

# X.25, Frame relay, ATM

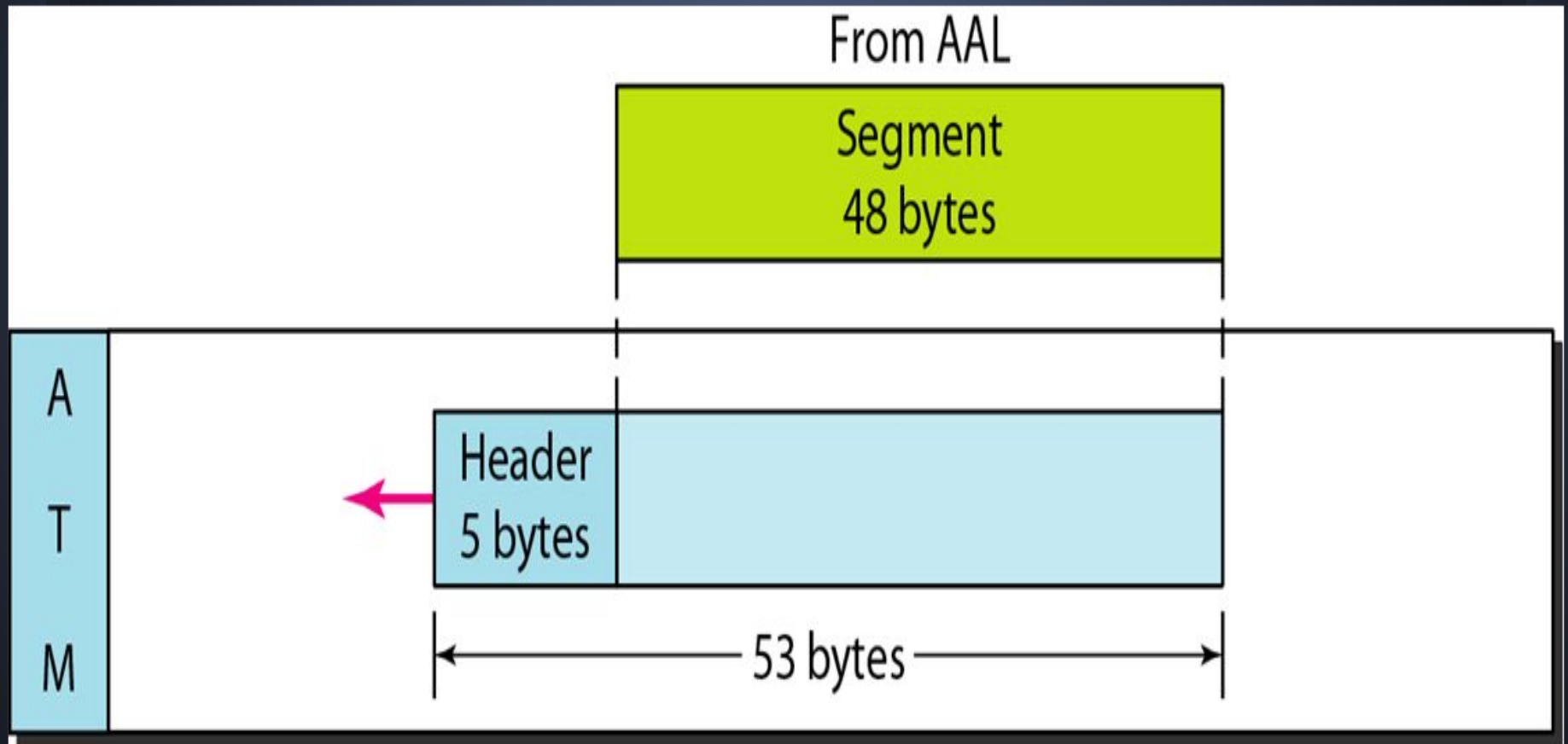
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# ATM

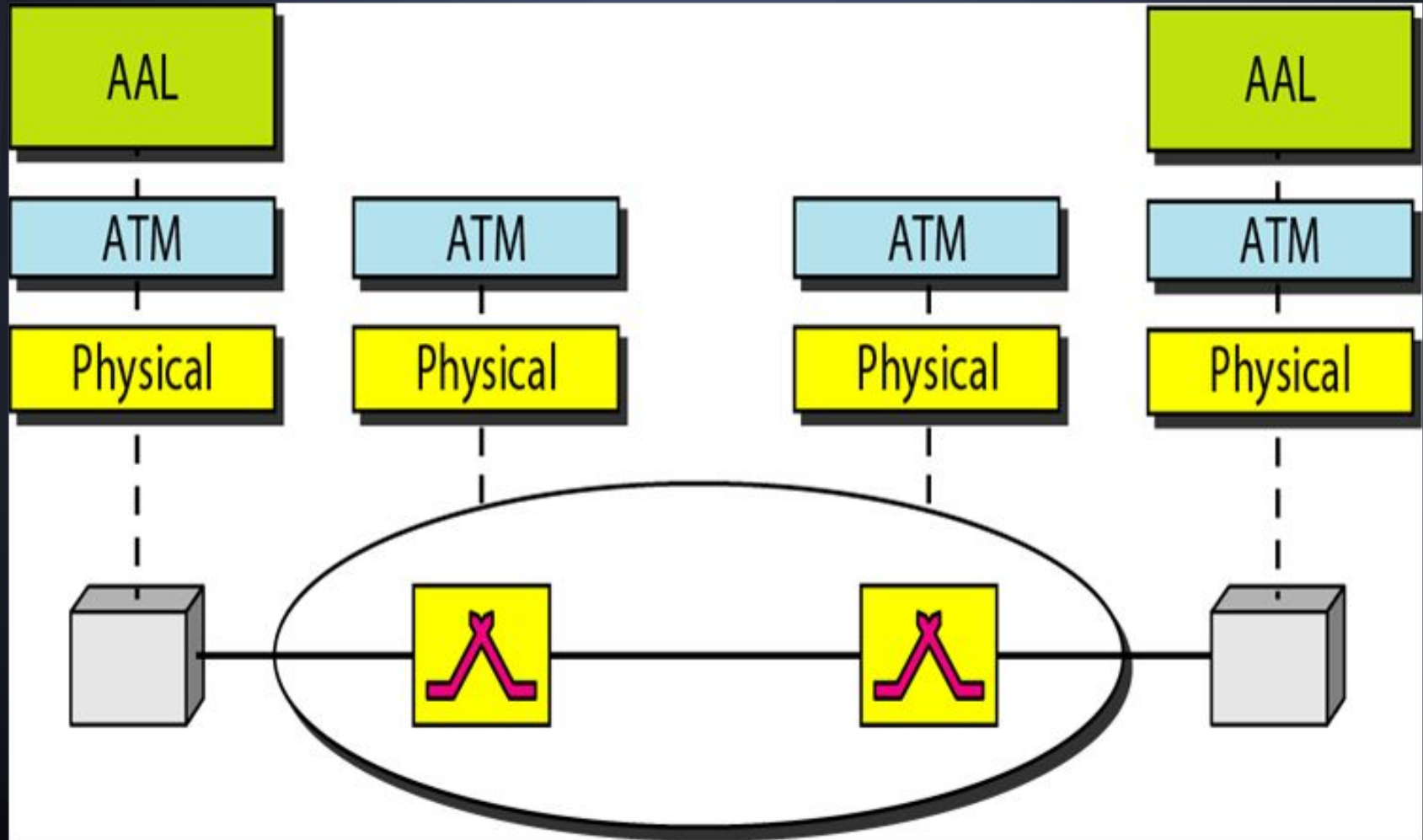
ATM has four important differences from frame relay:

- ATM uses fixed packet lengths of 53 bytes (5 bytes of overhead and 48 bytes of user data), which is more suitable for voice transmissions.
- ATM provides extensive quality of service information that enables the setting of very precise priorities among different types of transmissions (i.e. voice, video & email; services include CBR, VBR, ABR and UBR).
- ATM is scalable. It is easy to multiplex basic ATM circuits into much faster ATM circuits.
- ATM provides connection-oriented services only.

# An ATM cell



# ATM layers in endpoint devices and switches



# X.25

- In case of packet switching networks, the attached stations must organize their data into packets for transmission.
- This requires a certain level of cooperation between the network and the attached stations.
- X.25 is an ITU-T standard that specifies an interface between a host system and packet switching network.
- The functionality of X.25 is specified in three levels they are:

Ø Physical level

Ø Link Level

# X.25

## Physical level:

- Physical level deals with the physical interface between an attached station and the link that attaches that station to the packet switching node.

## Link level:

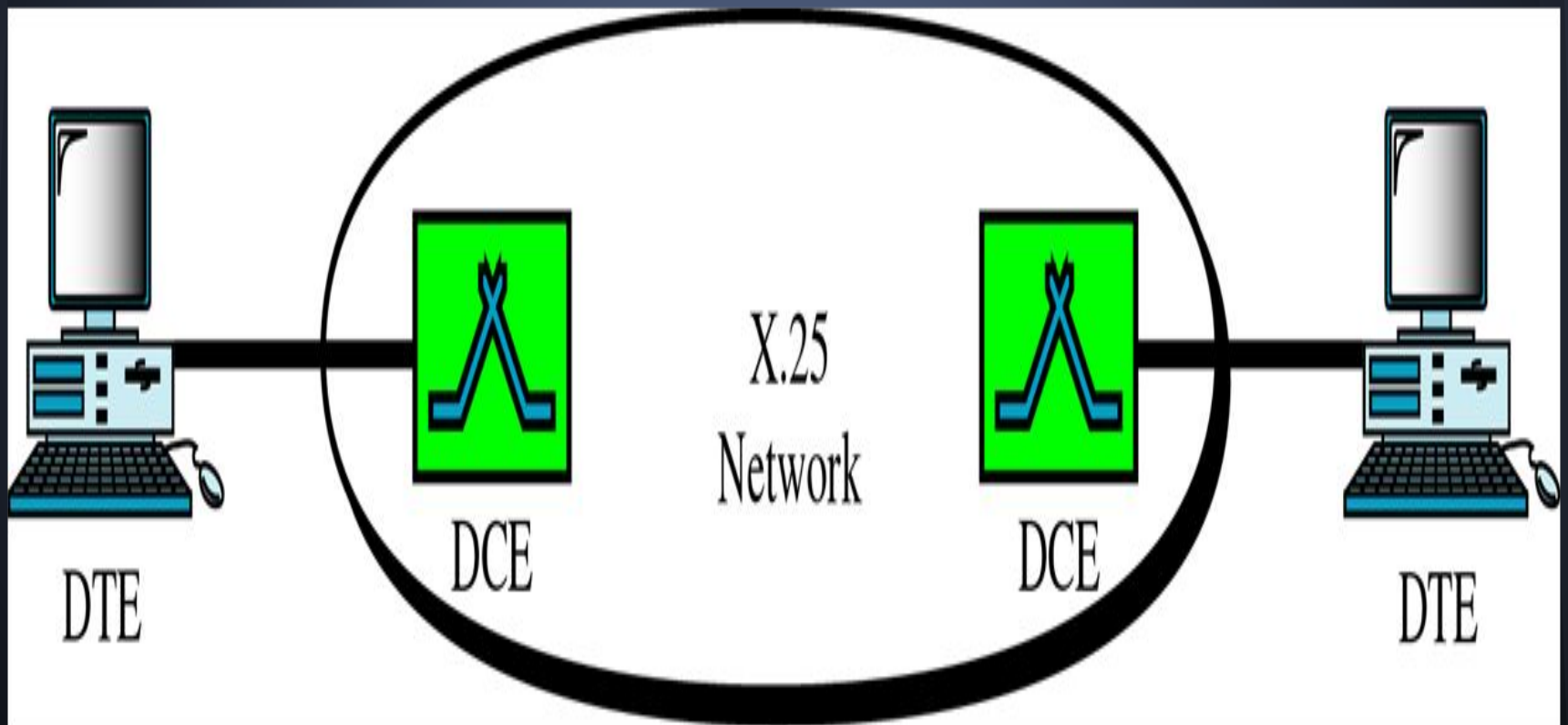
- The link level provides for the reliable transfer of data across the physical link, by transmitting the data as a sequence of frames.
- The link level standard is referred to as LAPB (link access protocol balanced) LAPB is subset of HDLC.

## Packet level:

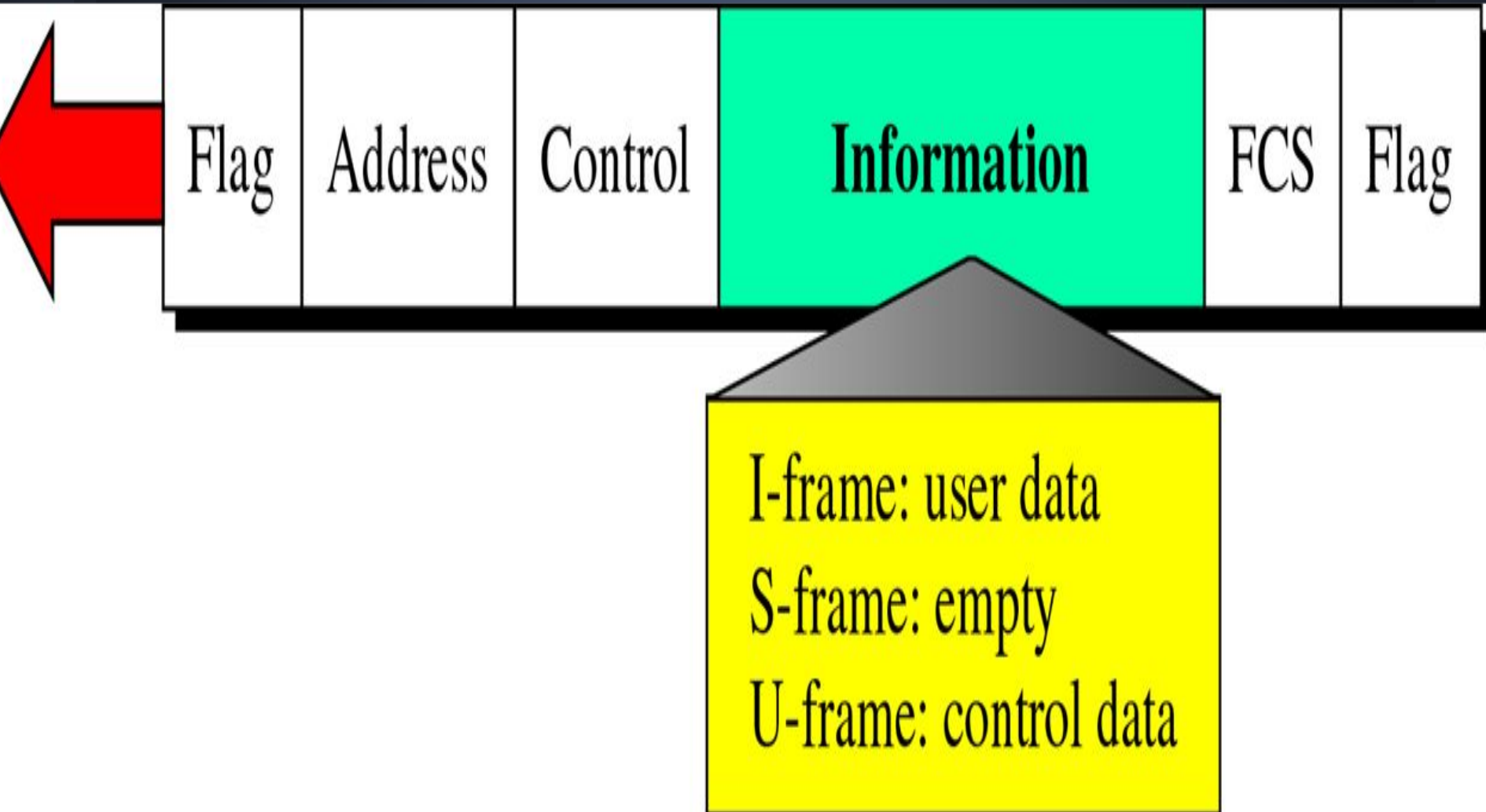
- The packet level provides a virtual circuit service.
- This service enables any subscriber to the network to setup logical connections called virtual circuits, to other subscribers.



# X.25



# Format of a Frame in X.25

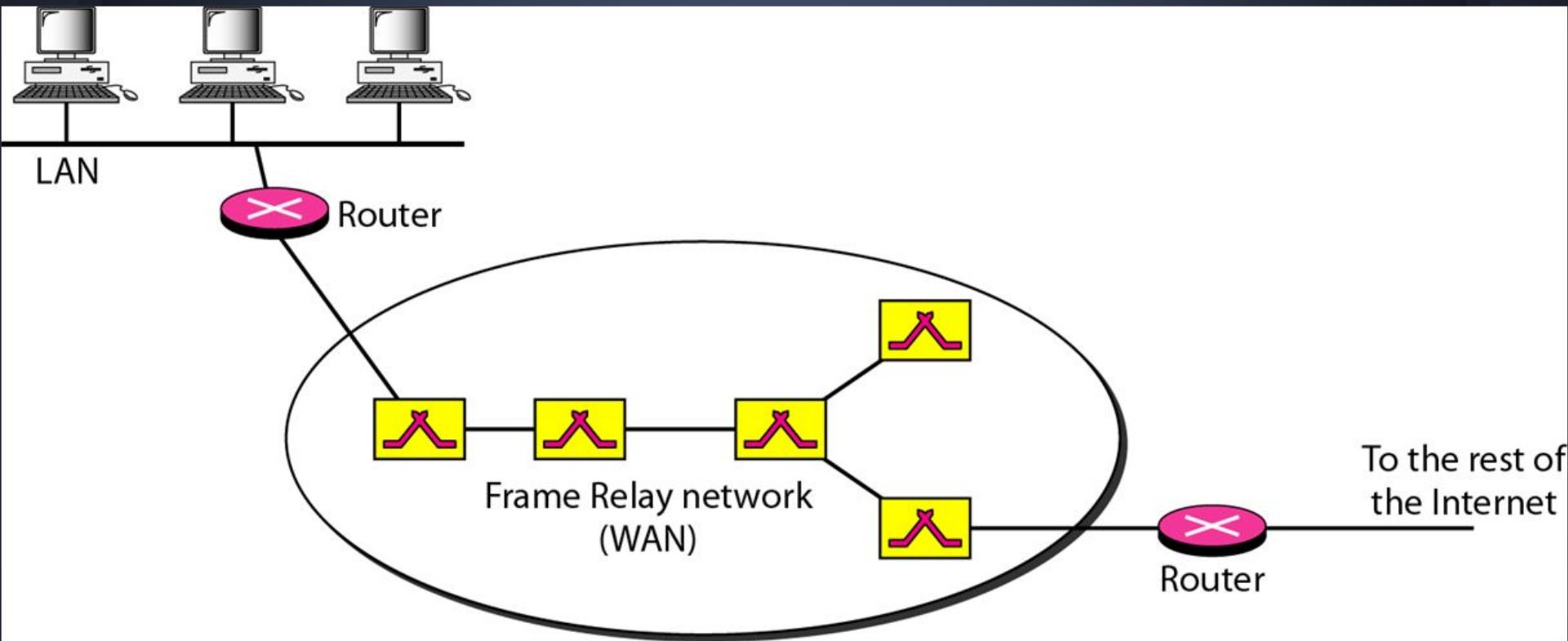




# Frame relay

- Frame relay is designed to provide more efficient transmission than X.25.
- The traditional approach of packet switching makes use of X.25.
  1. Multiplexing of virtual circuits takes place at layers
  2. Both layer 2 and 3 include flow control and

# Frame relay Network



# Frame relay frame

C/R: Command/response

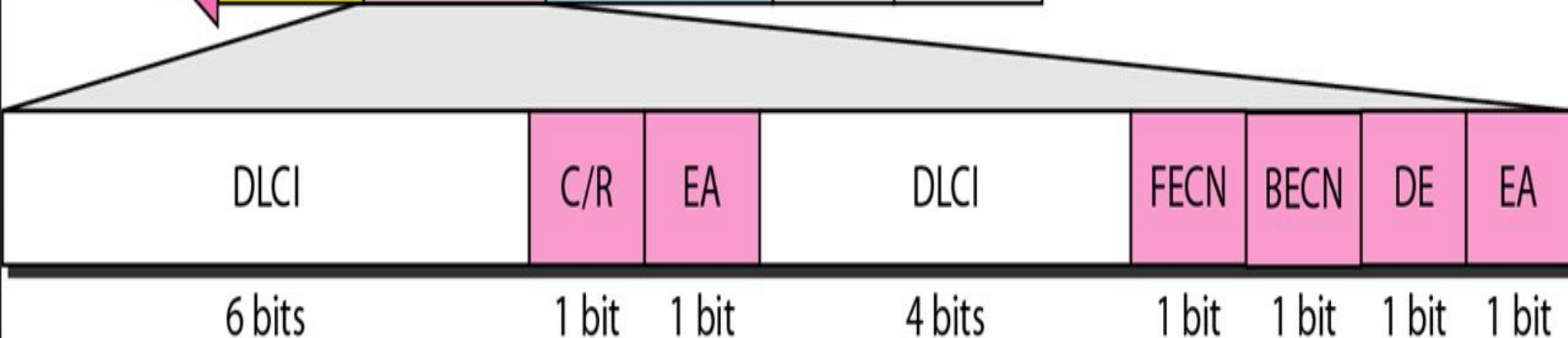
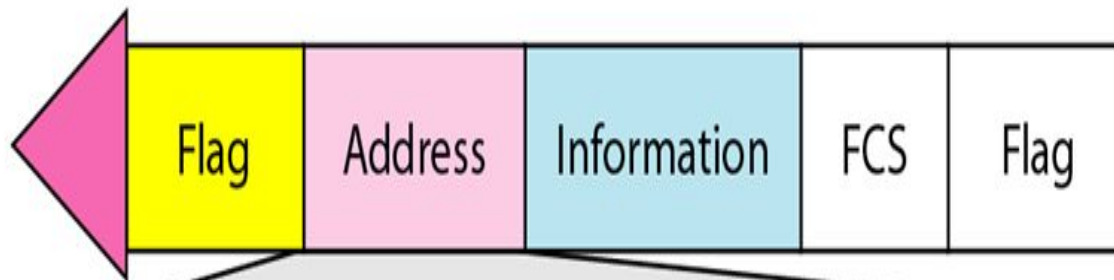
EA: Extended address

FECN: Forward explicit congestion notification

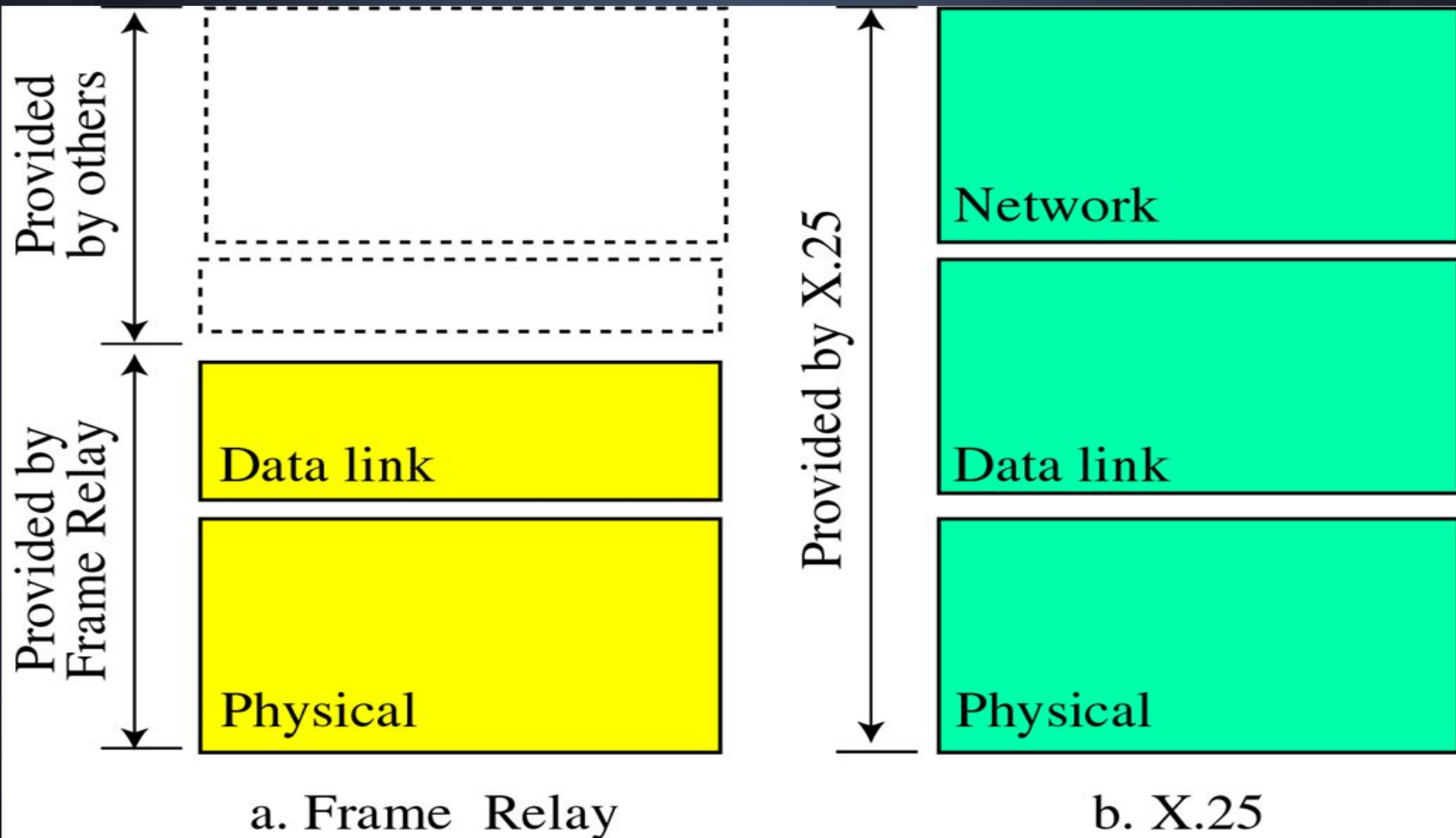
BECN: Backward explicit congestion notification

DE: Discard eligibility

DLCI: Data link connection identifier



# Comparing Layers in Frame Relay and X.25



# Differences:

<b>X.25</b>	<b>Frame Relay</b>	<b>Cell Relay (ATM)</b>
Switching at nodes	Digital switching	Digital switching
Multiple logical connections can be multiplexed over a single physical interface	Multiple logical connections can be multiplexed over a single physical interface	Multiple logical connections can be multiplexed over a single physical interface
Uses error and flow control	No link by link error control or flow control	No link by link error control or flow control
Large overhead for error control	Minimum overhead for error control	Minimum overhead for error control
		Data rates dynamically defined upon creation of virtual channel
Variable length packets	Variable length packets	Small fixed length packets.
64kbps	2Mbps	Up to 1000s of Mbps