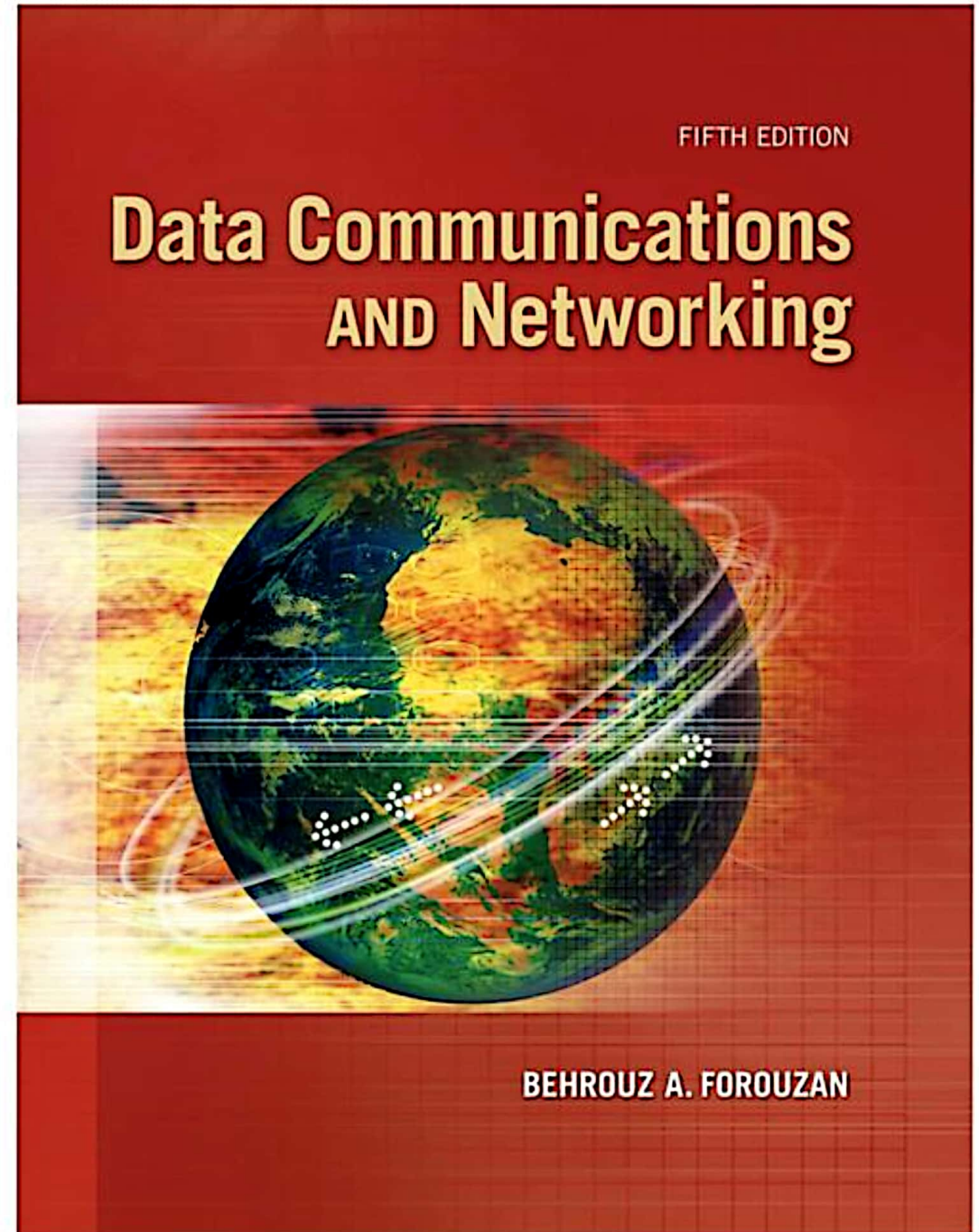


Chapter 9

Introduction To Data-Link Layer





Chapter 9: Outline

9.1 INTRODUCTION

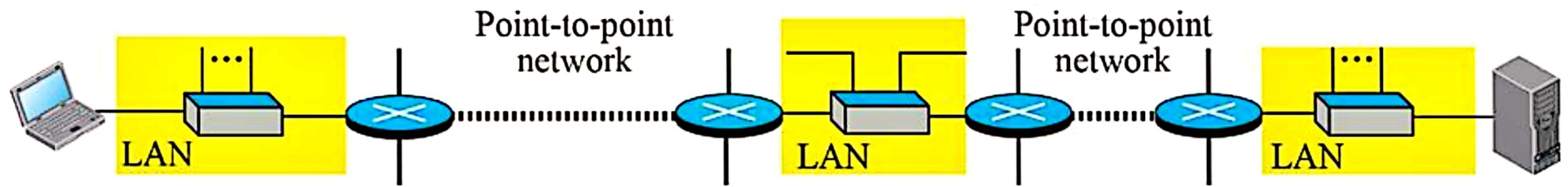
9.2 LINK-LAYER ADDRESSING



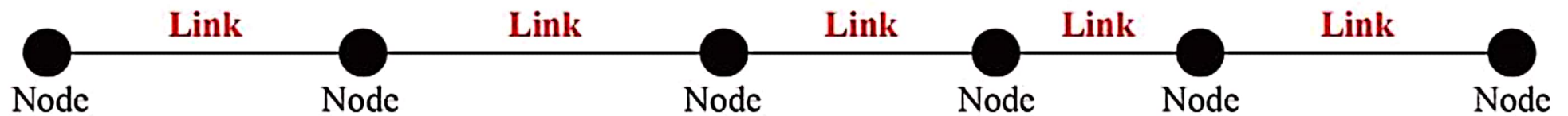
9.9.1 Nodes and Links

Communication at the data-link layer is node-to-node. A data unit from one point in the Internet needs to pass through many networks (LANs and WANs) to reach another point. These LANs and WANs are connected by routers. It is customary to refer to the two end hosts and the routers as nodes and the networks in between as links. Figure 9.2 is a simple representation of links and nodes when the path of the data unit is only six nodes.

Figure 9.2: Nodes and Links



a. A small part of the Internet



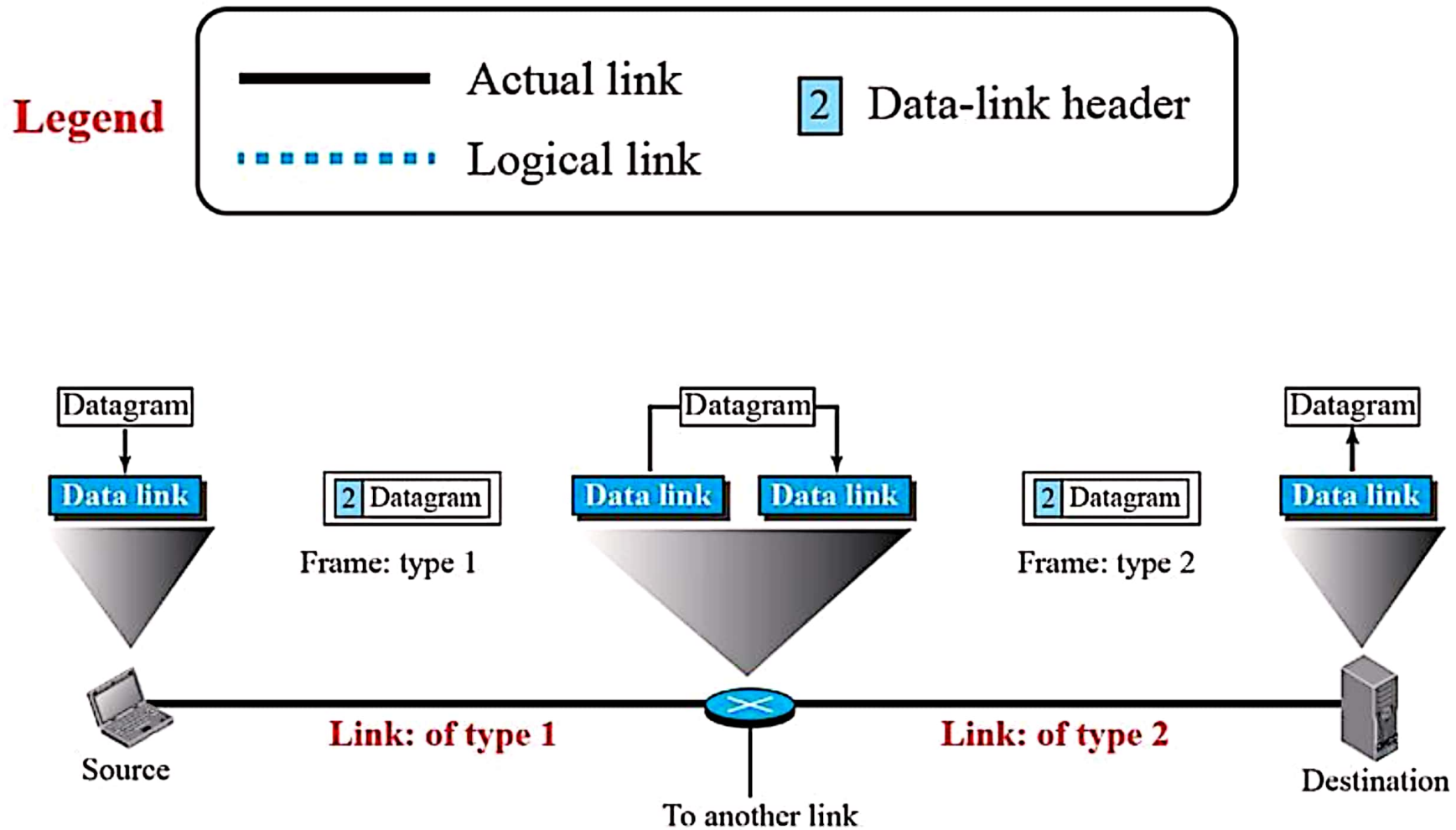
b. Nodes and links



9.9.2 Services

The data-link layer is located between the physical and the network layers. The data-link layer provides services to the network layer; it receives services from the physical layer. Let us discuss services provided by the data-link layer.

Figure 9.3: A communication with only three nodes





9.9.3 *Two Categories of Links*

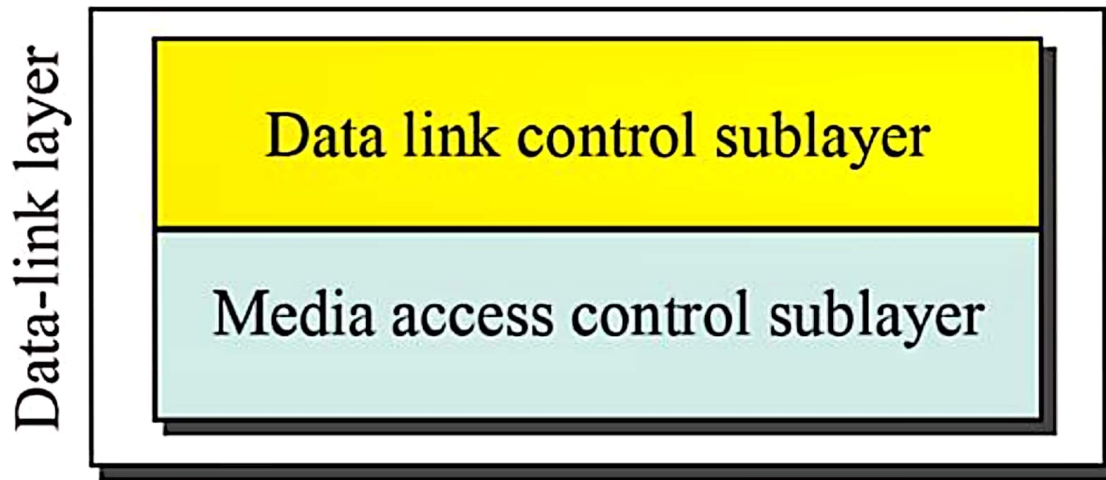
Although two nodes are physically connected by a transmission medium such as cable or air, we need to remember that the data-link layer controls how the medium is used. We can have a data-link layer that uses the whole capacity of the medium; we can also have a data-link layer that uses only part of the capacity of the link. In other words, we can have a point-to-point link or a broadcast link.



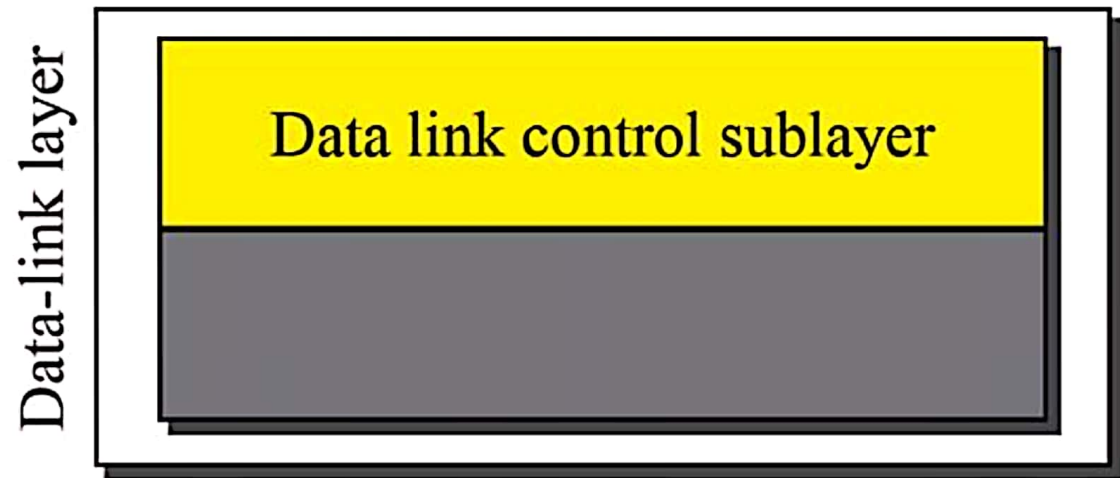
9.9.4 *Two Sublayers*

To better understand the functionality of and the services provided by the link layer, we can divide the data-link layer into two sublayers: data link control (DLC) and media access control (MAC). This is not unusual because, as we will see in later chapters, LAN protocols actually use the same strategy.

Figure 9.3: *Dividing the data-link layer into two sublayers*



a. Data-link layer of a broadcast link



b. Data-link layer of a point-to-point link

5-4 LINK-LAYER ADDRESSING

In Chapter 18, we will discuss IP addresses as the identifiers at the network layer. However, in a internetwork such as the Internet we cannot make a datagram reach its destination using only IP addresses. The source and destination IP addresses define the two ends but cannot define which links the packet should pass through.

Figure 9.5: IP addresses and link-layer addresses in a small internet

