Data Link Layer

It sometimes called Network Access Layer or Network Interface Layer

Shape of Data in This Layer Called Frames

it takes the role of Error Detection as it has the FCS in its Frame

this layer defines common way of interpreting signal so network devices can communicate

this layer uses ethernet protocol which responsible for data to nodes on the same network or link.

Devices in this layer is :

Switch , NIC
the switch have CSMA/CD Carrier Sense Multiple Access / Collision detection which avoid the flood that made by hub by send data it two direction every direction take a time slot and this process done in a fast way without the user can find any delay
The Addressing in this layer is MAC Address

MAC Address

is 48 Bits 6 Bytes (Octets)

1st 3 octets Is The OUI Organizational Unique Identifier is Individual Hardware Manufactured for the NIC Vendor	2nd 3 Octets Is Assigned by Vendor for the NIC

Data Link Frame

Preamble (8 bytes) : 7bytes alternate between ones and zeros it is like a buffer between frames used by network interface to synchronize internal clock to regulate speed to send data

1 byte SFD Start Frame Delimiter : signal for receiver tell that preamble is over and actual frame start

6 Bytes Destination MAC

6 Bytes Source MAC

6 Bytes Ether-Type & VLAN Header

Pay Load The Actual Data

FCS Frame Check Sequence it is a checksum value that calculated by CRC Cyclic Redundancy Check this value is recalculated at the receiver and if there is any difference this means that there is an error

and an upper layer protocol will decide if this packet will be sent again or not

Physical Mac Address can be used to communicate in LAN but it is not Ideal For Distance Communication