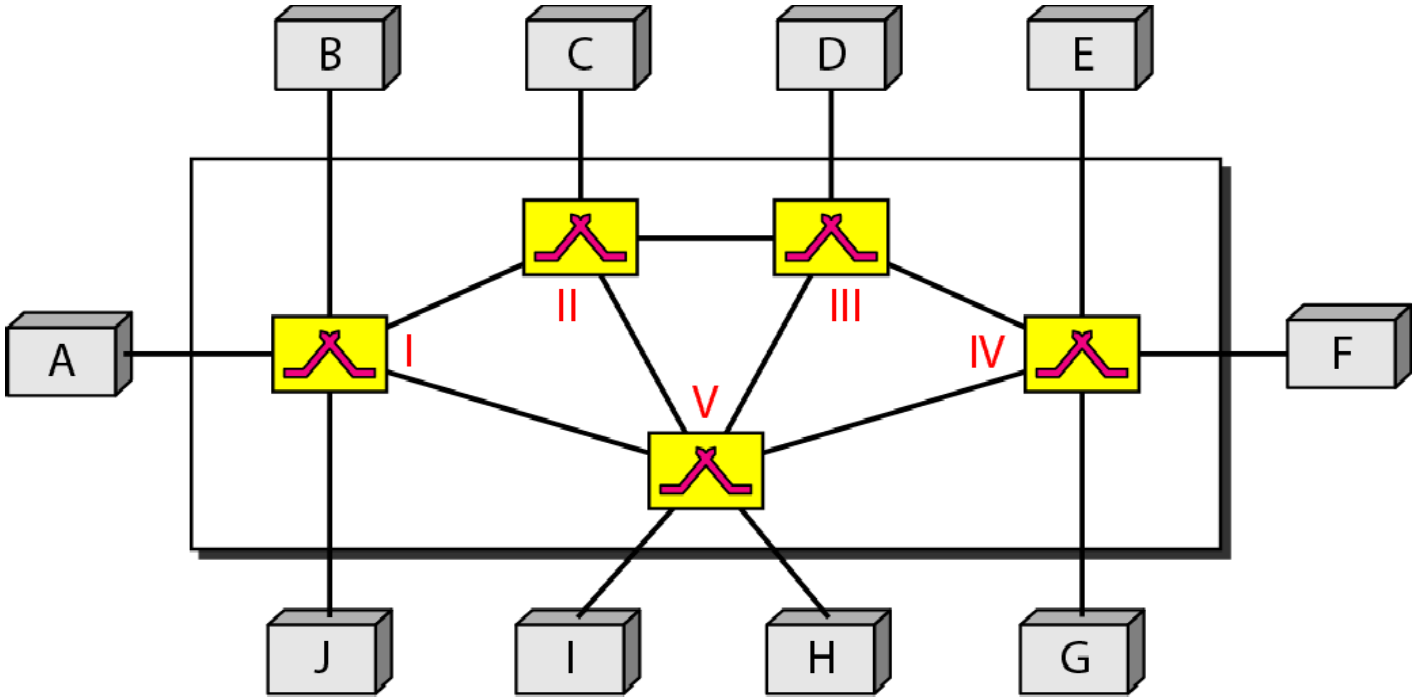
Data Communications and Networking Fourth Edition

Forouzan

Chapter 8

Switching

Figure 8.1 *Switched network*



8-1 CIRCUIT-SWITCHED NETWORKS

A circuit-switched network consists of a set of switches connected by physical links. A connection between two stations is a dedicated path made of one or more links.. However, each connection uses only one dedicated channel on each link.. Each link is normally divided into n channels by using FDM or TDM.

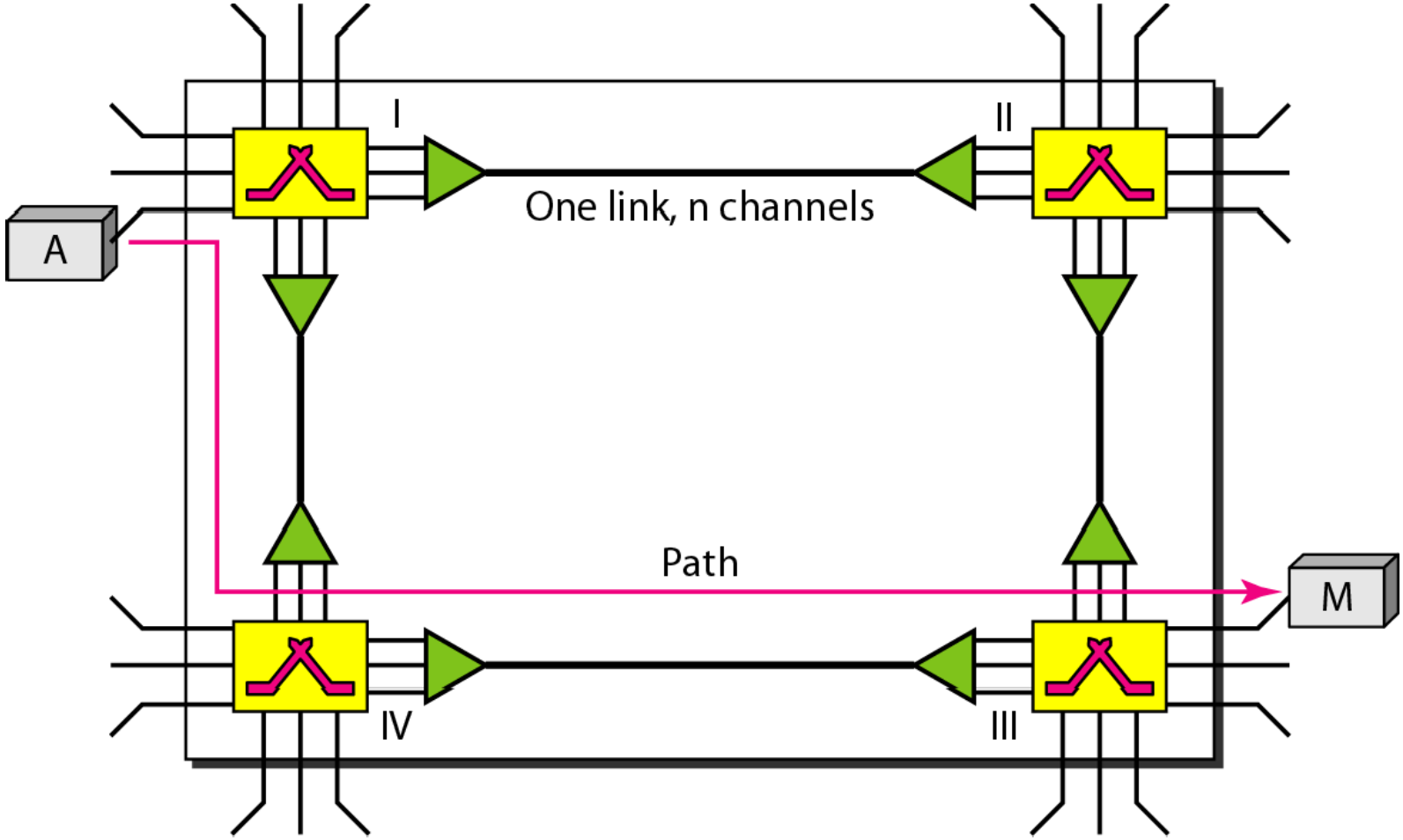
Topics discussed in this section:

Three Phases
Efficiency
Circuit-Switched Technology in Telephone Networks

Note

A circuit-switched network is made of a set of switches connected by physical links, in which each link is divided into *n* channels.

Figure 8.3 *A trivial circuit-switched network*



Note

In circuit switching, the resources need to be reserved during the setup phase; the resources remain dedicated for the entire duration of data transfer until the teardown phase.

Figure 8.4 *Circuit-switched network used in Example 8.1*

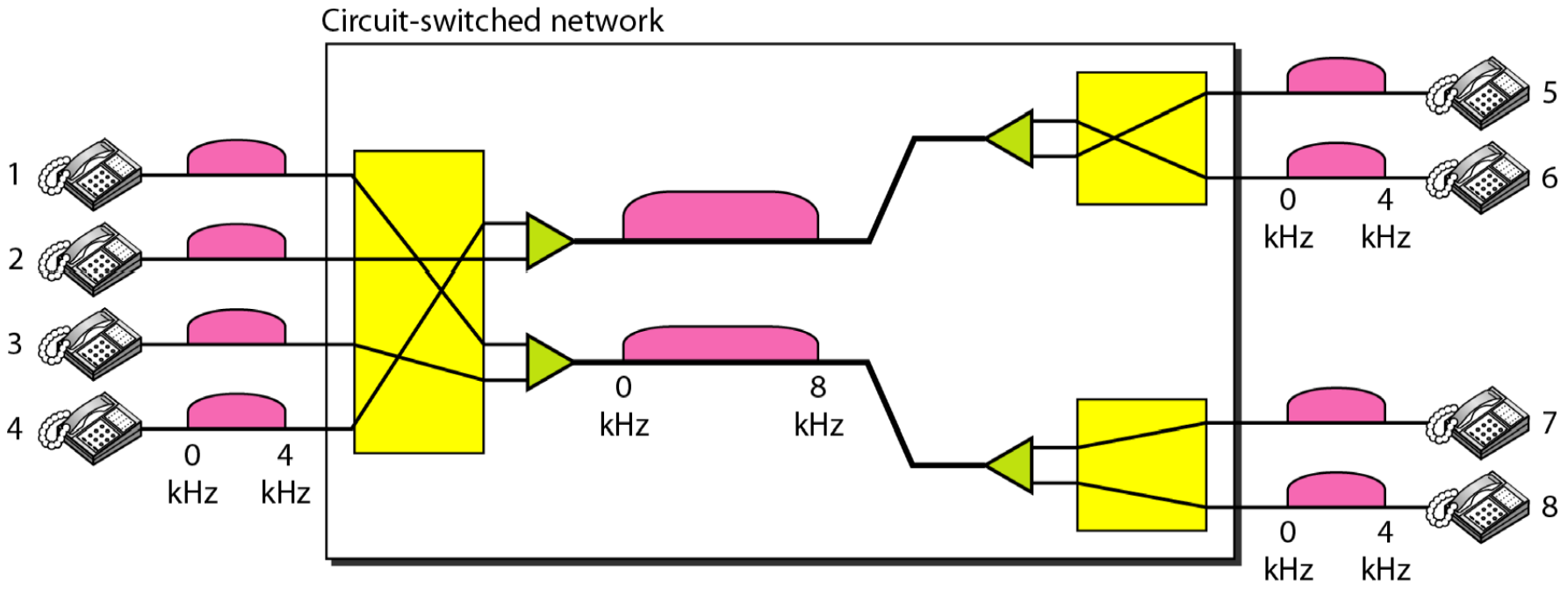
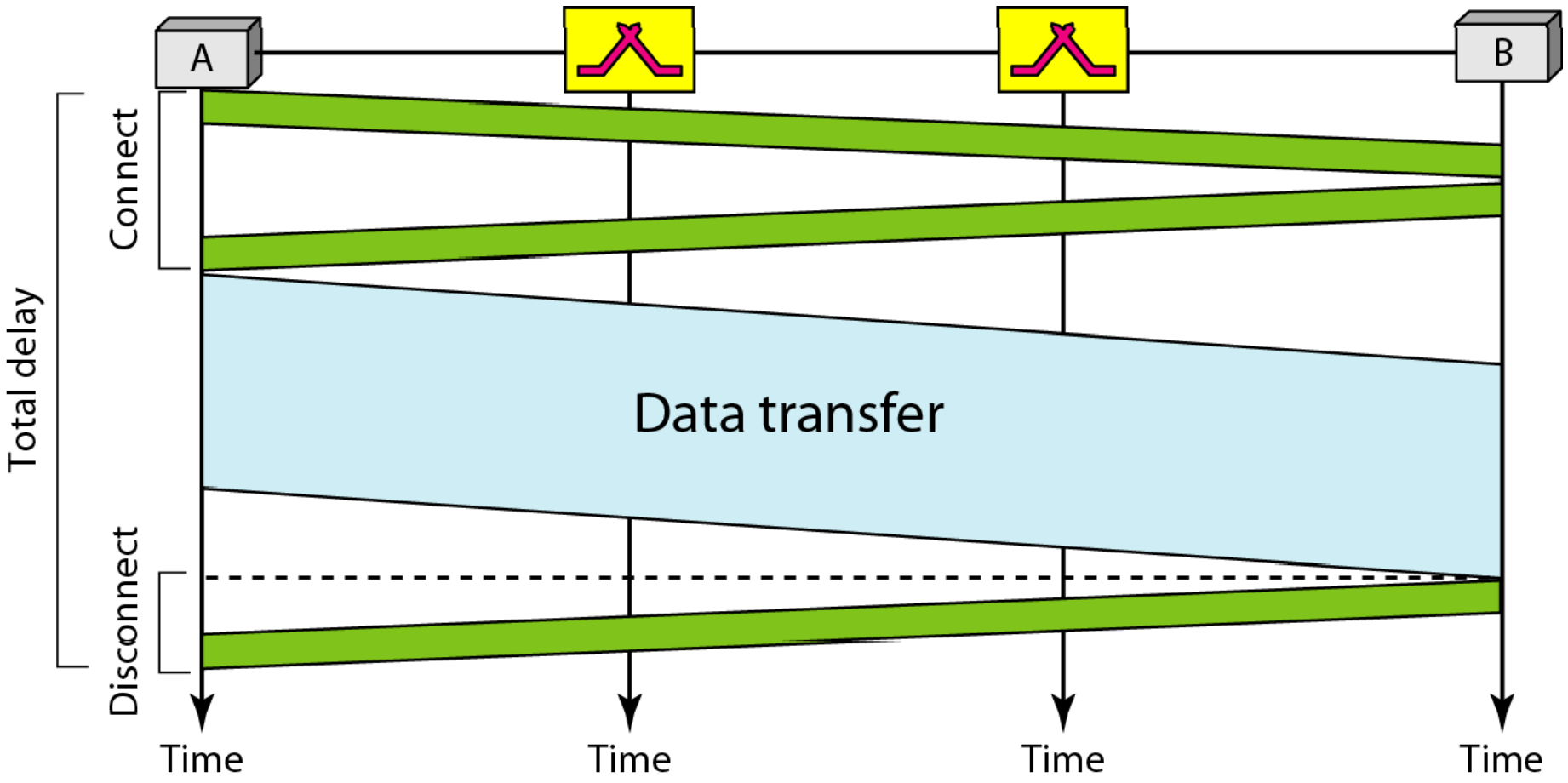


Figure 8.6 *Delay in a circuit-switched network*



Note

Switching at the physical layer in the traditional telephone network uses the circuit-switching approach.

8-2 DATAGRAM NETWORKS

In data communications, we need to send messages from one end system to another. If the message is going to pass through a packet-switched network, it needs to be divided into packets of fixed or variable size.. The size of the packet is determined by the network and the governing protocol.

Topics discussed in this section:

Routing Table
Efficiency
Delay
Datagram Networks in the Internet

Note

In a packet-switched network, there is no resource reservation; resources are allocated on demand.

Figure 8.7 *A datagram network with four switches (routers)*

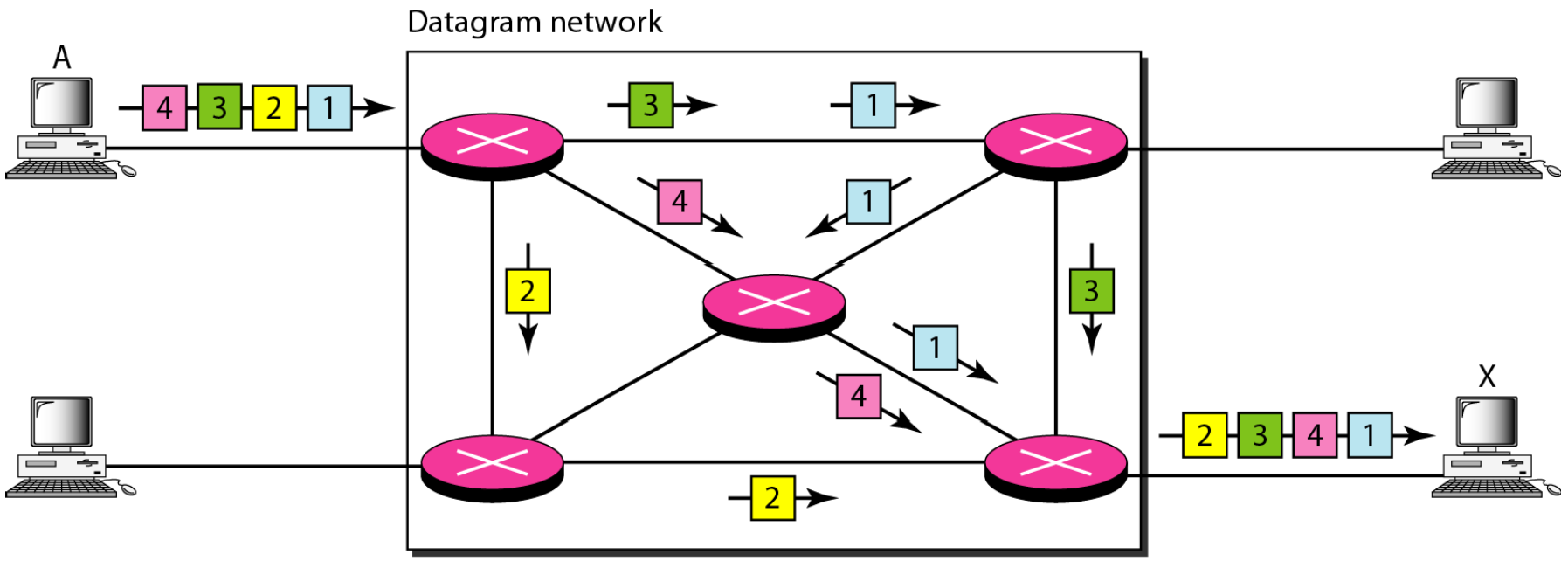
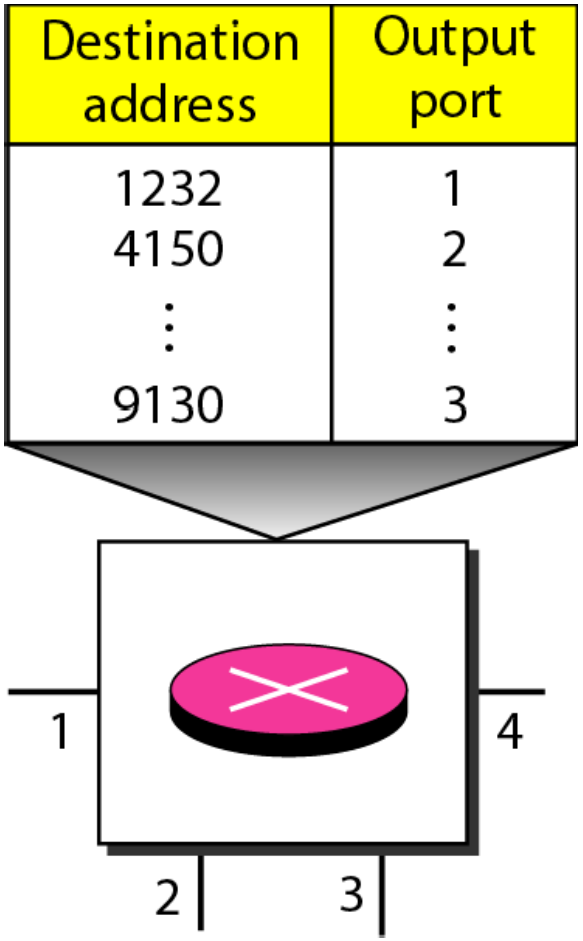


Figure 8.8 *Routing table in a datagram network*



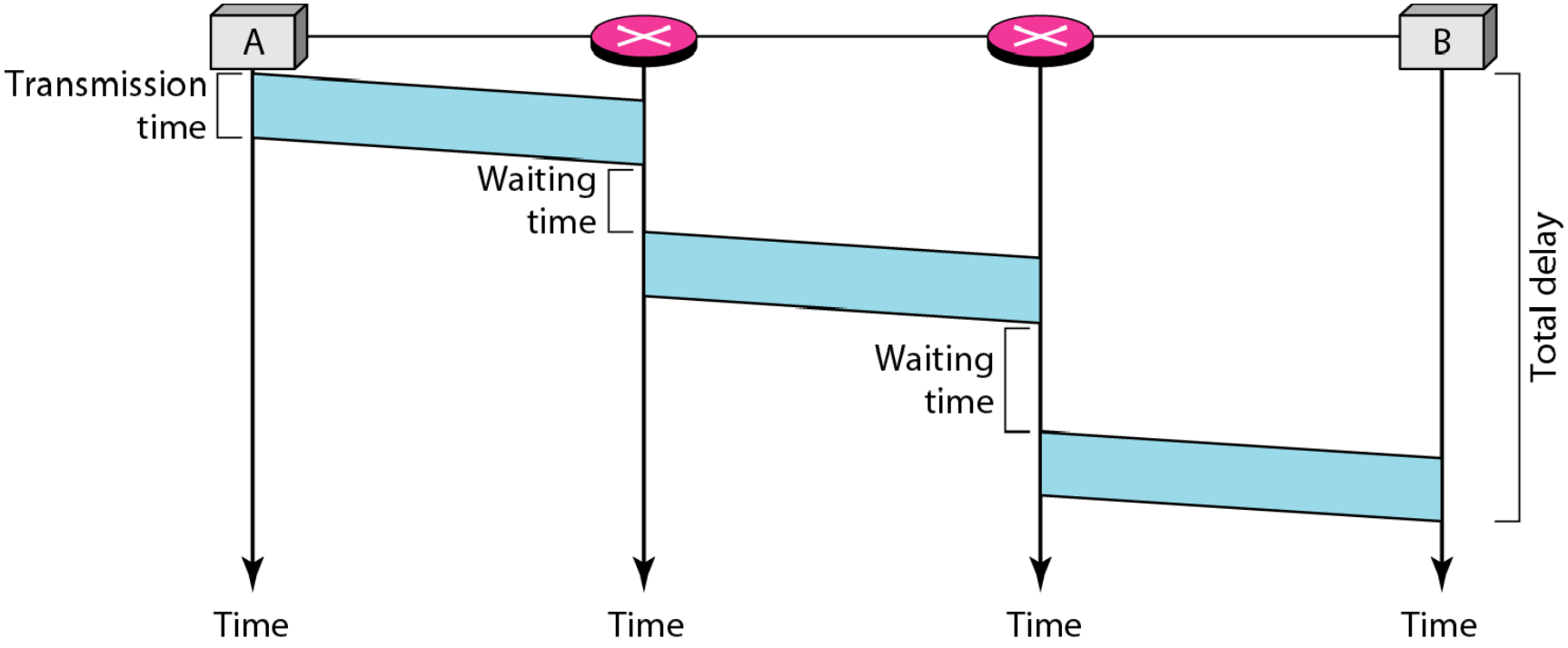
Note

A switch in a datagram network uses a routing table that is based on the destination address.

Note

The destination address in the header of a packet in a datagram network remains the same during the entire journey of the packet.

Figure 8.9 *Delay in a datagram network*



Note

Switching in the Internet is done by using the datagram approach to packet switching at the network layer.