Figure 13.1 IEEE standard for LANs

LLC: Logical link control MAC: Media access control

	Upper layers		Upper layers							
	Data link layer		LLC							
			Ethernet MAC	Token Ring MAC	Token Bus MAC	•••				
	Physical layer		Ethernet physical layers (several)	Token Ring physical layer	Token Bus physical layer	•••				
Transmission medium		Transmission medium								
OSI or Internet model		IEEE Standard								

13-2 STANDARD ETHERNET

The original Ethernet was created in 1976 at Xerox's Palo Alto Research Center (PARC). Since then, it has gone through four generations. We briefly discuss the Standard (or traditional) Ethernet in this section.

Topics discussed in this section:

MAC Sublayer Physical Layer

Figure 13.3 Ethernet evolution through four generations

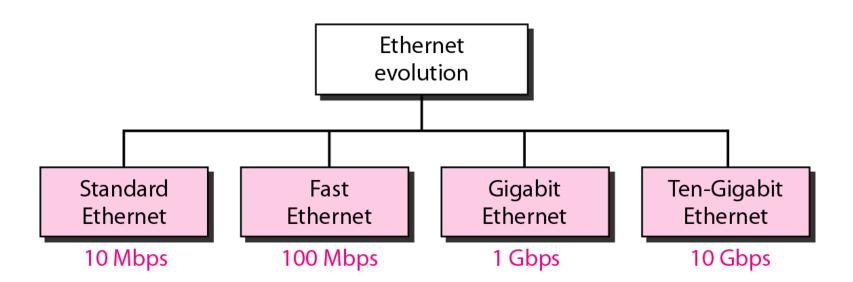


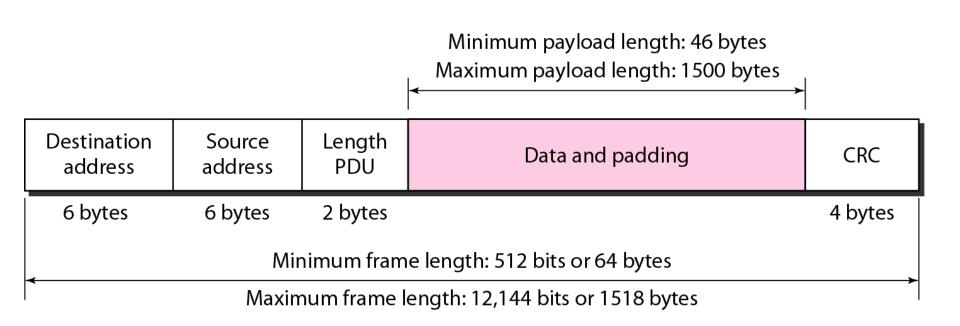
Figure 13.4 802.3 MAC frame

Preamble: 56 bits of alternating 1s and 0s.

SFD: Start frame delimiter, flag (10101011)

Preamble	SFD	Destination address	Source address	Length or type	Data and padding	CRC
7 bytes	1 byte	6 bytes	6 bytes	2 bytes		4 bytes
Physical layer header						

Figure 13.5 Minimum and maximum lengths





Note

Frame length:

Minimum: 64 bytes (512 bits)

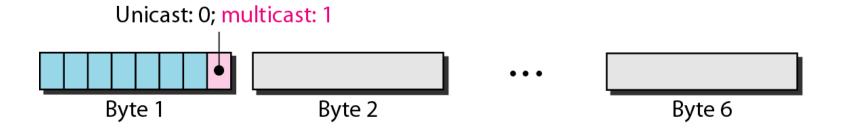
Maximum: 1518 bytes (12,144 bits)

Figure 13.6 Example of an Ethernet address in hexadecimal notation

06:01:02:01:2C:4B

6 bytes = 12 hex digits = 48 bits

Figure 13.7 Unicast and multicast addresses



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Note

The least significant bit of the first byte defines the type of address. If the bit is 0, the address is unicast; otherwise, it is multicast.

Note

The broadcast destination address is a special case of the multicast address in which all bits are 1s.