
CHAPTER 3

Underlying Technologies

Exercises

1. The Ethernet frame must have a minimum data size because a sending station must be able to sense a collision before the entire frame is sent out. The minimum size of an Ethernet network is therefore determined by the minimum frame size.
3. In the worst case, the collision would be sensed in $2 \times 12.5 = 25$ microseconds.
5. Let X equal the minimum number of bits. Then,

$$X \text{ bits} / 10,000,000 \text{ bits/second} = 0.000025 \text{ seconds}$$

$$X = 10,000,000 \times 0.000025 = 250 \text{ bits}$$

$$250 \text{ bits} / 8 = 31.25 \text{ bytes}$$

The minimum frame size would have to be larger than 32 bytes for an Ethernet network of 2500 meters to work properly. The minimum size is set to 65 bytes to allow for propagation delay in the connecting devices.

7. No, the data cannot be encapsulated in one frame. Two frames need to be sent. One frame has 1500 bytes of data; the other has 10 bytes of data plus 36 bytes of padding.

9. See Table 3.1.

Table 3.1 *Exercise 9*

<i>Fields</i>	<i>IEEE 802.3</i>	<i>IEEE 802.11</i>
Destination address	6	
Source address	6	
Address 1		6
Address 2		6
Address 3		6
Address 4		6
FC		2
D/ID		2
SC		2
PDU length	2	
Data and padding	1500	
Frame body		2312
FCS (CRC)	4	4