



# LAN and frame types

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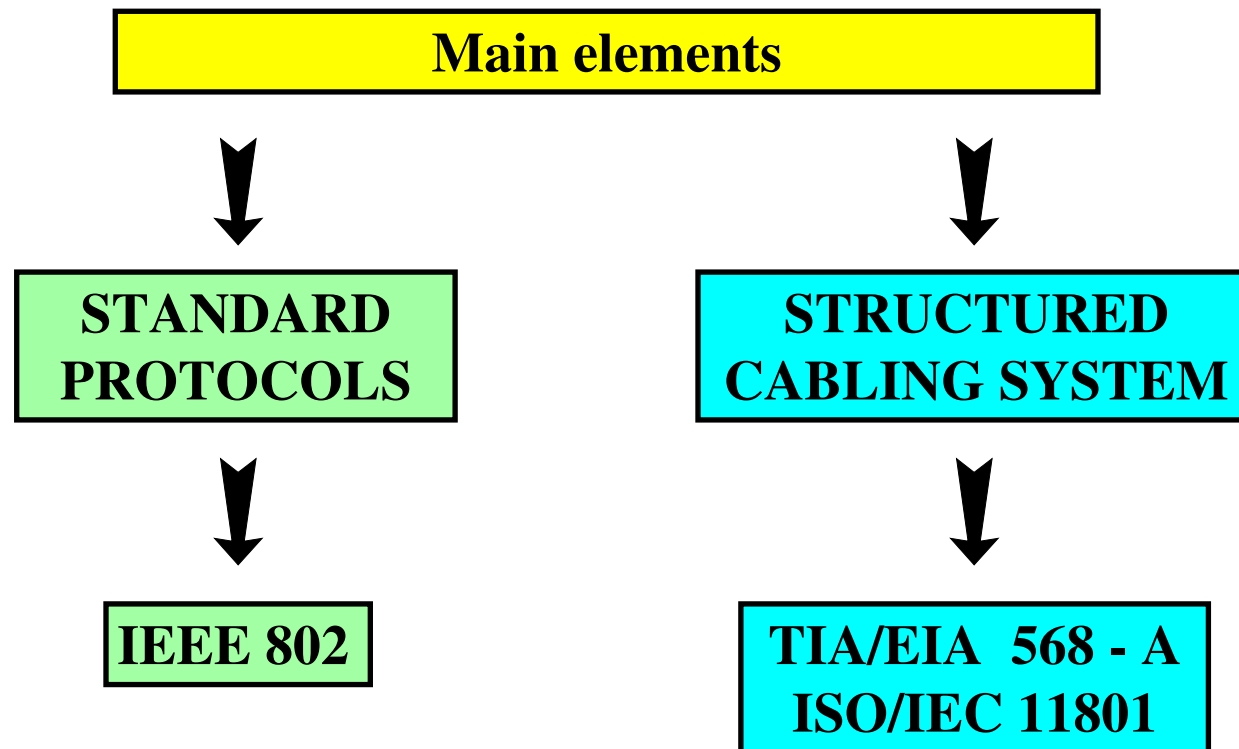


## LAN (Local Area Network)

- Its' a communication system witch allow independent equipment's to communicate each other within a limited area using an high speed physical channel with low error rate.
  - LAN Standards specify how to share the media.



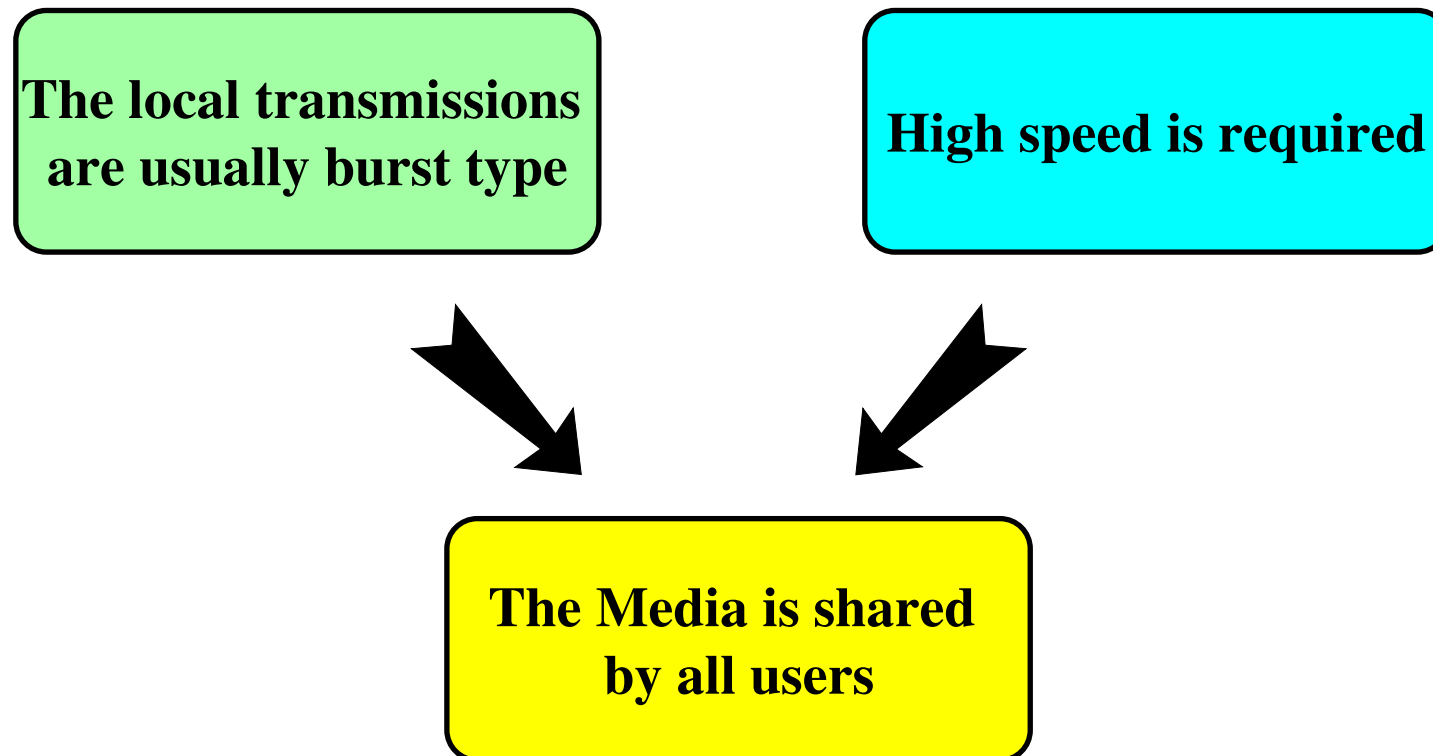
# Main elements





## WY LAN?

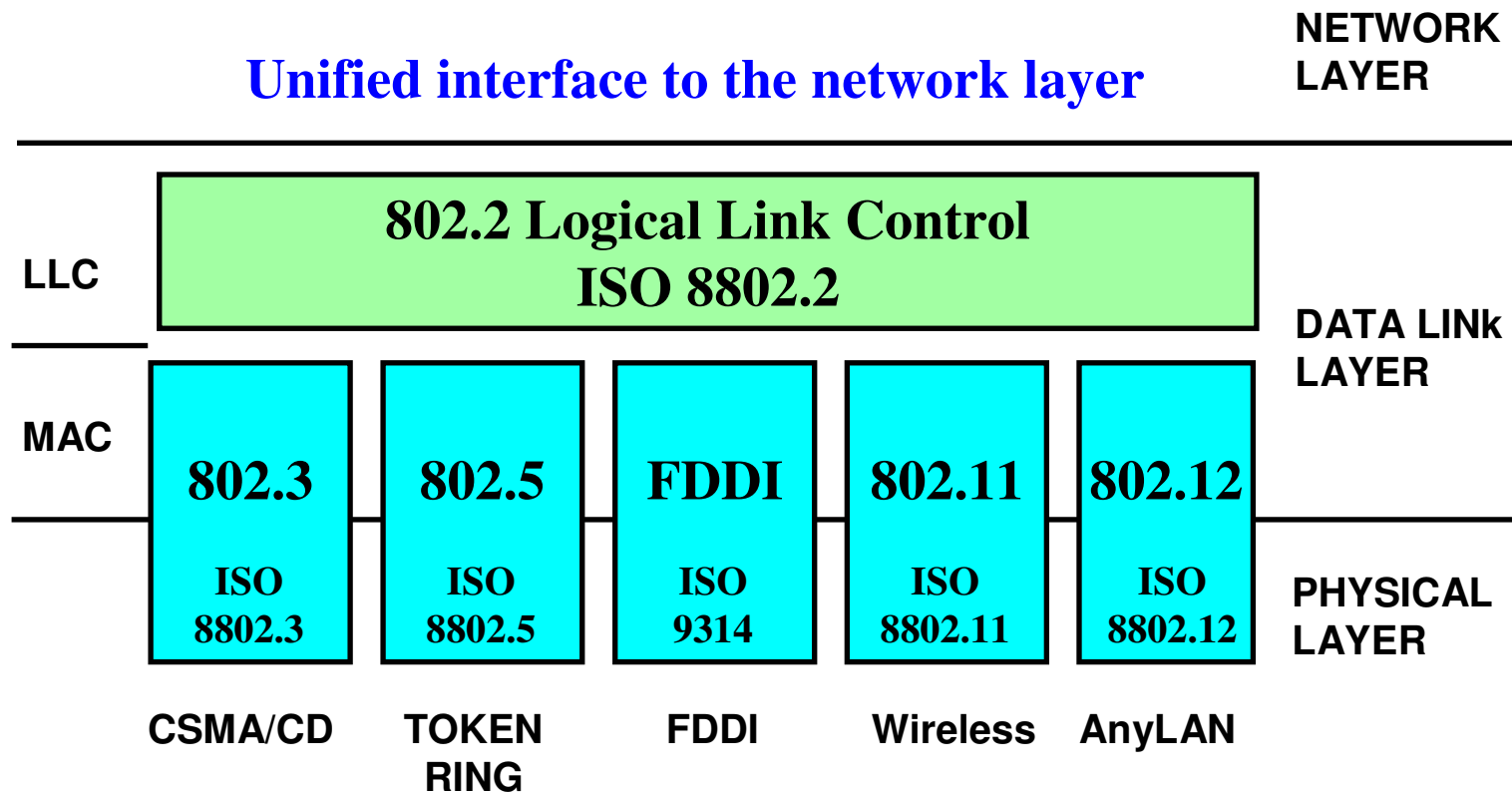
- Because the most data's amount its' locally transmitted





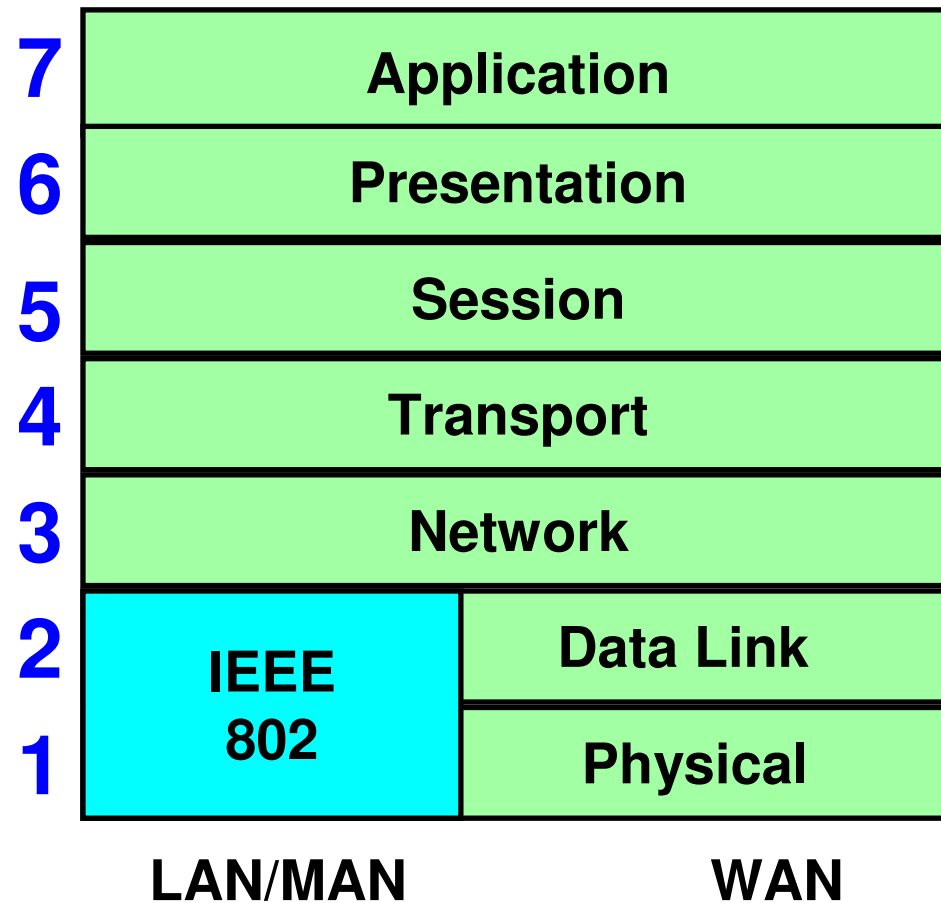
# IEEE 802 project

*(Local and Metropolitan Area Network)*





# ISO/OSI & IEEE 802





## Data-Link sub-layers

- IEEE 802 Data-Link layer is divided in two sub-layers:
  - LLC: Logical Link Control
  - MAC: Media Access Control
- The LLC sub-layer is common to all LANs
  - IEEE 802.2 standard describe services and protocols for this sub-layer
- MAC is specific for every LAN and define the method how to share the medium



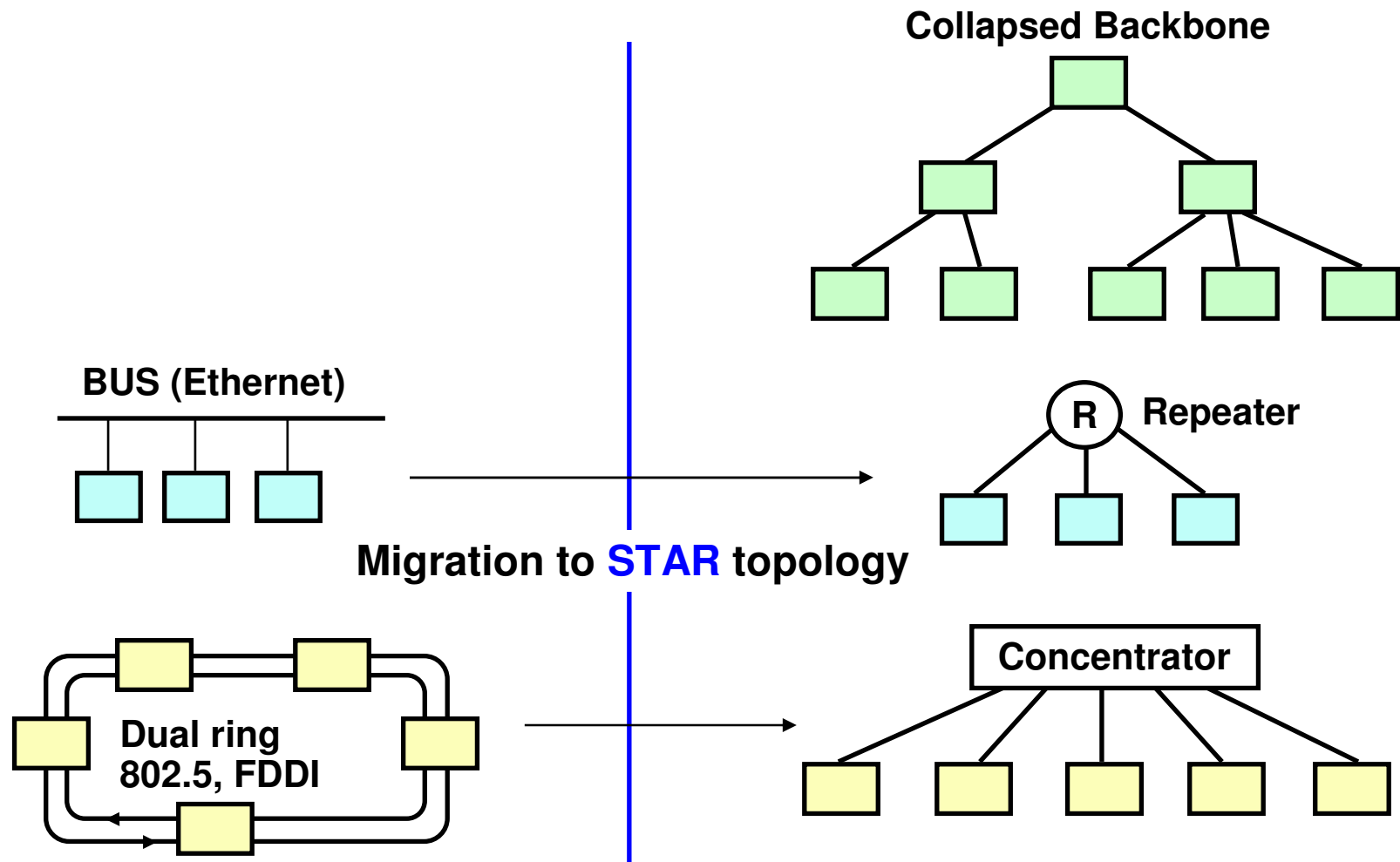


## MAC sub-layer

- The Mac sub-layer realize a broadcast communication
  - Any station receive the frames transmitted from other stations
- The broadcasting can be implemented by:
  - broadcasting topologies like the bus
  - ring topologies with stations connected each other in point to point mode (ring -in ring-out)
- Because the medium is reliable (low bit error rate) the layer 2 do not correct errors, but just detect them
- LANs implement a connection-less communication

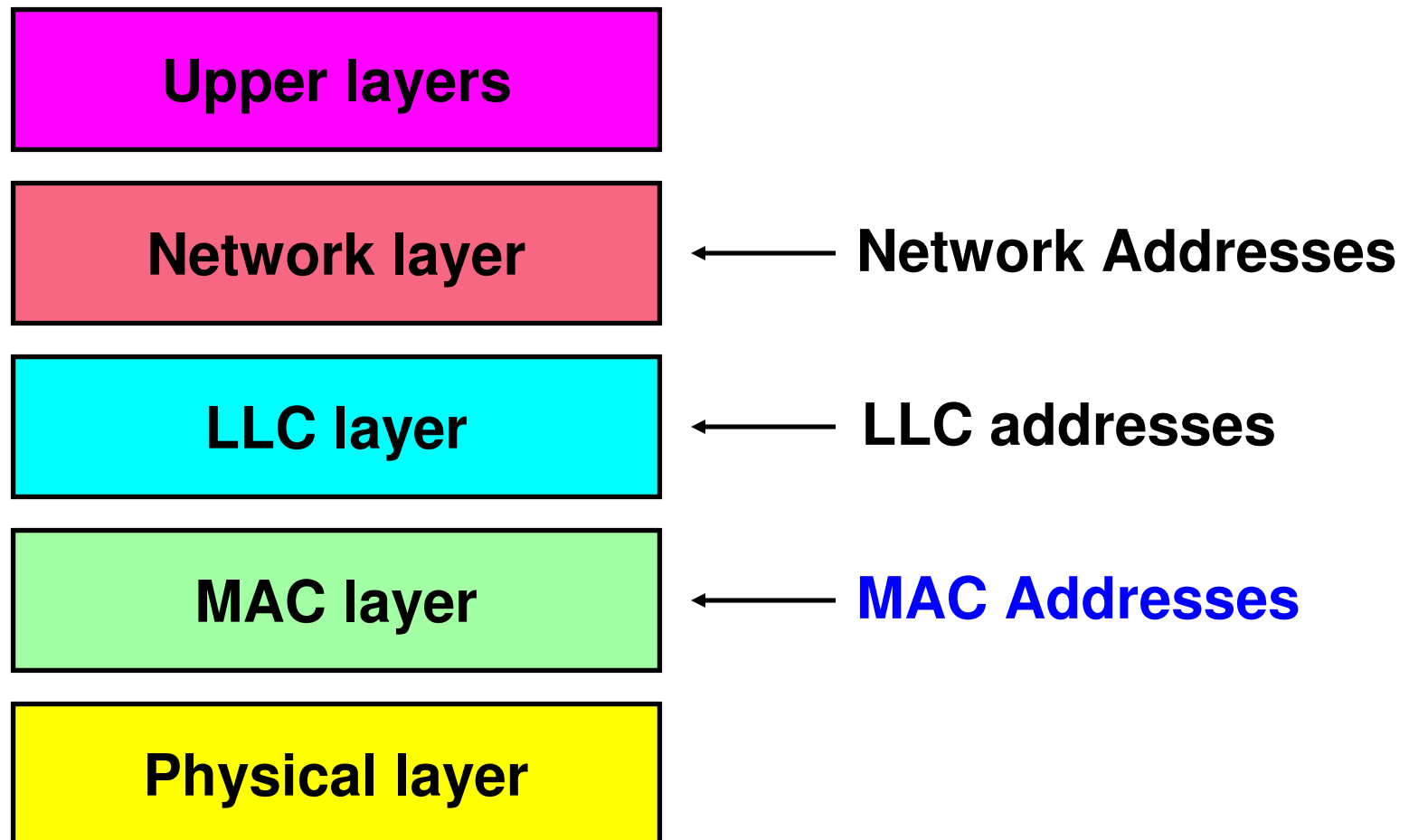


# LAN topologies



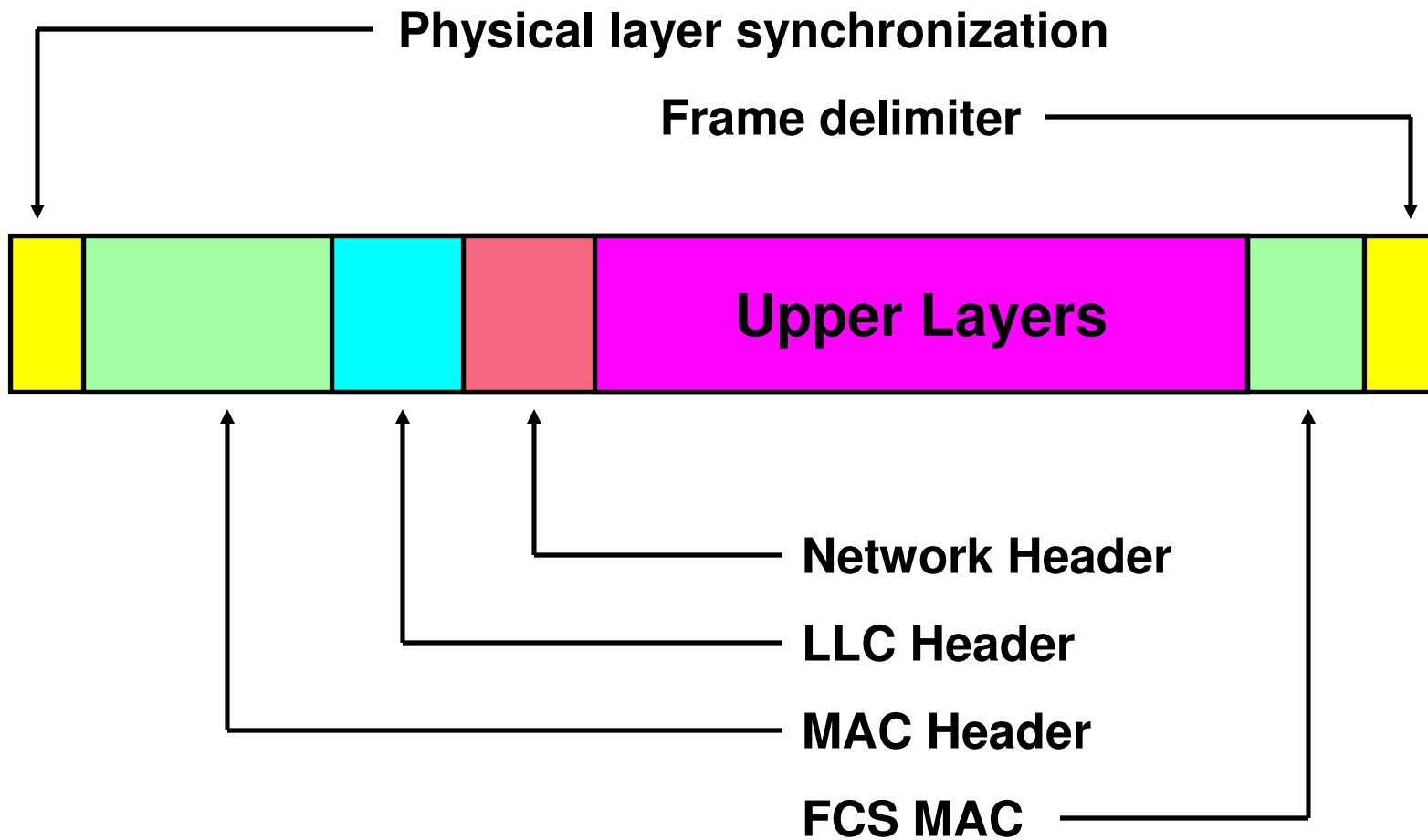


# The addresses





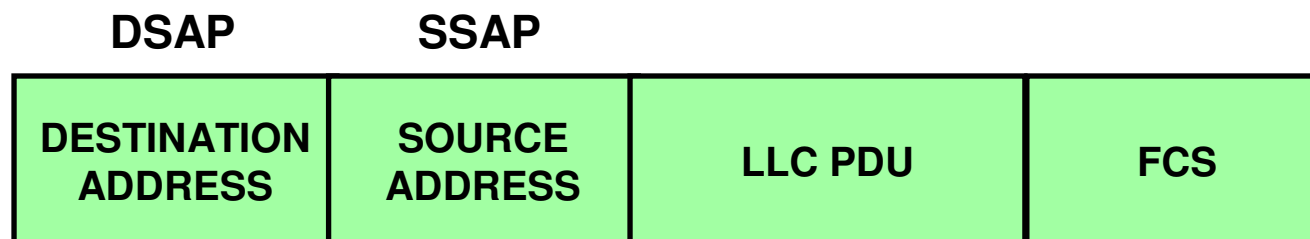
# LAN frame





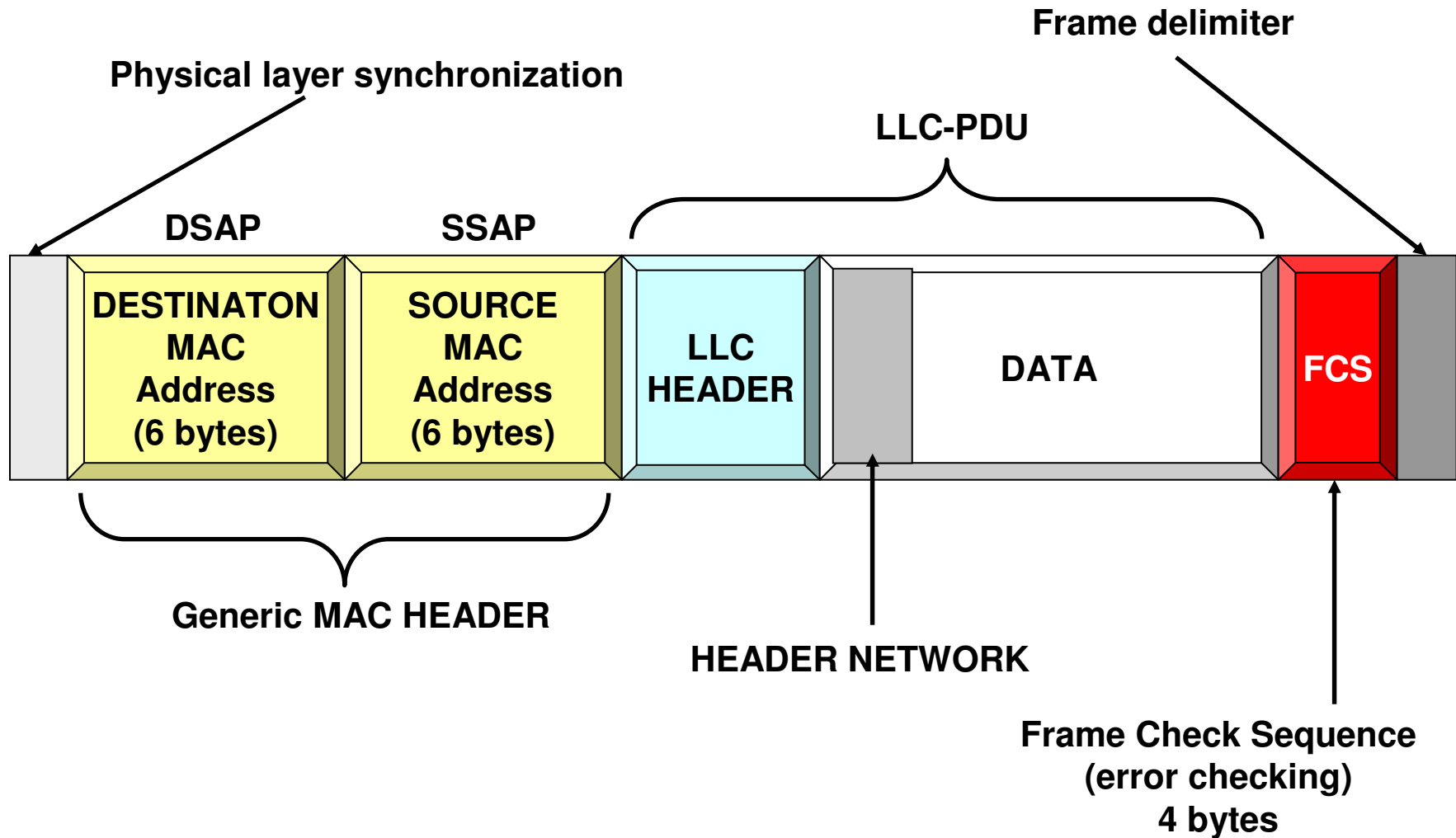
# MAC PDU (Protocol Data Unit)

- The main fields in a MAC PDU are:
  - Addresses (Called SAP: Service Access Point):
    - DSAP: Destination SAP
    - SSAP: Source SAP
  - LLC-PDU contain the datas
  - FCS (Frame Control Sequence): a CRC over 32 bits used for error frame control





# MAC PDU (more detail)

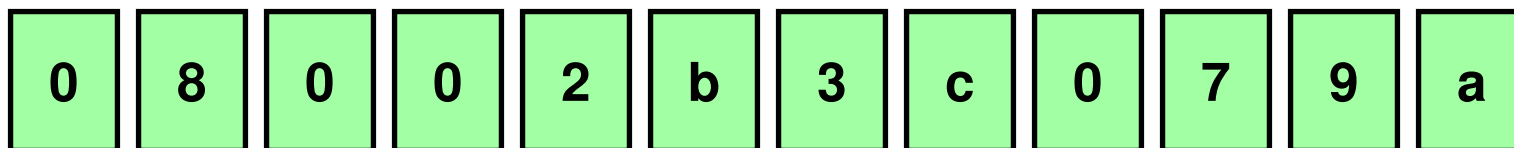




# MAC Addresses

- Are standardized by IEEE
  - composed by 6 byte (48 bit)
  - represented as 6 hexadecimal number pairs
- For example:

0000**1000**0000**0000**0010**1011**0011**1100**0000**0111**1001**1010**

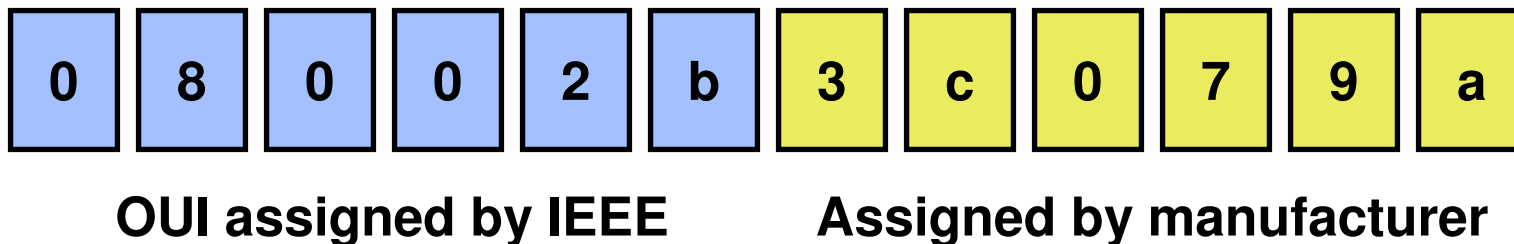


**08-00-2b-3c-07-9a**



# MAC address

- Is composed of two parts with 3 byte each:
  - the 3 most significant bytes indicate the manufacturer or *OUI (Organization Unique Identifier)*.
  - the 3 less significant bytes indicate the progressive number assigned by the manufacturer







## Some OUI

<u>Organization</u>	<u>Address Block</u>
Cisco	00000C
DEC	08002B
IBM	08005A
Sun	080020
Proteon	000093
Bay-Networks	0000A2



# MAC Address Types

- Singlecast:
  - addressed to a single station
- Multicast:
  - addressed to group stations
- Broadcast (ff-ff-ff-ff-ff-ff):
  - addressed to all stations



# Multicast addresses

- Are normally used to discover adjacent nodes
- There are two way to use multicast frames:
  - Solicitation:
    - the TCP/IP station that want discover the MAC address of another station send a multicast frame containing the layer 3 address of the other station
  - Advertisement:
    - the station periodically announce it self in the network (Decnet)