Framing

Overview

Framing is a technique performed by the information link layer. The frame can be a point-to-point connection between two computers or devices, consisting of a cable, during which data is transmitted in the form of a bitstream. However, these bits must be framed indiscernible data blocks. Framing provides how the sender sends a set of bits that is meaningful to the receiver. Ethernet, Token Ring, Frame Relay, and other link-layer technologies have their frame structure. The frame header contains information such as a bug check code. The frame can be a point-to-point connection between two computers or devices, consisting of a cable, during which data is transmitted in the form of a bitstream. However, these bits must be framed indiscernible data blocks. Framing can be a function of the information link layer. Provides how the sender transmits a set of bits that is meaningful to the receiver. Ethernet, Token Ring, Frame Relay, and other link-layer technologies have their frame structure. The link-layer extracts the message from the sender and provides it to the receiver by giving the sender and receiver addresses. The advantage of using frames is that the data is intermittently divided into recoverable blocks, which can easily be checked for corruption.

Character Count

This method uses fields in the header to specify the number of characters in the frame. When the target's information link layer sees the number of characters, it knows what percentage of the characters are behind, knowing where the top of the frame is. The disadvantage is that if the count becomes distorted due to transmission errors, the destination will lose synchronization and not locate the beginning of subsequent frames. This method has never been used, and it is usually necessary to count the total number of characters in the frame. This is generally done using a field in the title. The character counting method ensures that there are a few real characters behind the link layer of the receiver or destination and the position of the end of the frame.

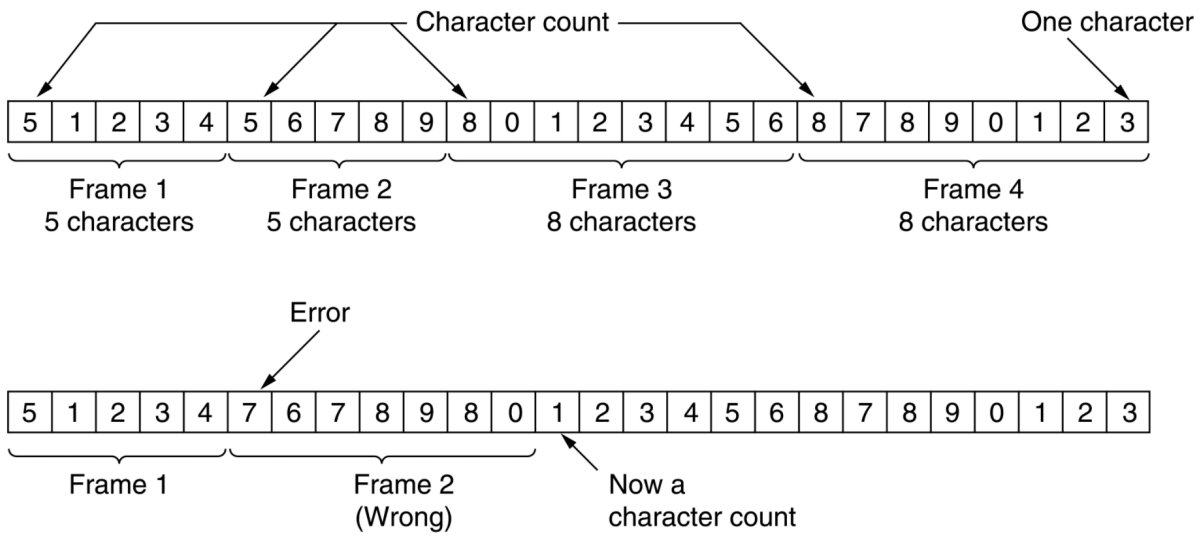

Figure 1: Character Count

Character Stuffing

Each frame begins with the ASCII character sequence DLE STX and ends with the DLE sequence ETX. (DLE is link escape, STX is the beginning of TeXt, and ETX is the end of TeXt.) This method overcomes the shortcomings of the character count method. If the destination is out of sync, look for the DLE STX and DLE ETX characters. However, if binary data is being transmitted, the characters DLE STX and DLE ETX may appear in the data. Since this interferes with the frame, a form called character padding is used. The sender link-layer inserts an ASCII DLE character into the data before the DLE character. Before this data is transmitted to the network layer, the receiver link layer deletes this DLE. However, character padding is closely related to 8-bit characters, which is usually a severe obstacle to transmitting characters of any size.

In byte padding (or character padding), when a personality has an identical pattern to the flag, a specific byte is added to the frame information part. The info part is filled with an extra byte. This byte is usually called the escape character (ESC), and it has a predefined bit pattern. Whenever the receiver finds an ESC character, it deletes it from the message part and treats subsequent characters as data, not boundary markers. Character padding is also called byte padding or character-oriented framing, which is the same as bit padding. Still, byte padding operates in bytes, while bit padding operates in bits. In byte padding, when there is a message or character with an identical pattern, a particular byte with a predefined pattern (basically called ESC (the escape character)) is added to the information part of the information stream or frame byte.

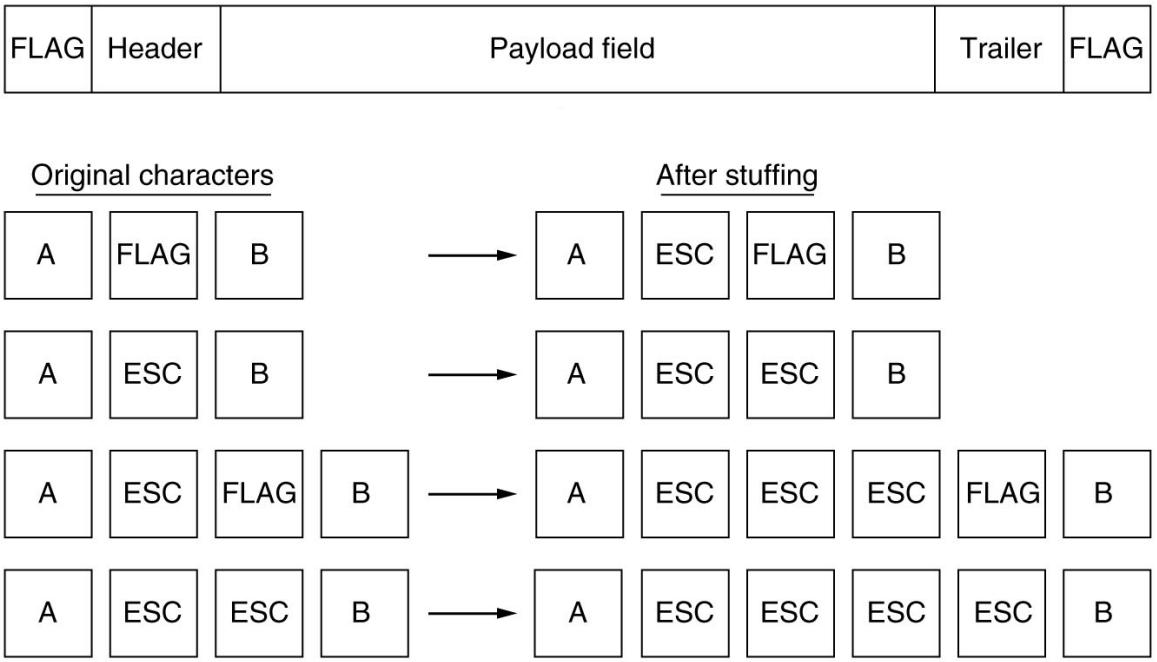

Figure 2: Character Stuffing

Bit Stuffing

It refers to the insertion of one or more bits into the knowledge transmission to provide signaling information to the receiver. The receiver knows how to detect, remove, or ignore padding bits. In the link layer of the open systems interconnection model, the bitstream is divided into units or frames that are easier to manage. Each frame contains sending and receiving information to facilitate transmission. An 8-bit flag byte is injected at the beginning and end of the sequence to separate the frames. This prevents the receiver from interpreting the flag as part of the transmitted information. Bit padding can also be used for other purposes. For example, you can increase a bitstream without an equivalent bitrate to a comparable rate to fill a buffer or fill a frame.

Regardless of the intended purpose, the state of the stuffing bits is transmitted to the receiving end of the information transmission, where the additional bits are extracted and sent back to their original shape or bit rate. In this way, bit stuffing allows multiple channels to be synchronized, maximizing available bandwidth.

Alternatively, bit stuffing is usually used for limited run-length encoding, limiting the number of bits that can be passed without conversion. This reduces the number of consecutive bits with equivalent values during the data stream to ensure reliable transmission and reception. However, bit stuffing alone does not guarantee that the

payload is free of transmission errors. Instead, it just ensures that the information starts and ends at the correct location. For this reason, unplanned error detection techniques should look for problems at the top of the frame, and if there are errors, resend the frame. Some consider bit stuffing to include bit stuffing, adding bits to the stream to form a streaming unit that fits a typical size. It is different from bit capture, a kind of in-band signaling.

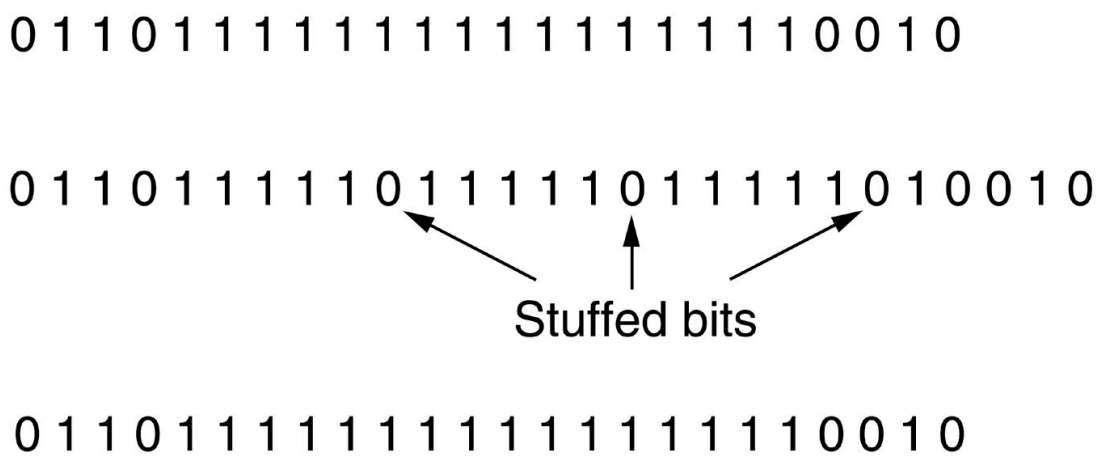

Figure 3: Bit Stuffing