High-Level Data Link Control (HDLC)

- HDLC is an ISO Standard developed from the Synchronous Data Link Control (SDLC) standard proposed by IBM in the 1970's.
- HDLC is the protocol which is now considered an umbrella under which many Wide Area protocols sit. ITU-T developed HDLC in 1979.
- HDLC stands for High-Level Data Link Control protocol.
- Like the two other WAN, HDLC is a Layer 2 protocol.
- HDLC is a simple protocol used to connect point to point serial devices.
- For example, you have point to point leased line connecting two locations, in two different cities.
- HDLC would be the protocol with the least amount of configuration required to connect these two locations.
- HDLC would be running over the WAN, between the two locations.
- Each router would be de-encapsulating HDLC and turning dropping it off on the LAN.

Within HDLC there are three types of stations defined:

- **Primary Station** - this completely controls all data link operations issuing commands from secondary stations and has the ability to hold separate sessions with different stations.
- **Secondary Station** - this can only send responses to one primary station. Secondary stations only talk to each other via a Primary station.
- **Combined Station** - this can transmit and receive commands and responses from one other station.

- The Link Access Procedure-Balanced (LAP-B) and Link Access Procedure D-channel (LAP-D) protocols are subsets of HDLC.

LAPB: Ensures that frames are error free and in the right sequence.

- **Link Access Procedure, Balanced** (**LAPB**)
- Implements the data link control protocol derived from HDLC that ensures that frames are error free and in the correct sequence.
- LAPB is specified in ITU-T Recommendation X.25 and ISO/IEC 7776.

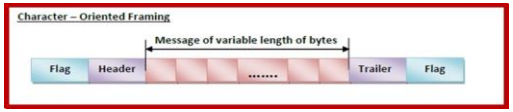
Data Link Layer Protocol : LAPD

- ISDN standards are constructed using the Open System Interconnection seven-layer reference model.
- Layer 2 (data link) protocol for the D channel(called Link Access Procedure-D) is used to convey messages over common D channel.
- The LAPD and higher layer protocols handle the handshaking (commands and responses), signaling, and control for all of the voice and data calls that are setup through the ISDN D channel.
- Each user is assigned a Logical Channel Number(LCN) and bandwidth is divided accordingly.

- The two types of variable - sized framing are:
- Character-oriented framing
- Bit - oriented framing

Character - Oriented Framing

- In character - oriented framing, data is transmitted as a sequence of bytes, from an 8-bit coding system like ASCII.



Bit-oriented framing

In bit-oriented framing, data is transmitted as a sequence of bits that can be interpreted in the upper layers both as text as well as multimedia data.