Framing is a process used in computer networking and telecommunication to delineate the boundaries of a frame (or packet) within a stream of data. The purpose of framing is to enable the receiver to correctly interpret and extract the transmitted information. It involves adding specific bit sequences or characters at the beginning and end of a frame to mark its boundaries. This process allows the receiver to identify the start and end of each frame, facilitating proper frame synchronization and data extraction.

### Key aspects of framing:

1. \*\*Frame Structure:\*\*

- A frame typically consists of a header, payload (data), and a trailer.

- The header often contains information such as source and destination addresses, frame type, and control information.

- The trailer may include error-checking information, such as a Frame Check Sequence (FCS), to detect and correct transmission errors.

2. \*\*Frame Delimiters:\*\*

- Special bit sequences or characters are used as delimiters to mark the beginning and end of each frame.

- Delimiters help the receiver identify where a frame starts and stops in the data stream.

3. \*\*Escape Mechanism:\*\*

- To handle the possibility of the delimiter appearing within the data itself, an escape mechanism may be used.

- Escape sequences or techniques are employed to distinguish actual data from delimiters that might be part of the data.

4. \*\*Synchronization:\*\*

- Framing helps maintain synchronization between the transmitter and receiver.

- By identifying the start of each frame, the receiver can align itself with the incoming data stream and correctly interpret the information.

### Common Framing Techniques:

1. \*\*Byte-Oriented Protocols:\*\*

- In byte-oriented protocols (e.g., HDLC), a special flag sequence (delimiters) is used to mark the start and end of a frame.

- Character stuffing may be employed to handle situations where the flag sequence appears within the data.

2. \*\*Bit-Oriented Protocols:\*\*

- In bit-oriented protocols (e.g., asynchronous transmission), start and stop bits are used to frame each character.

- Bit stuffing may be used to prevent specific bit patterns from being misinterpreted as start or stop bits.

3. \*\*HDLC (High-Level Data Link Control):\*\*

- HDLC uses a frame structure with a flag sequence ("01111110") as delimiters.

- Character stuffing is employed to address the possibility of the flag sequence appearing within the data.

4. \*\*Ethernet:\*\*

- Ethernet frames include a preamble, start frame delimiter, MAC addresses, type/length field, data payload, and Frame Check Sequence (FCS) for error checking.

Framing is a fundamental aspect of data link layer protocols, ensuring that transmitted data is properly structured and can be reliably interpreted by the receiving device. Different protocols may use variations of framing techniques based on their specific requirements and characteristics.