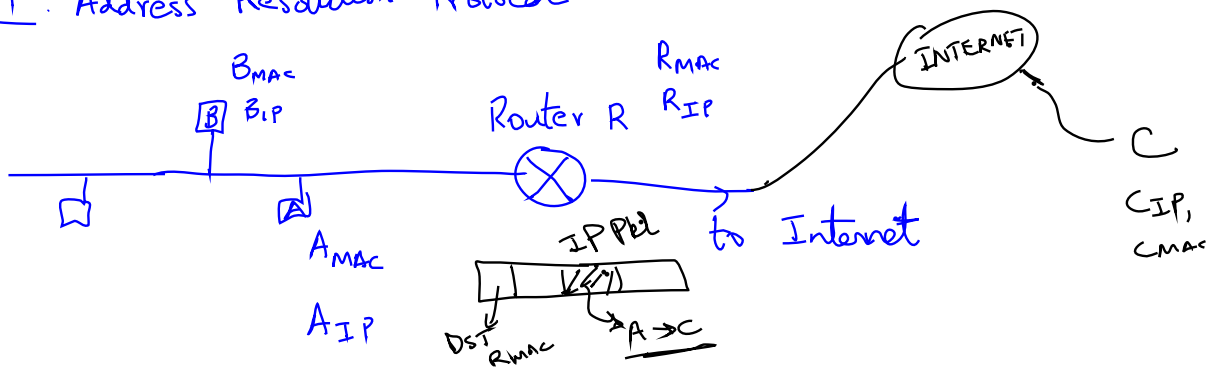
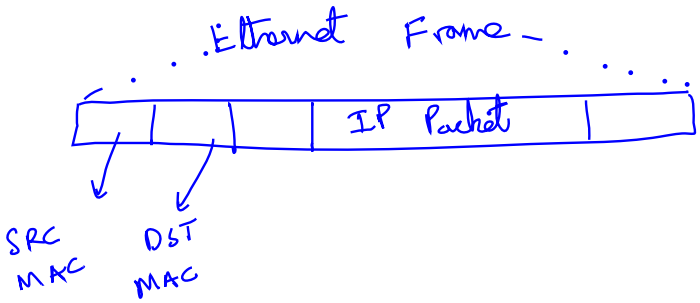
ARP: Address Resolution Protocol

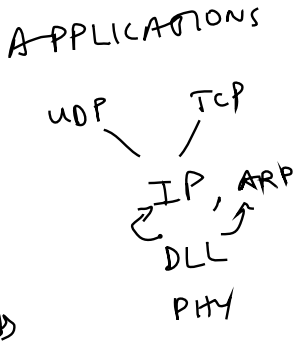


A wants to send an IP packet to B

A knows B's IP ; A does not know B_{MAC}



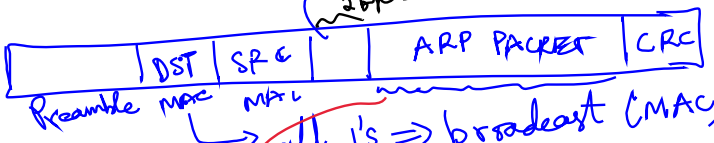
ARP to the rescue



Ethernet Frame

Type/length (2 bytes)

Value > 1536 ⇒ this corresponds to TYPE not length (Eg: 0x0806 ⇒ ARP packet)



all 1's ⇒ broadcast (MAC)

ARP REQ
Request
(A → All (meant for B))

SENDER MAC (A_{MAC}) ; SENDER IP (A_{IP})

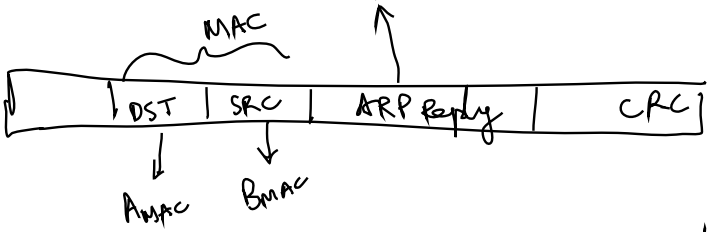
TARGET MAC ; TARGET IP (B_{IP})

↳ All zeros

ARP Reply : SENDER MAC : SENDER IP
(from B → A) (BMAC) (BIP)

↓ UNICAST ETHERNET FRAME

TARGET MAC ; TARGET IP → AIP
→ (AMAC)



Information (BMAC) stored in ARP cache at A, with a timeout

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1) How does A know if DST IP belongs own network or not?

2) If DST IP is not in own network, how to know R_{IP}, R_{MAC} → discuss later

1) A_{IP} : $a_1 . a_2 . a_3 . a_4$

Subnet mask: Ex: 255.255.255.0
all 1s

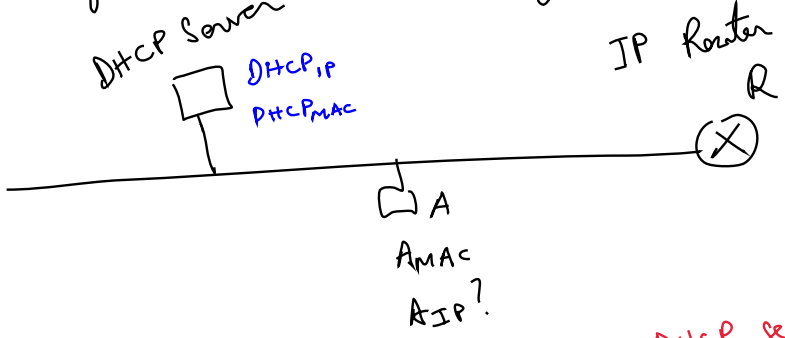
If DST IP AND MASK == A_{IP} AND MASK
NETWORK ADDRESS

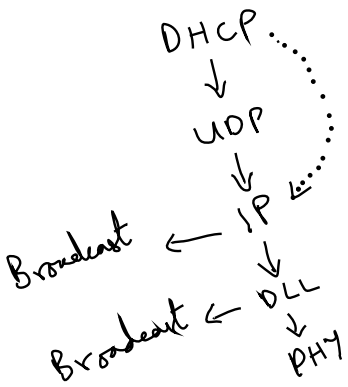
then DST IP is in my network

2) Suppose know R_{IP}, how to find R_{MAC}

Use ARP

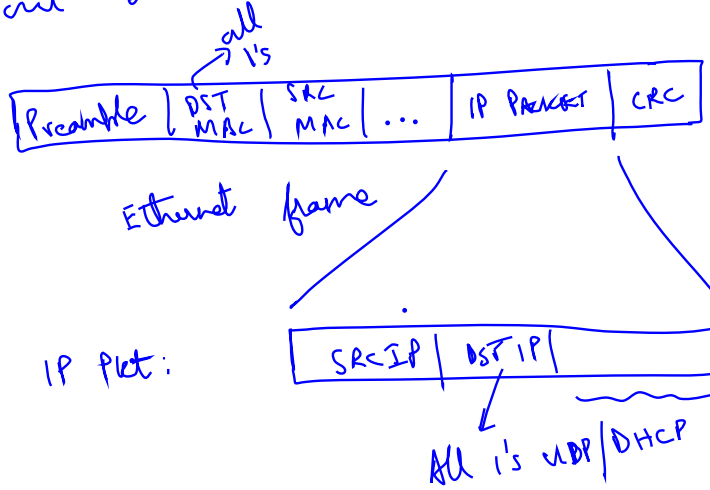
DHCP: Dynamic Host Configuration Protocol



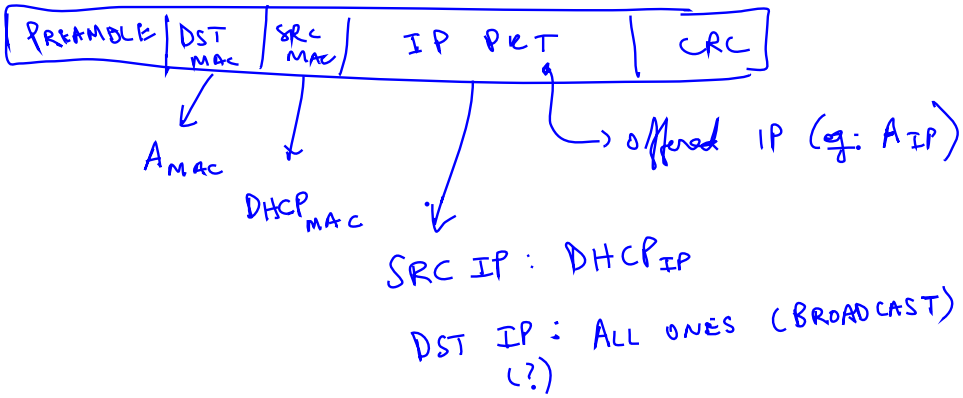


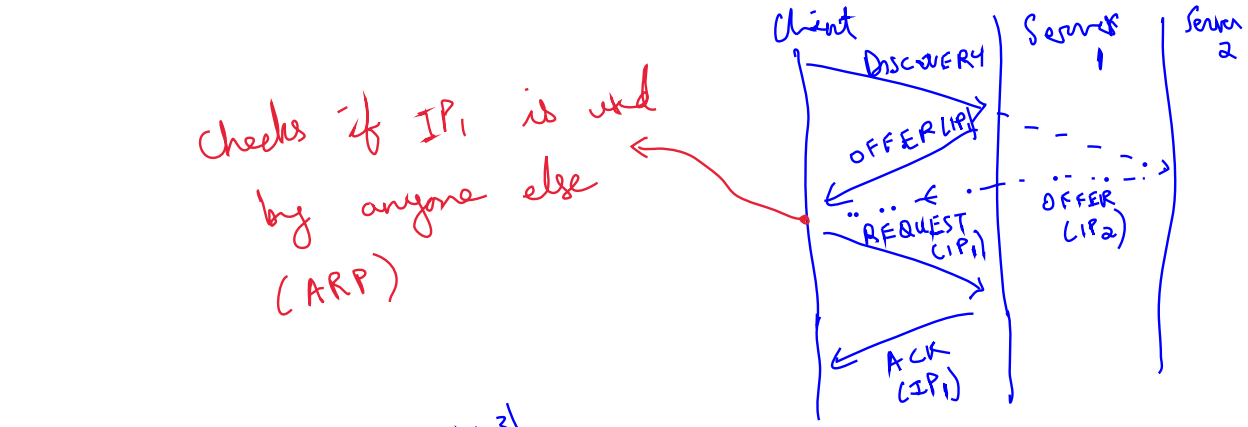
→ Port #s: 68 → DHCP server
67 → DHCP client

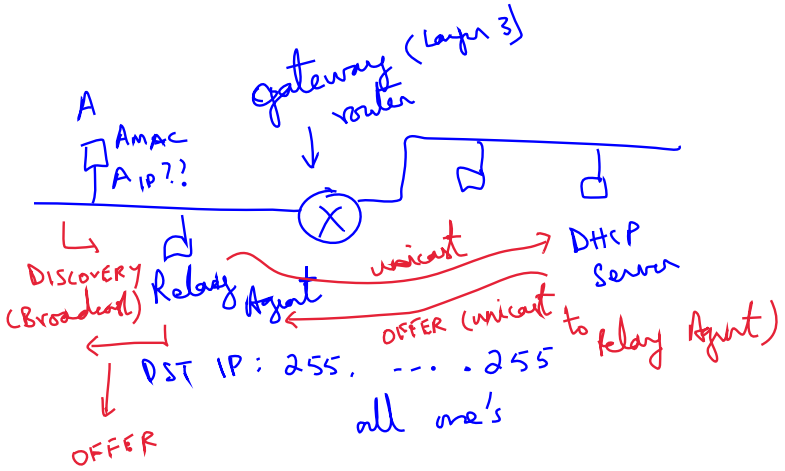
'A' sends out DHCP 'DISCOVER' PACKET



DHCP SERVER REPLIES (OFFER) → Contains a potential IP address for A




Client
Server 1
Server 2
DISCOVERY
OFFER (IP1)
OFFER (IP2)
REQUEST (IP1)
ACK (IP1)
checks if IP1 is used by anyone else (ARP)


A
AMAC
AIP ??
gateway (Layer 3) router
DISCOVERY (Broadcast)
Relay Agent
unicast
DHCP Server
OFFER (unicast to Relay Agent)
DST IP: 255. ... .255
all one's
OFFER

BGP