# CS & IT ENGINEERING

## COMPUTER NETWORKS

## IP Support Protocol

**Lecture No-1**

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## IP Support protocols

ARP, ICMP, DHCP, RARP

# Implementation of Broadcasting

IP|NL

(i) Limited Broadcast Address

255.255.255.255

(ii) Direct Broadcast Address

NID = $\underbrace{10}_{\text{NID}}.\underbrace{0.0.0}_{\text{HID}}$

DBA = 10.255.255.255

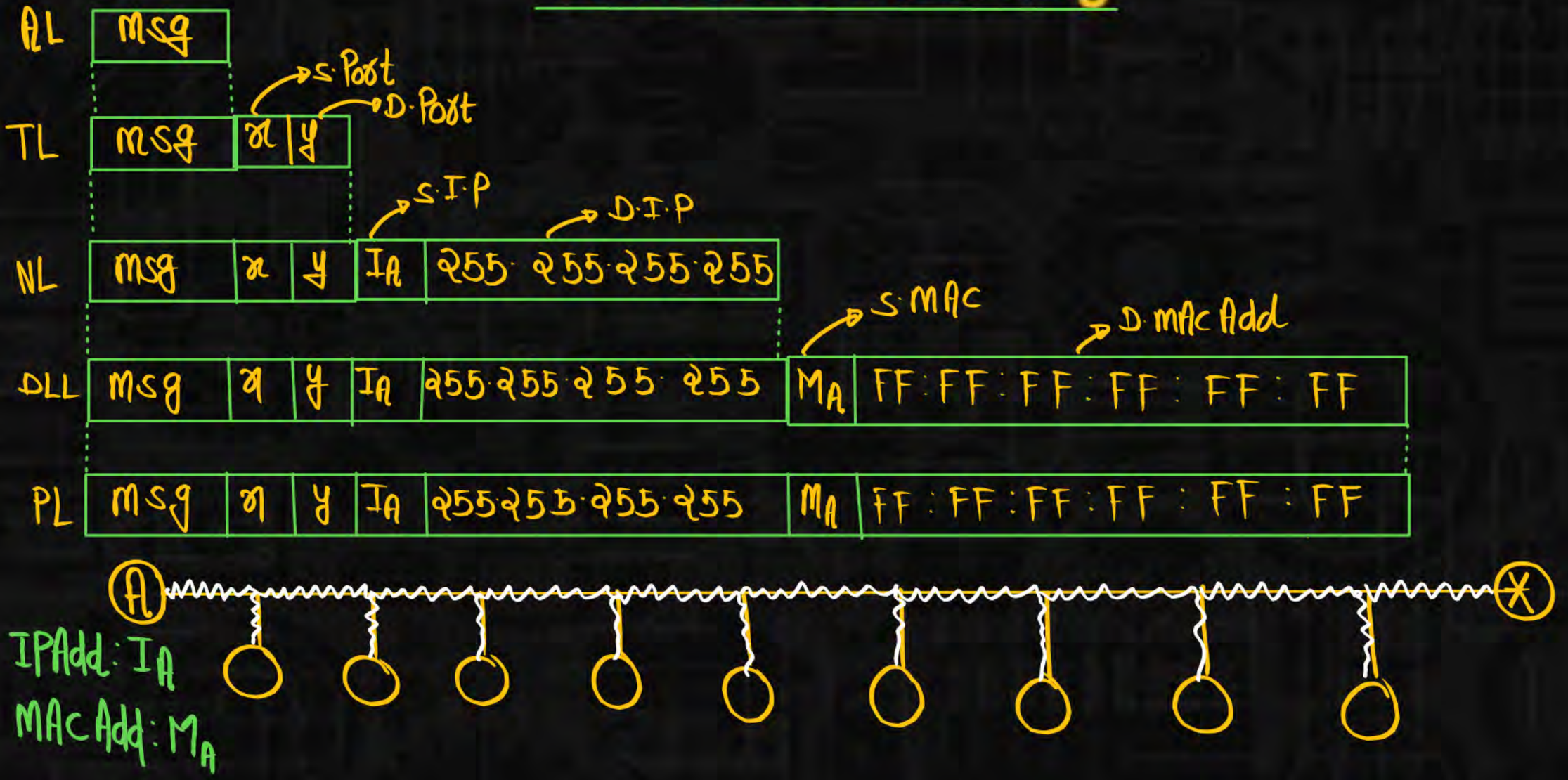
DLL

⇓

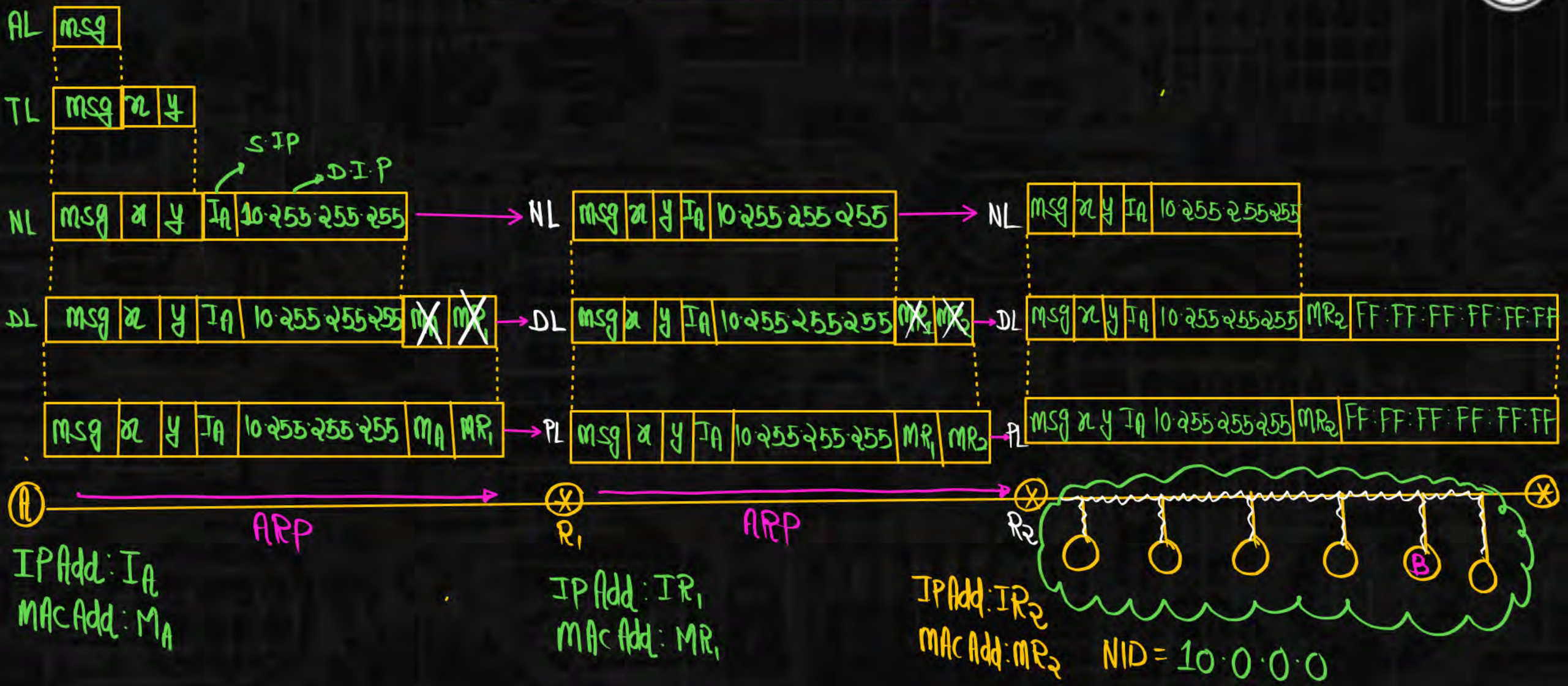
Broadcast MAC Address (48bit)

FF:FF:FF:FF:FF:FF

# Limited Broadcasting

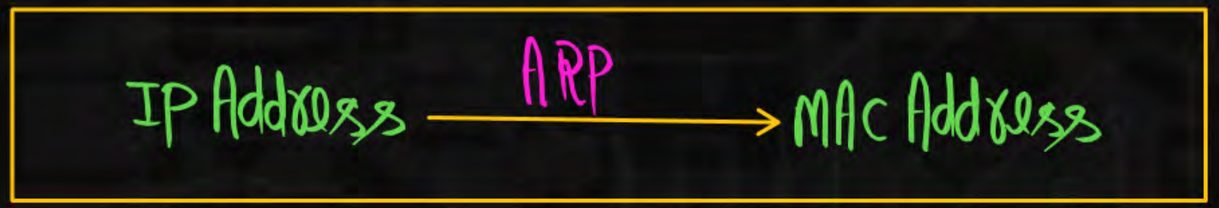


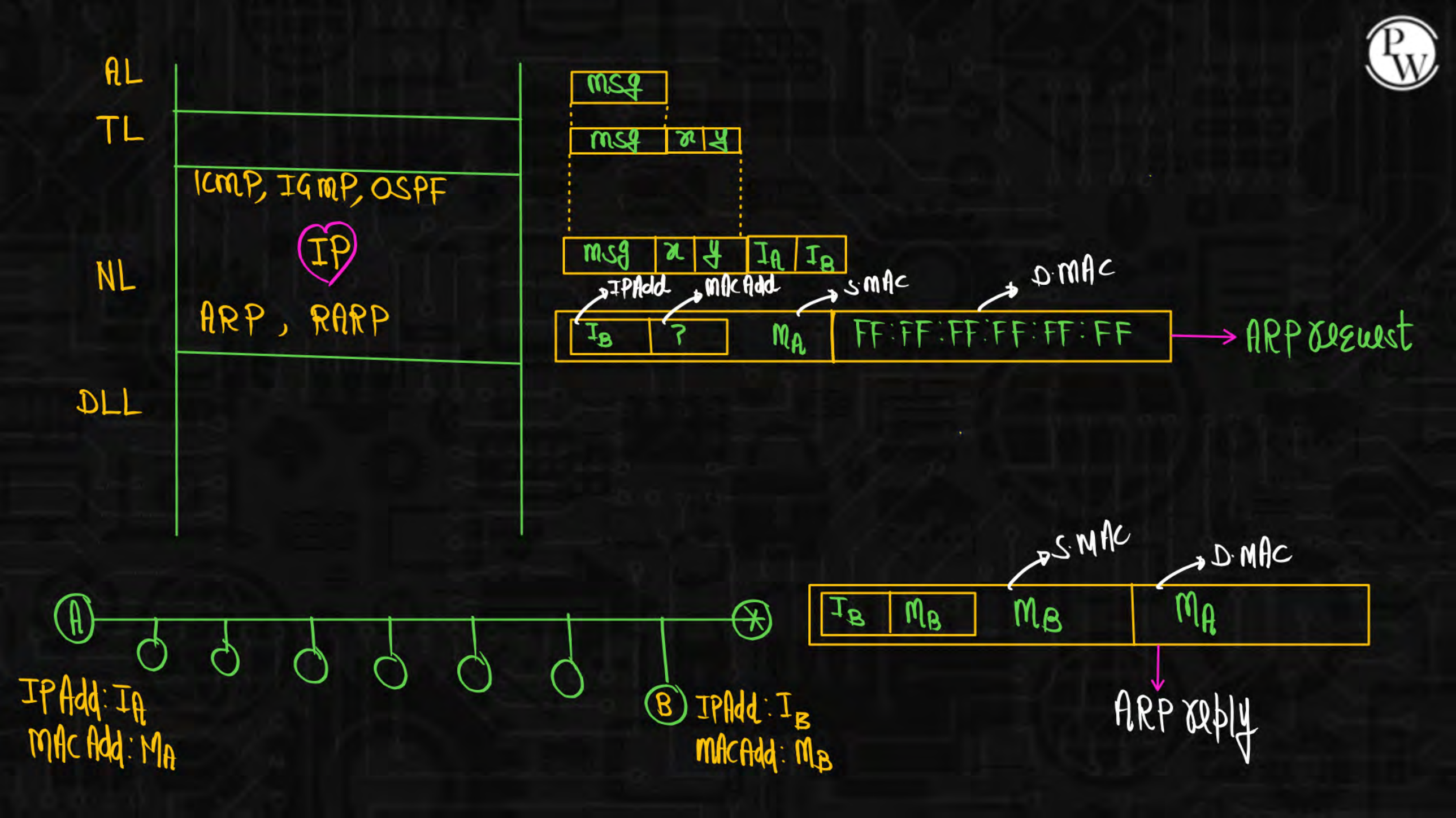
# Direct Broadcasting

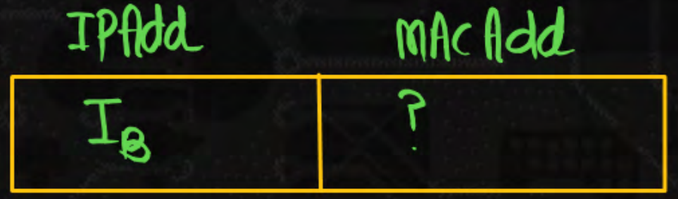


# ARP

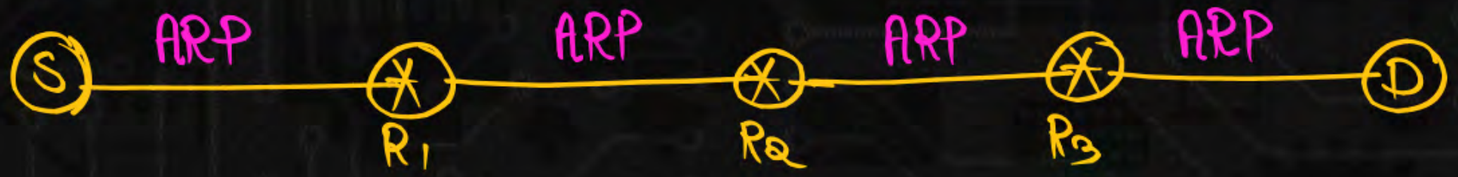
- ARP is a communication Protocal used to Find the MAC Address of a device From its IP Address




AL
TL
ICMP, IGMP, OSPF
IP
NL
ARP , RARP
DLL
msg
msg x y
msg x y $I_A$ $I_B$
IPAdd
MACAdd
S.MAC
D.MAC
$I_B$
?
$M_A$
FF:FF:FF:FF:FF:FF
ARP Request
A
B
IPAdd: $I_A$
MAC Add: $M_A$
IPAdd: $I_B$
MACAdd: $M_B$
S.MAC
D.MAC
$I_B$
$M_B$
$M_B$
$M_A$
ARP reply




ARP request




(i) Host $\xrightarrow{\text{ARP}}$ Host

(ii) Host $\xrightarrow{\text{ARP}}$ Router

(iii) Router $\xrightarrow{\text{ARP}}$ Router

(iv) Router $\xrightarrow{\text{ARP}}$ Host

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:** ARP request is broadcasting
4. **ARP response/reply:** ARP reply is unicasting.

**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.

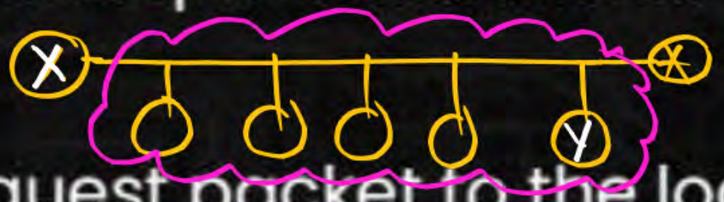
Find the IP address of the next router.

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.

Q.1 Suppose that in a IP over Ethernet network, a machine X wishes to find the MAC address of another machine Y in its subnet. Which one of the following technique can be used for this ?




GATE 2019

a. X sends an ARP request packet to the local gateway's IP address which then finds the MAC address of Y and sends to X.

b. X sends an ARP request packet with broadcast IP address in its local subnet.

c. X sends an ARP request packet to the local gateway's MAC address which then finds the MAC address of Y and sends to X.

d. X sends an ARP request packet with broadcast MAC address in its local subnet.

Q.2 The address resolution protocol (ARP) is used for :

GATE 2005

a. Finding the IP address from the DNS

b. Finding the IP address of the default gateway

c. Finding the IP address that corresponds to a MAC address

d. Find the MAC address that corresponds to an IP address

Q.3 Which one of the following protocols is NOT used to resolve one form of address to another one ?

GATE 2016

a. DNS — Domain Name ⟶ IP Address

b. ARP — IP Add ⟶ MAC Add

c. DHCP ✓

d. RARP — MAC ⟶ IP Address

Q.4 Consider the following two statements.

**$S_1$ :** Destination MAC address of an ARP reply is a broadcast address. (F)

**$S_2$ :** Destination MAC address of an ARP request is a broadcast address. (T)

Which one of the following choices is correct?

GATE 2021

a. Both $S_1$ and $S_2$ are true.

b. $S_1$ is true and $S_2$ is false.

c. ✓ $S_1$ is false and $S_2$ is true.

d. Both $S_1$ and $S_2$ are false.


ICMP - 9PM
THANK YOU
GW
SOLDIERS !