LAYER CONCEPT

DOD MODEL: TCP MODEL

4--> APPLICATION

3--> TRANSPORT

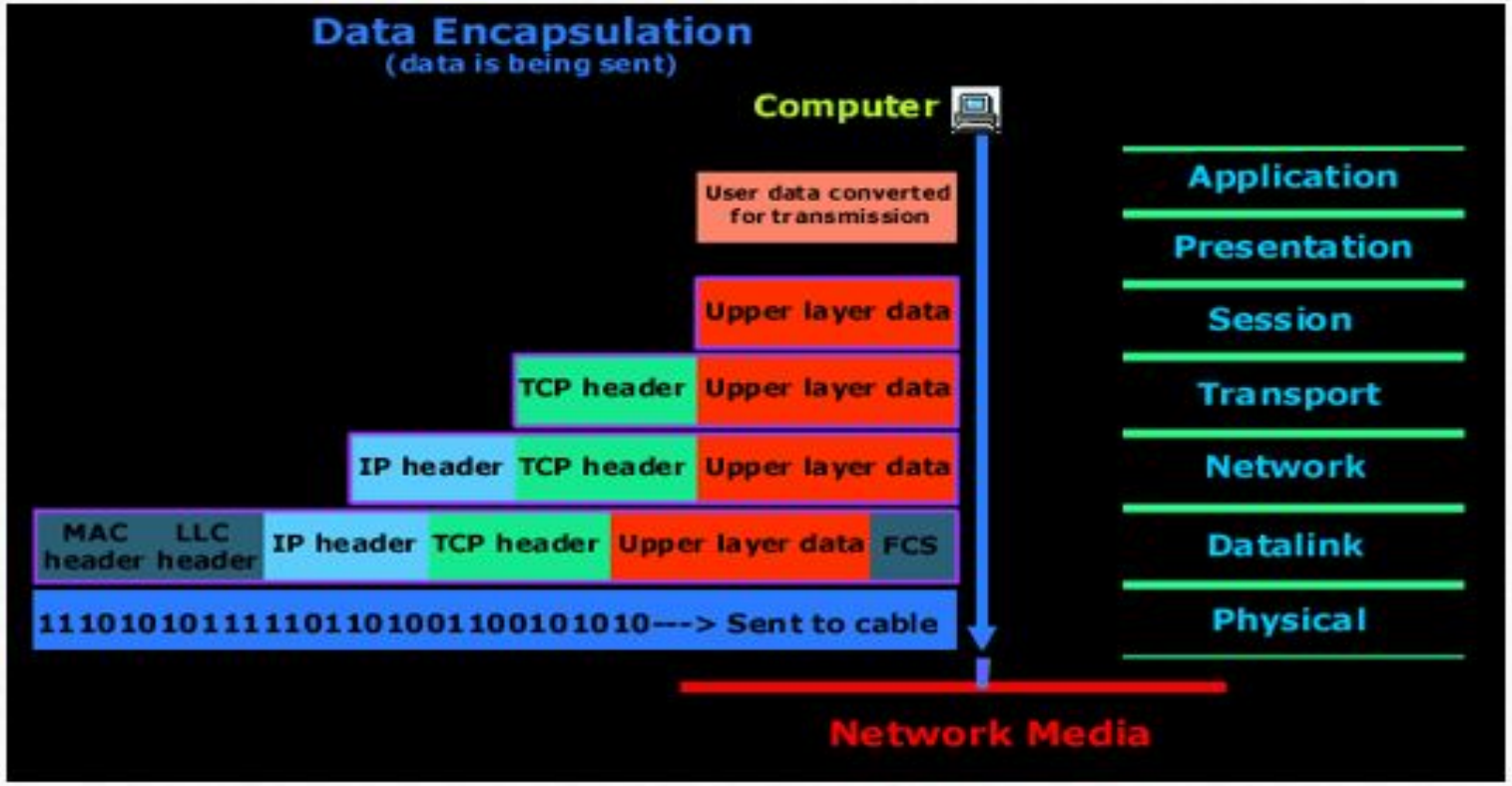
2--> INTERNET

1--> NETWORK ACCESS LAYER

OSI MODEL---> TCP/IP

7---> APPLICATION		
6---> PRESENTATION	DATA	
5---> SESSION		
4---> TRANSPORT	SEGMENT	
3---> NETWORK	PACKET	PDU
2---> DATA-LINK	FRAME	
1---> PHYSICAL	BIT	

DATA ENCAPSULATION



Layer 1: Physical Layer:

This Layer is Responsible for the Transmission and Reception of Unstructured Raw Data between a Device and Physical Transmission medium. This Layer verifies Electrical and Mechanical specification of Interface which include Layout of Pins, Voltages, Cable specifications, Signal timing and Frequency for Wireless Devices. Bit Rate control is executed on this Layer and this Layer also defines Transmission Mode as Simplex, Half-Duplex and Full Duplex. Physical Layer components are Ethernet, Bluetooth, USB Standards.

Layer 2: Data Link:

This Layer is Responsible to Convert Physical Layer Functionality into Reliable Link.

It Detects and Correct Errors which occur in the Physical Layer. This Layer has divided

Into Two Sub Parts.

MAC and Logical Link Control (LLC).

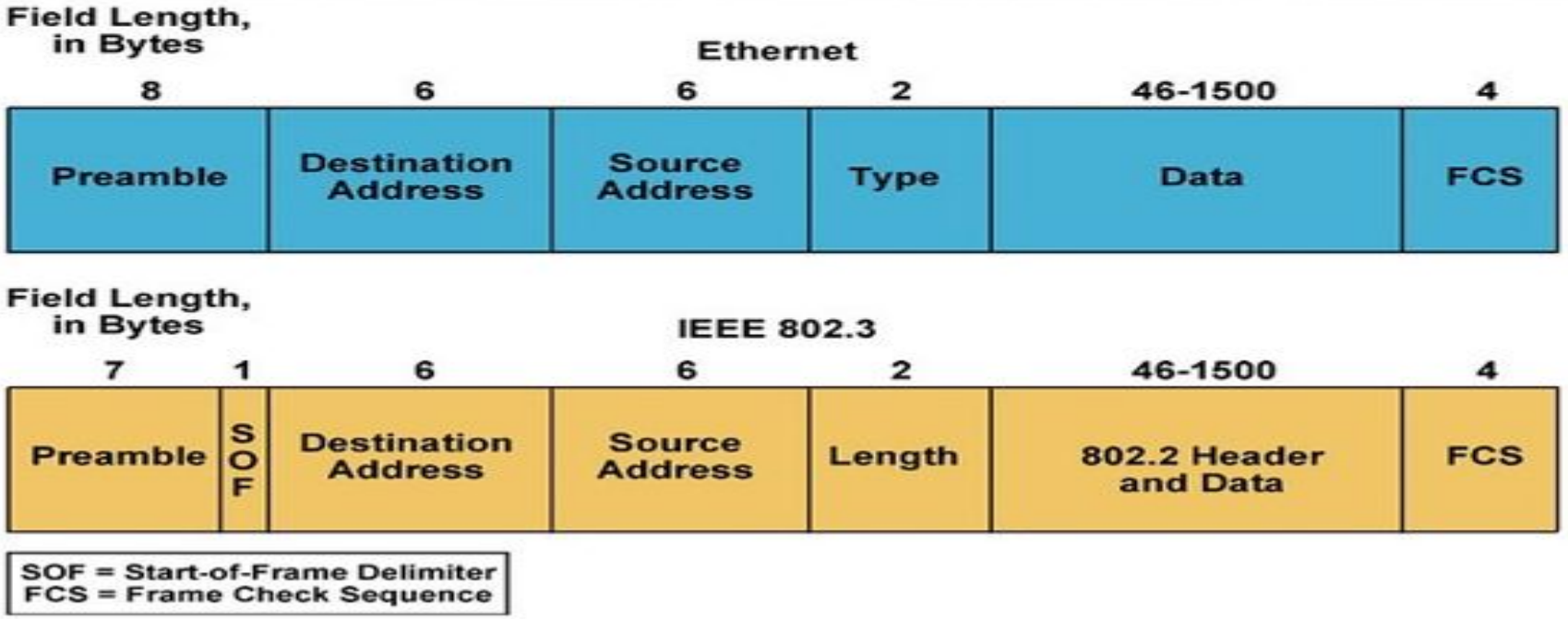
LLC is used to controls the Synchronization, Flow Control and Error-Checking.

Based upon the Function there are Three Types of Switches works on Data Link

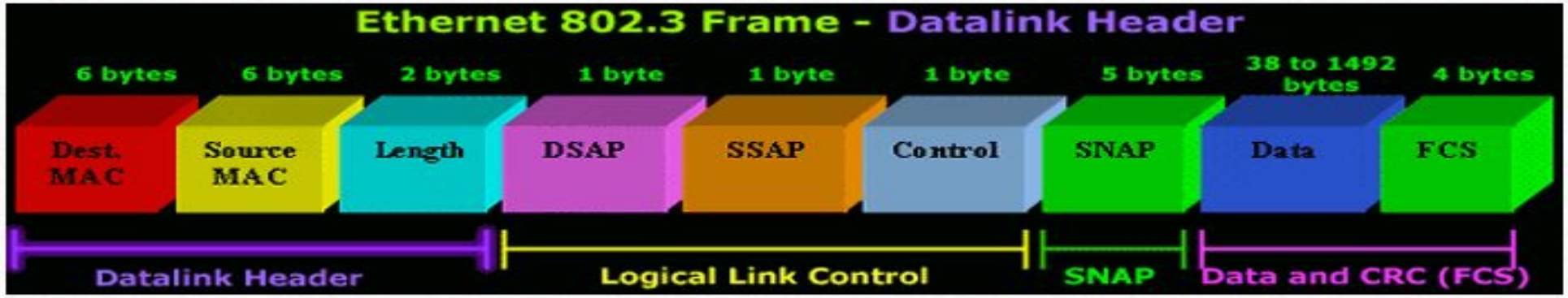
Layer. These are-> Cut-Through, Fragment-Free, Store & Forward.

- MAC
- 24: OUI
- 24: VENDOR SPECIFIC
- FRAME CONTENT

Frame Header



LLC Header


Ethernet 802.3 Frame - Datalink Header
6 bytes
6 bytes
2 bytes
1 byte
1 byte
1 byte
5 bytes
38 to 1492 bytes
4 bytes
Dest. MAC
Source MAC
Length
DSAP
SSAP
Control
SNAP
Data
FCS
Datalink Header
Logical Link Control
SNAP
Data and CRC (FCS)

LLC Header

- DSAP Field
- The Destination Service Access Point (DSAP) identifies the SAP for which the LPDU is intended. The DSAP consists of six address bits, a user bit (U) and an Individual/Group (I/G) bit
- DSAP is the destination of the LPDU. Some common ones appear over and over. LPDU-> LLC Protocol Data Unit.
- SSAP Field
- The Source Service Access Point (SSAP) identifies the SAP which originated the LPDU. The SSAP consists of six address bits, a user bit (U) and a Command/Response (C/R) bit,

LLC Header

- Control Field
- The LPDU control field contains command, response, and sequence number information. You need to know how to decode the control field in order to determine what happens on a particular LLC2 session.
- **SNAP.**
  IP datagrams are sent on IEEE 802 networks encapsulated within the 802.2 LLC and SNAP data link layers, and the 802.3, 802.4, or 802.5 physical networks layers. The SNAP is used with an Organization Code indicating that the following 16 bits specify the Ether Type code.

DATA LINK LAYER PROTOCOLS

- **HDLC**
- **SDLC**
- **PPP**
- **FRAME-RELAY**
- **ATM**

Layer 3: Network Layer:

This Layer provides the Functional and Procedural means of Transferring Packets.

This Layer Applies Policies on User Traffic and Filter Request according to Topology.

Router and Firewall works on Network Layer.

NETWORK LAYER PROTOCOL

- **IP (INTER NETWORK ADDRESS)**
- **IPV4 AND IPV6**
- **ICMP→ PING**
- **IGMP→ MULTICAST GROUP**
- **ARP→ IP TO MAC RESOLVE**
- **RARP→ MAC TO IP RESOLVE**
- **IPseC→ USED FOR VPN**

Layer 4: Transport Layer:

This Layer Provides the Functional means of Transferring Variable-Length Data

Sequences from a Source to a Destination Host and it also maintain QOS.

TCP AND UDP ARE TRANSPORT LAYER PROTOCOL.

Layer 5: Session Layer:

It Establishes, Manages and Terminate the Connections between the Local and

Remote Application. It Provides Full-Duplex, Half-Duplex, Simplex Operation and

Establishes Procedures which is to check pointing, Suspending, Restarting and Terminating Session.

- SESSION LAYER STANDARDS:
- RPC: REMOTE PROCEDURE CALL
- SPC: SESSION CONTROL PROTOCOL
- NFS: NETWORK FILE SYSTEM
- SQL:
- ASP: APPLE TALK SESSION CONTROL PROTOCOL

Layer 6: Presentation Layer:

This Layer Transforms Data into the Form that the Application accepts. This Layer Formats Data to be sent across a Network.

Presentation Later Standards are:

MPEG, MIDI, QUICK-TIME, JPEG, ASCII, EBCDIC

Layer 7: Application Layer provides support to User System so that they can access Network Resources. For Example: Email

Remote-file Access and Transfer

Shared Data Base Management

- Application Layer Protocol
- FTP-→ 20, 21
- TFTP→ 69
- TELNET→ 23
- HTTP→ 80
- SMTP→ 25
- POP3→ 110
- IMAP4→ 143
- NNTP→ 119
- IRC--→ 194