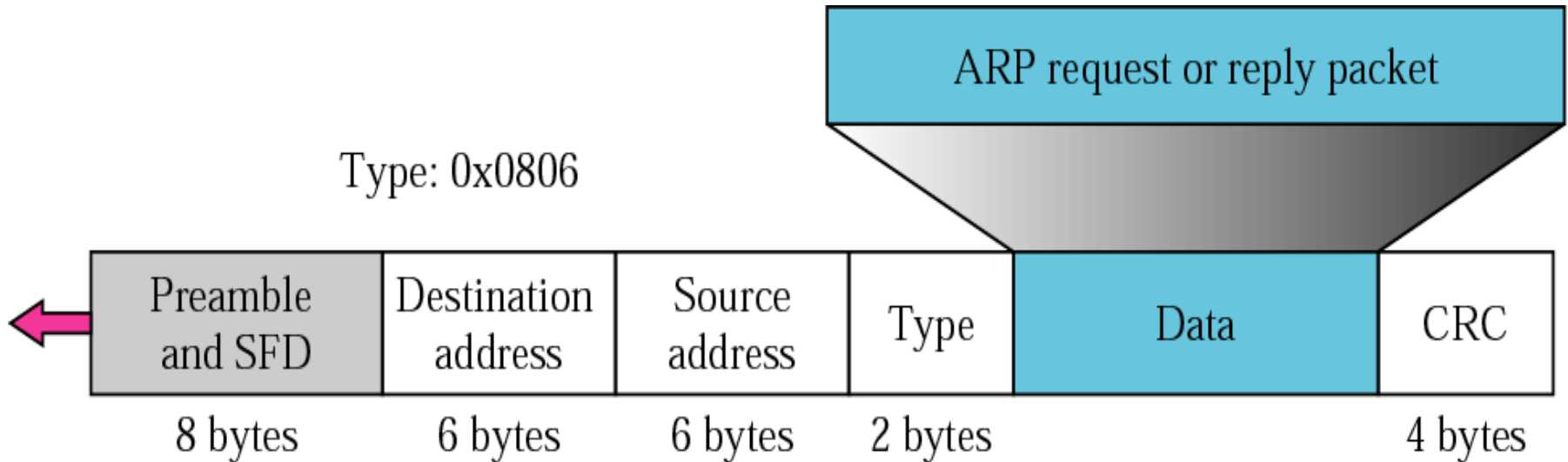
- **Hardware type** : Type of network on which ARP is running. Ethernet = 1, ARCnet = 7, localtalk = 11
- **Protocol type** : IPv4 = 0X800
- **Hardware length** : length of physical address, Ethernet = 6 bytes
- **Protocol length** : length of logical address, IP = 4 bytes
- **ARP operation** : ARP request = 1, ARP reply = 2,  
RARP request =3 RARP reply =4

# Packet Format

- **Source Hardware Address:** Physical address of sender
- **Source Protocol Address:** Logical Address of sender
- **Target Hardware Address:** Physical address of receiver
- **Target Protocol Address:** Logical address of receiver

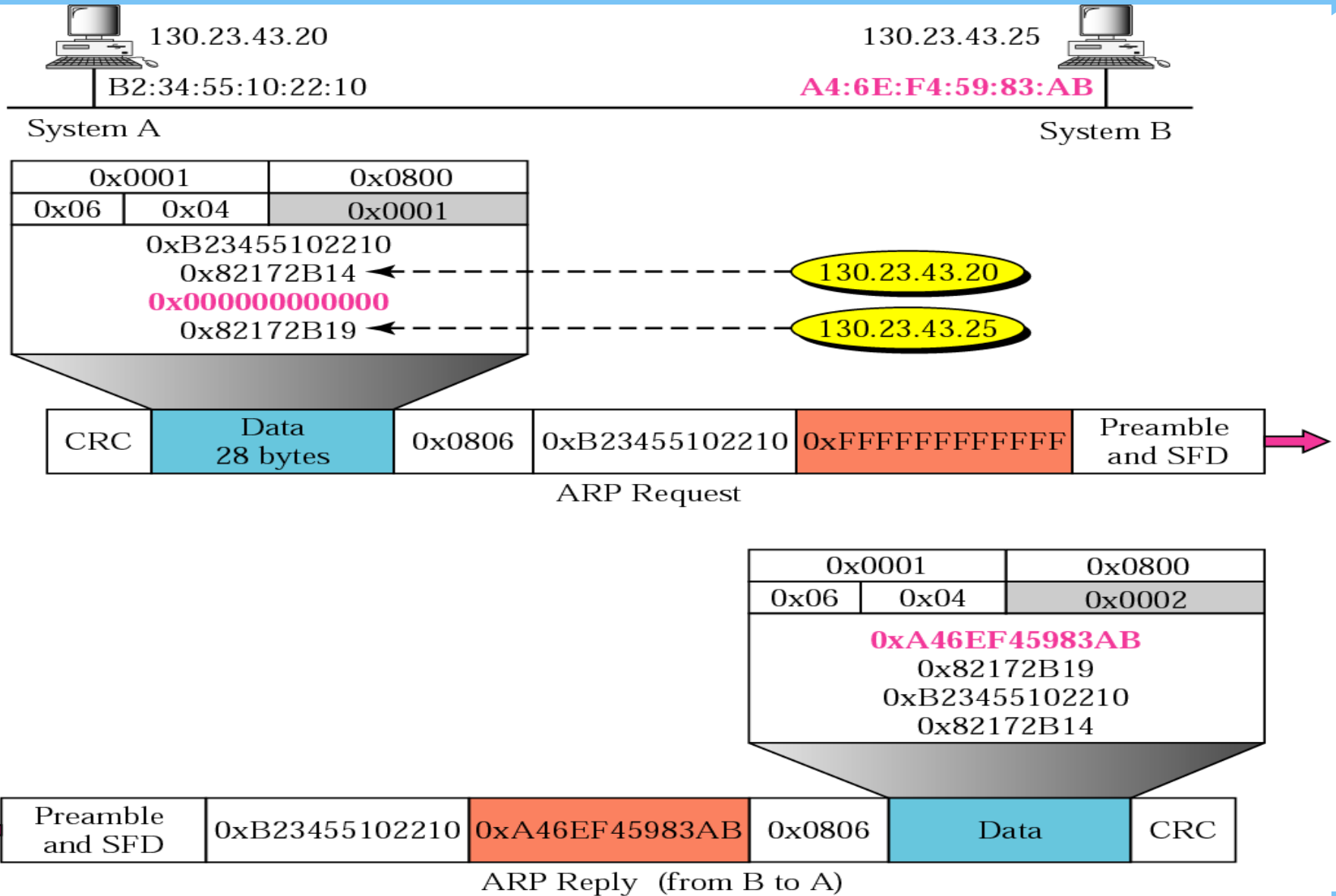


# Encapsulation of ARP packet



The ARP packet is encapsulated within an Ethernet packet.  
Note: Type field for Ethernet is x0806

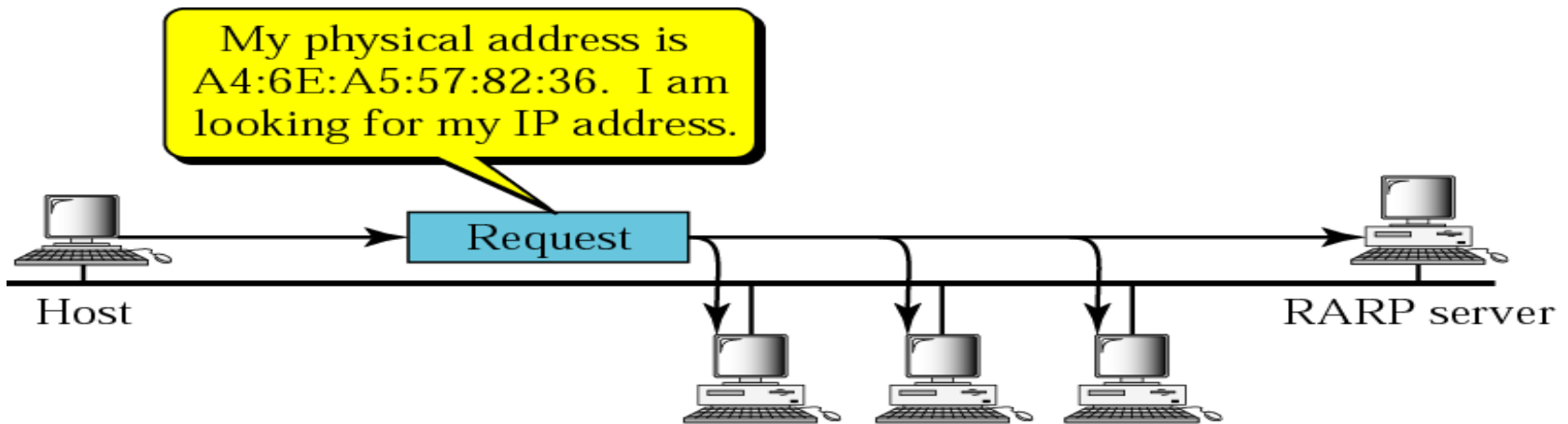
# Example



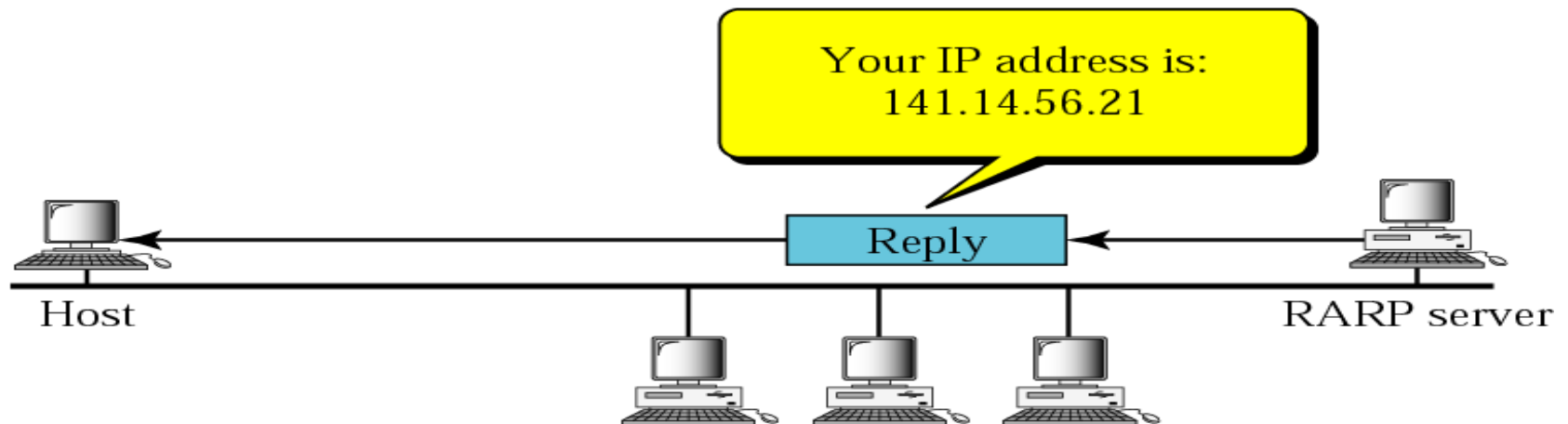
# RARP

- RARP finds the logical address for a machine that only knows its physical address.
- This is often encountered on thin-client workstations. No disk, so when machine is booted, it needs to know its IP address (don't want to burn the IP address into the ROM).
- RARP requests are broadcast, RARP replies are unicast.

# RARP operation



a. RARP request is broadcast



b. RARP reply is unicast