Chapter 8

Switching

Figure 8.1 *Switched network*

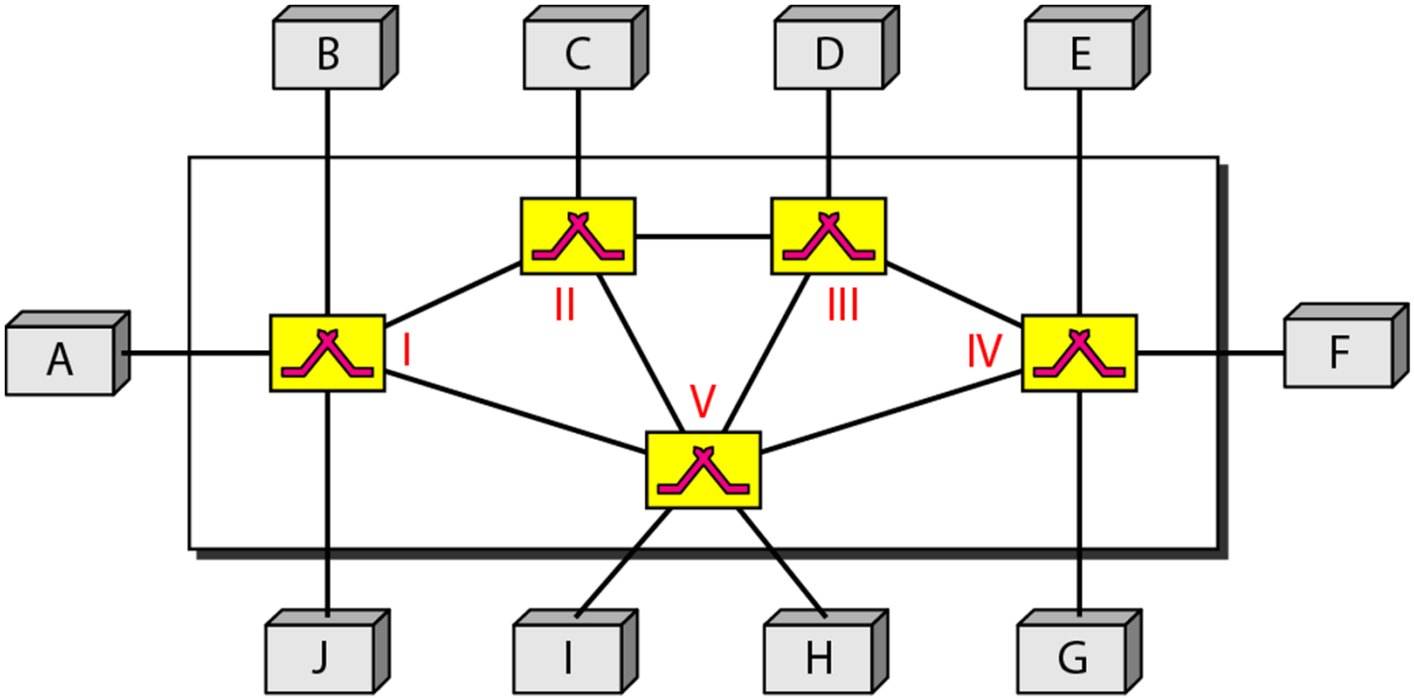
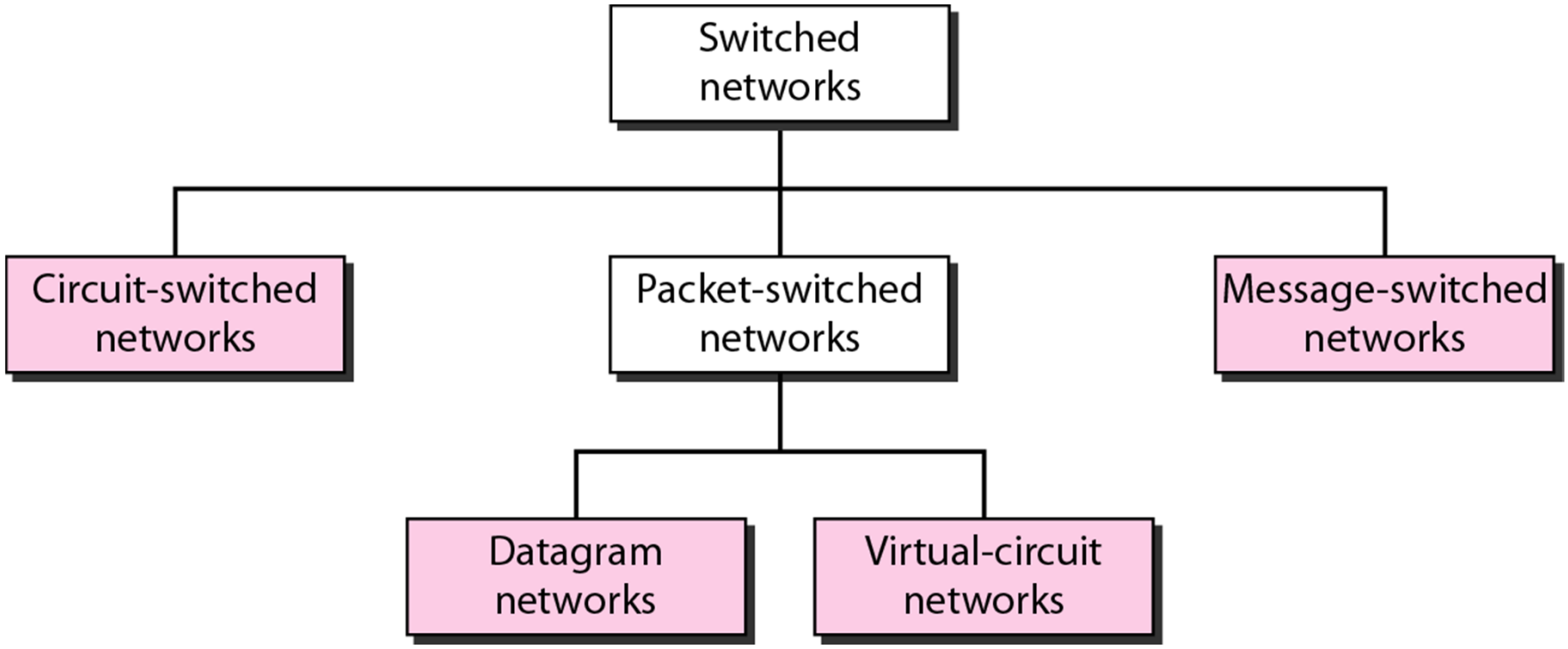
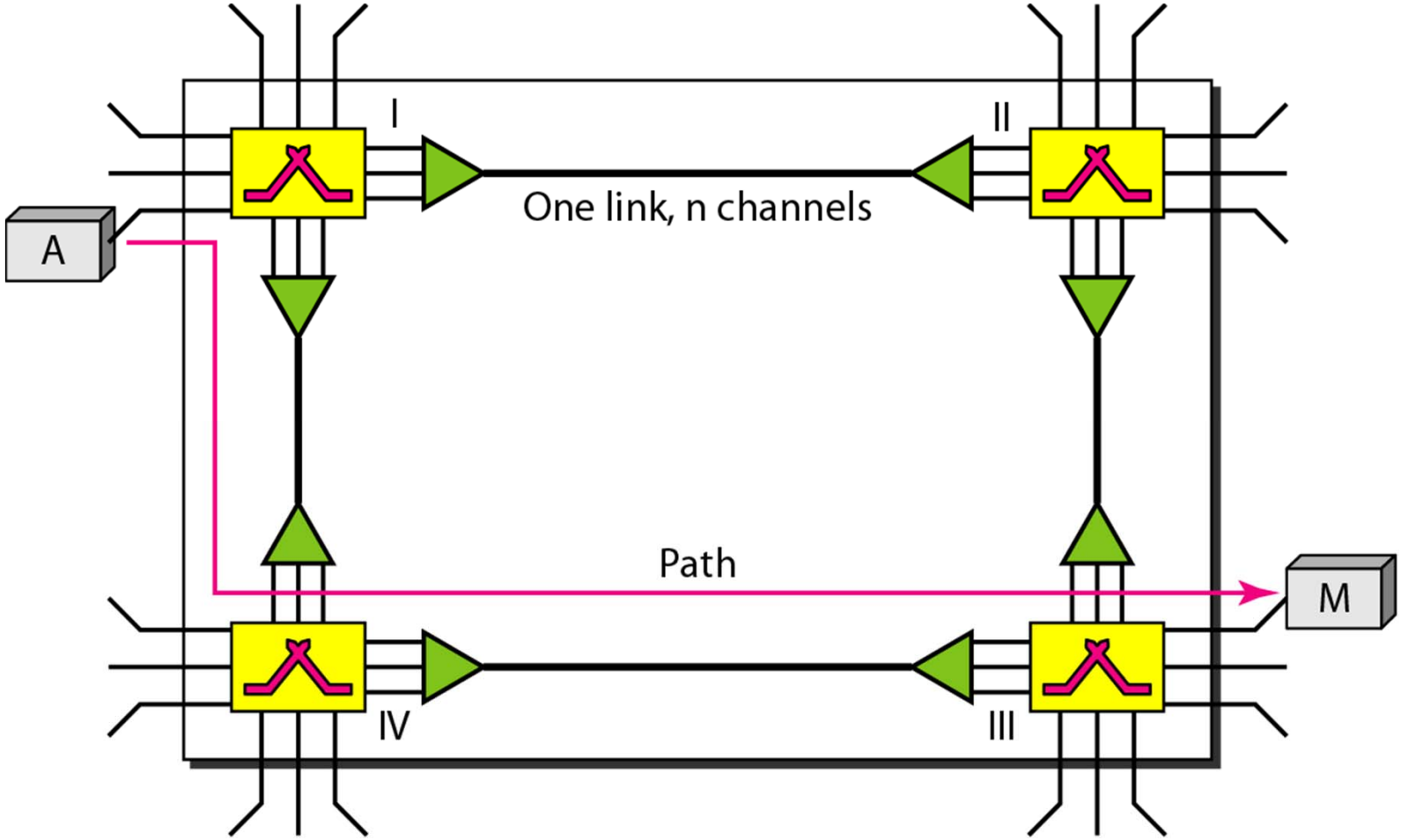


Figure 8.2 *Taxonomy of switched networks*



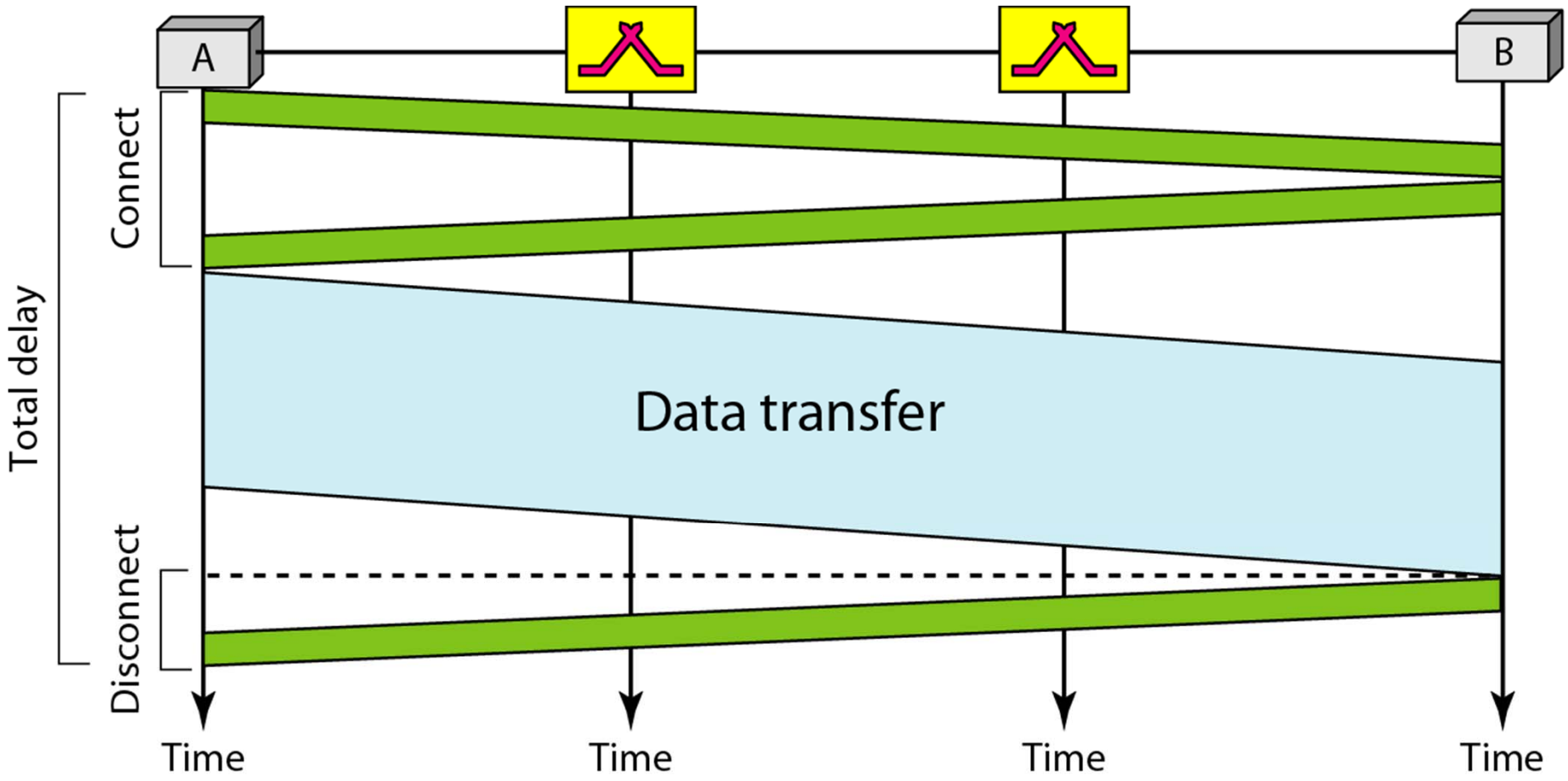
A circuit-switched network is made of a set of switches connected by physical links, in which each link is divided into *n* channels.

Figure 8.3 *A trivial circuit-switched network*



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 8.6 *Delay in a circuit-switched network*



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)*

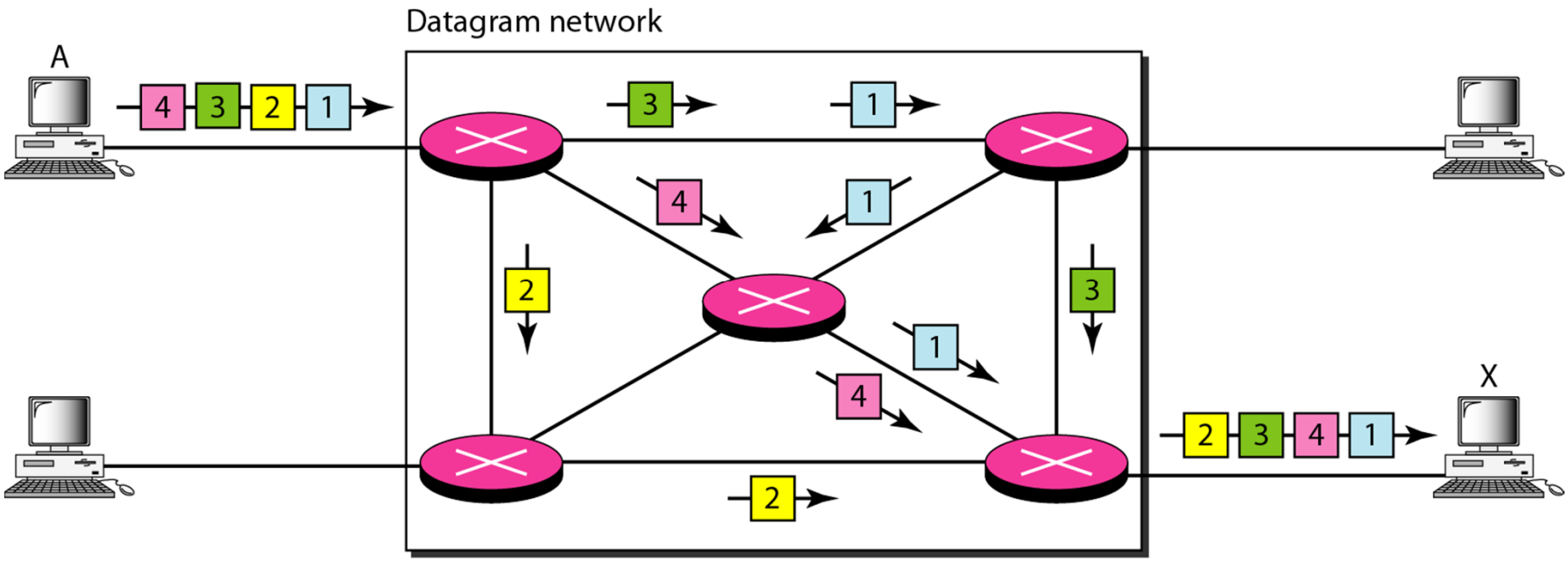
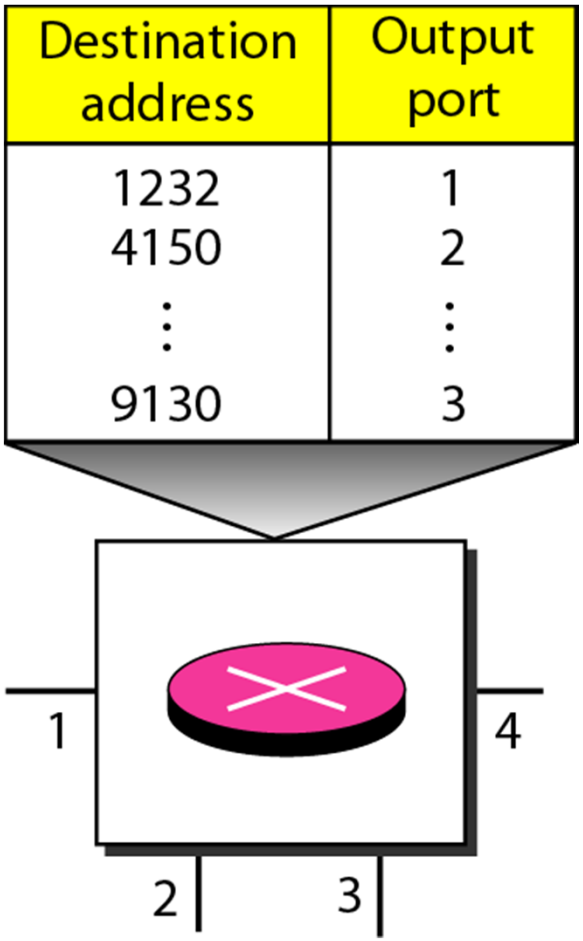


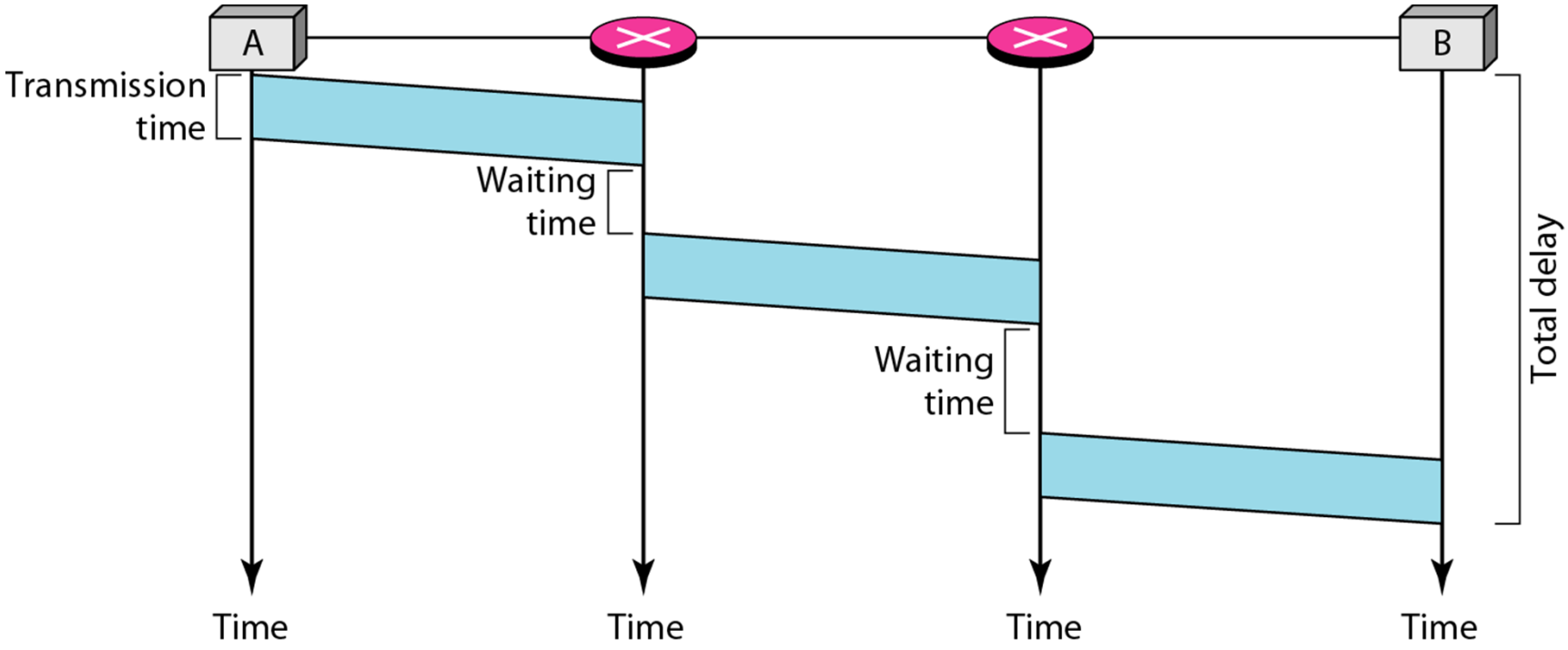
Figure 8.8 *Routing table in a datagram network*



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

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*



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

VIRTUAL-CIRCUIT NETWORKS

A virtual-circuit network is a cross between a circuit-switched network and a datagram network. It has some characteristics of both.

Figure 8.10 *Virtual-circuit network*

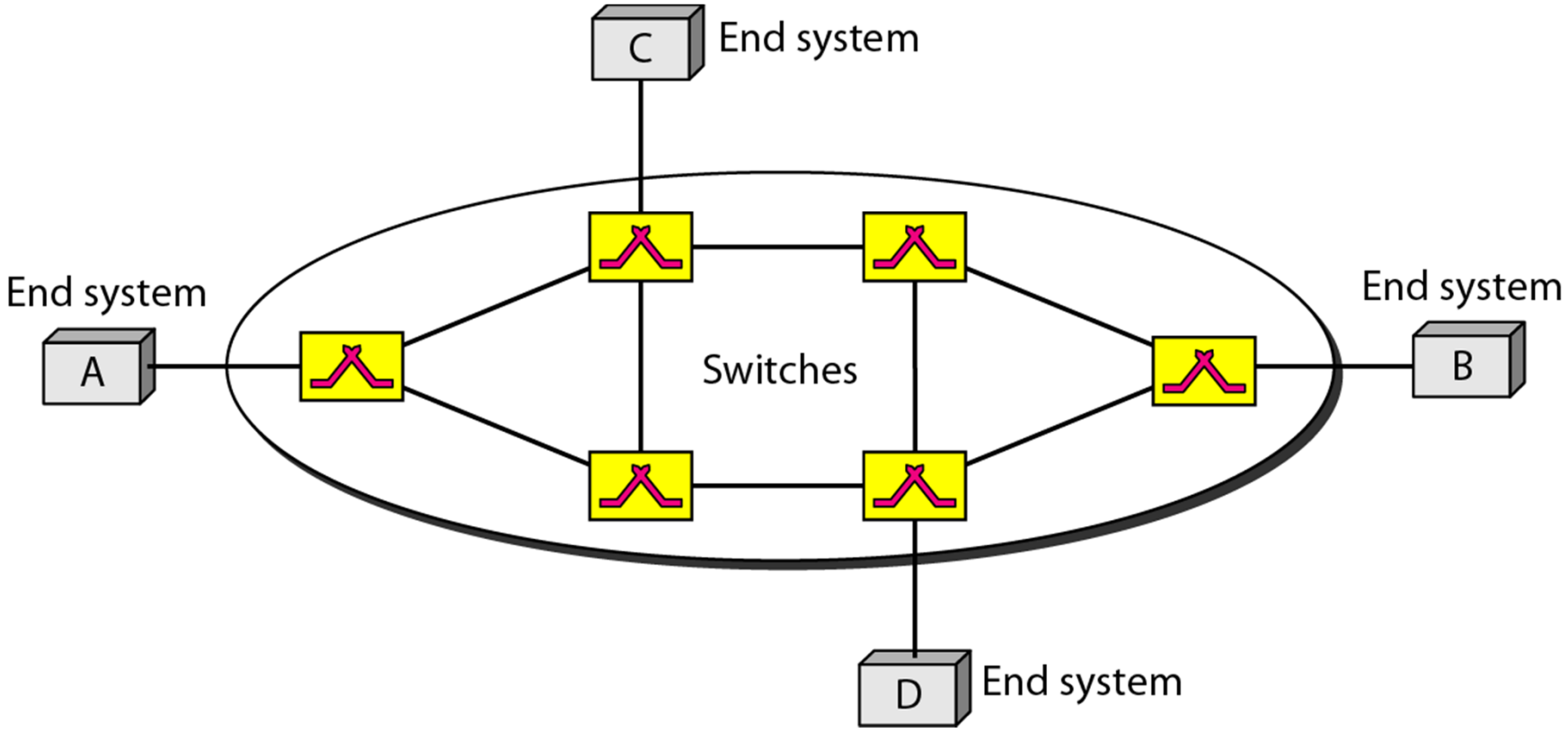


Figure 8.11 *Virtual-circuit identifier*

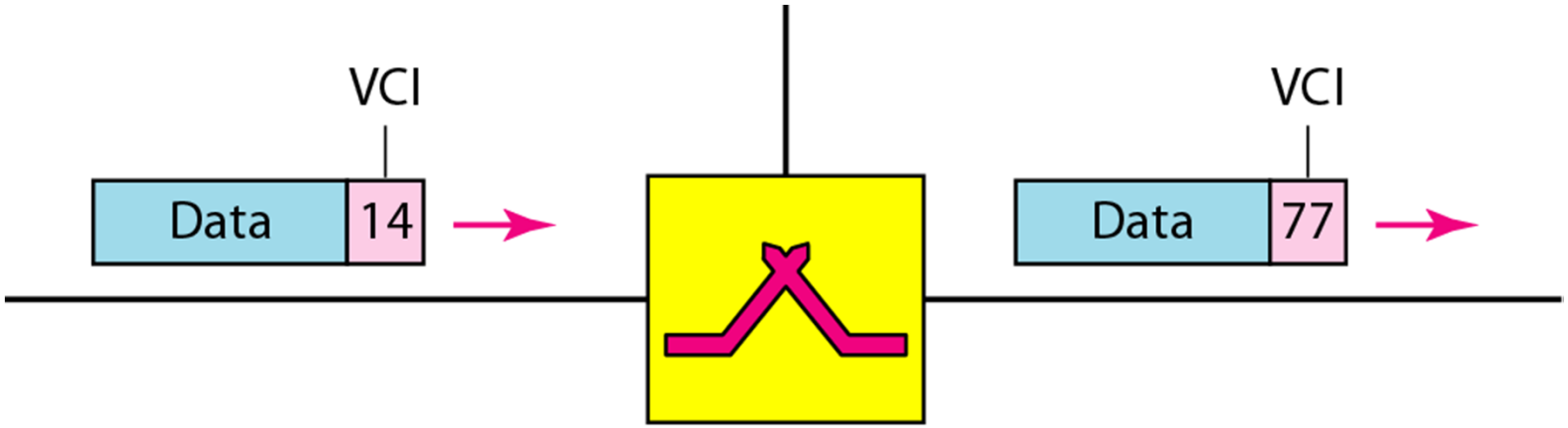


Figure 8.12 *Switch and tables in a virtual-circuit network*

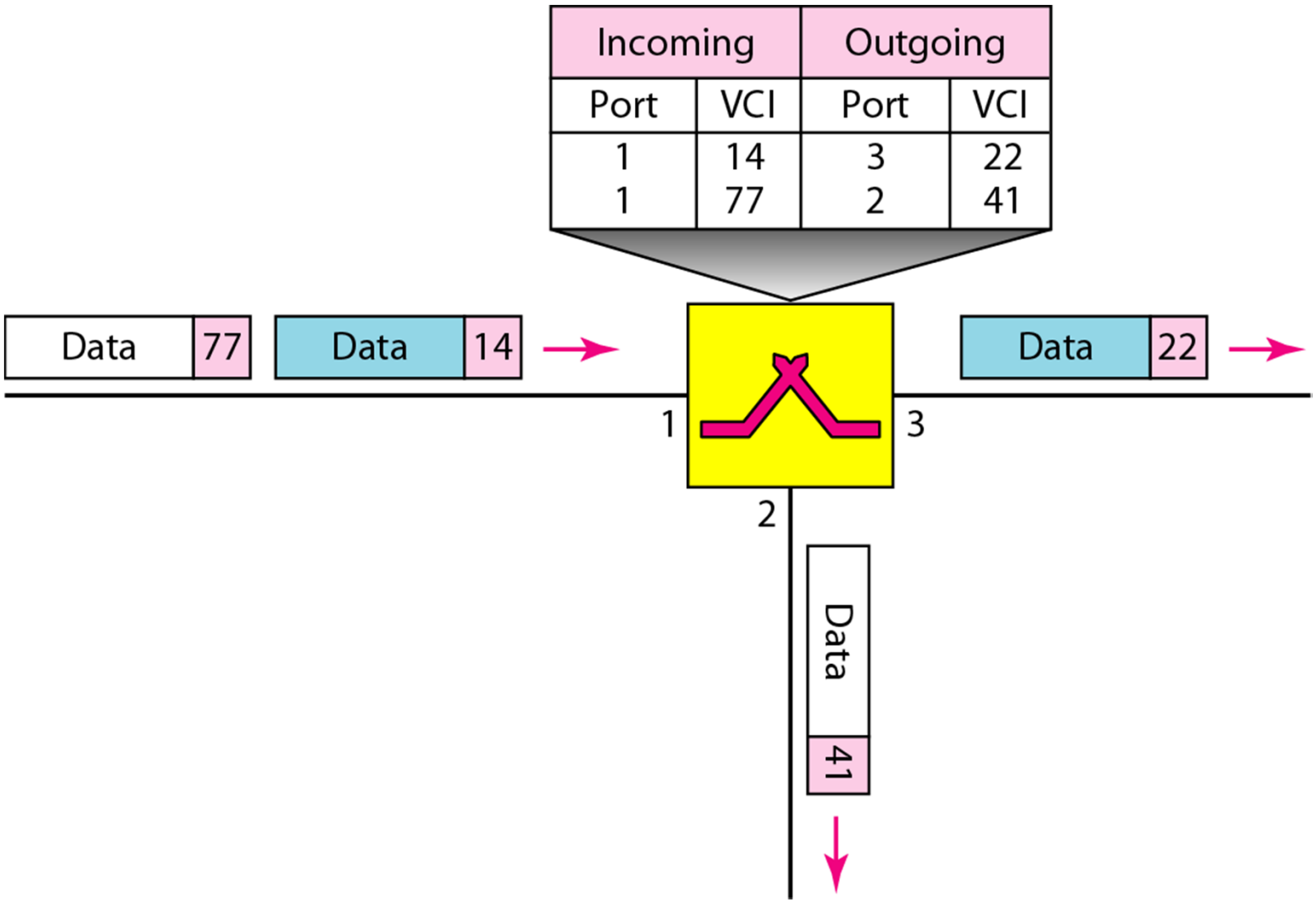


Figure 8.13 *Source-to-destination data transfer in a virtual-circuit network*

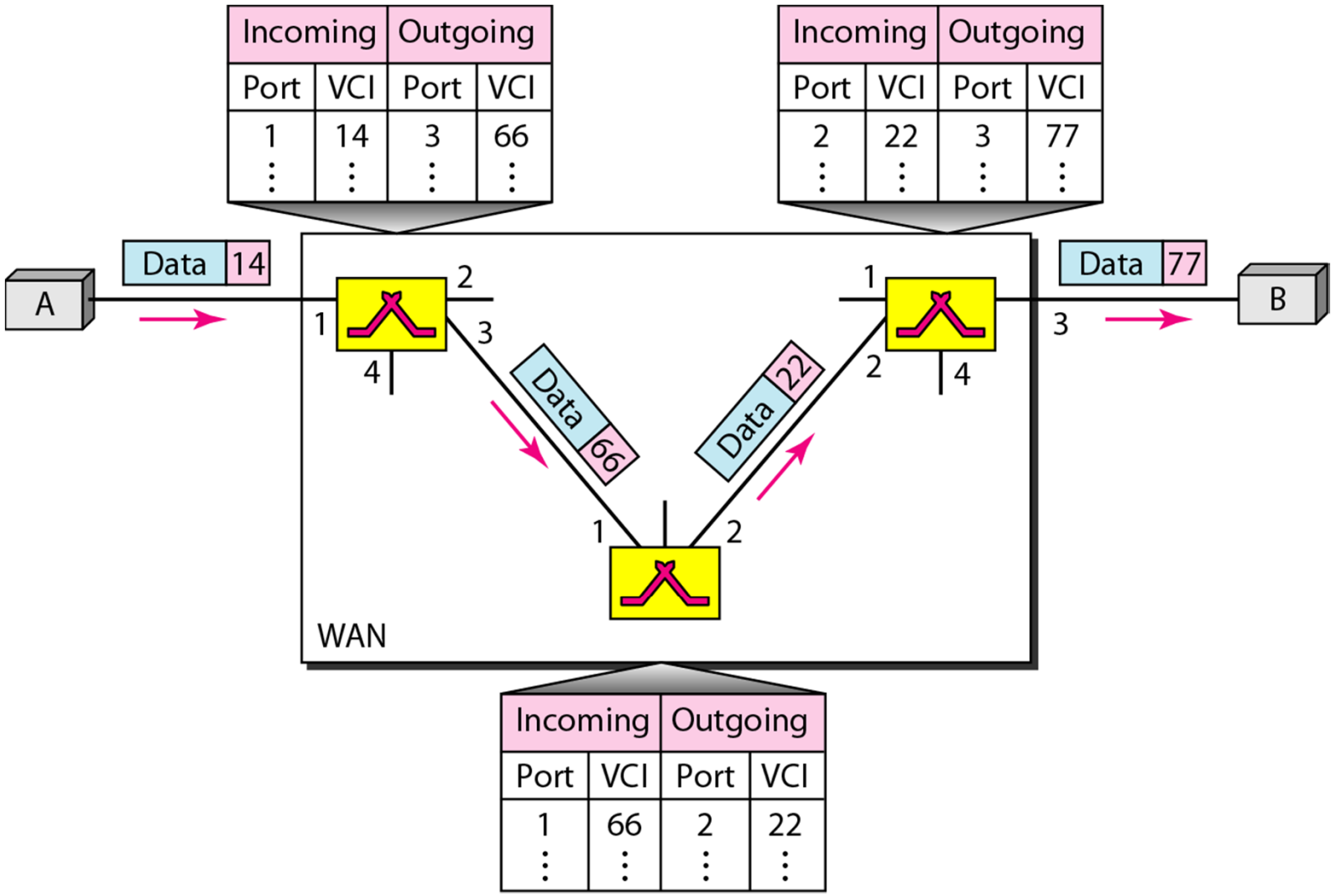


Figure 8.14 *Setup request in a virtual-circuit network*

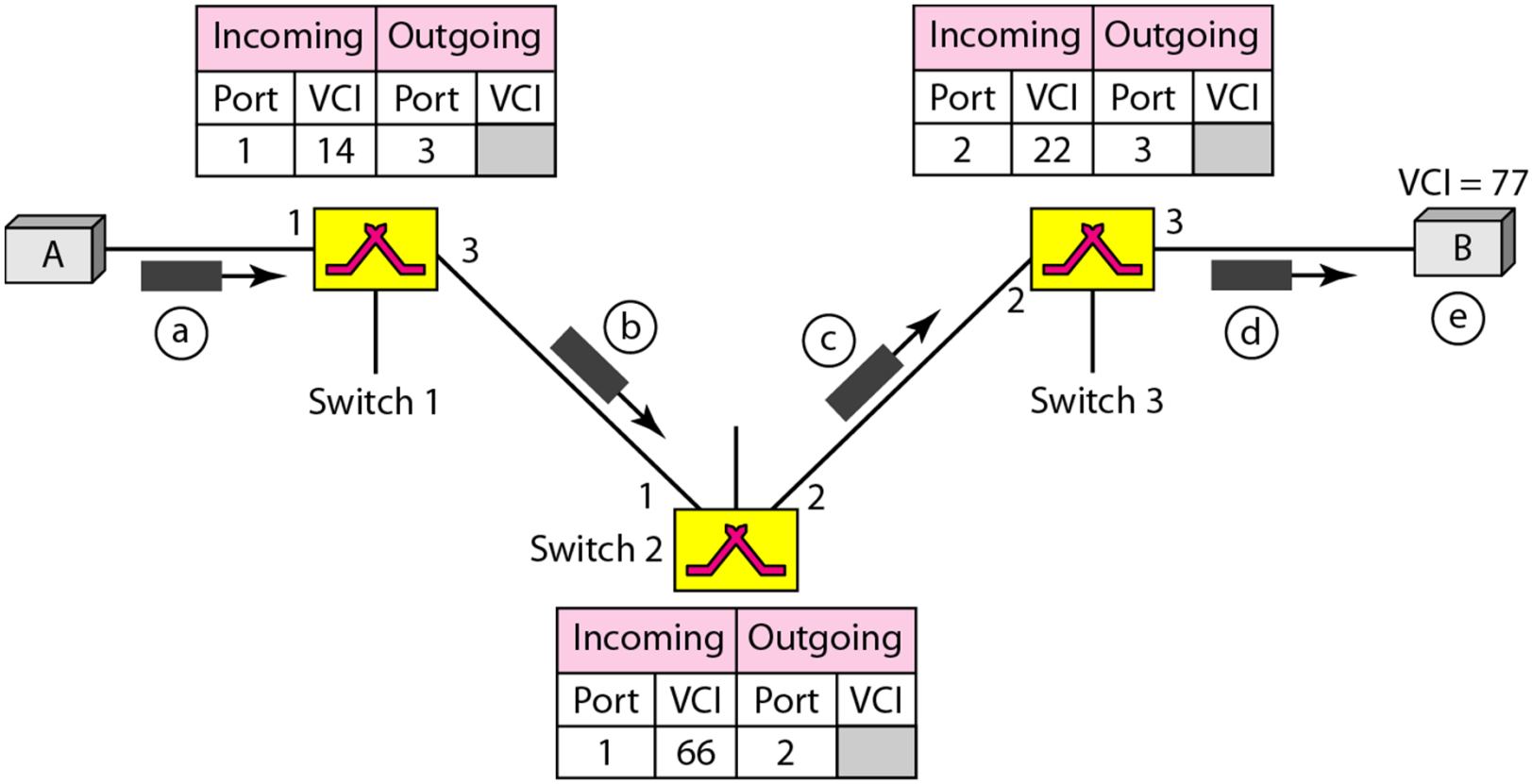
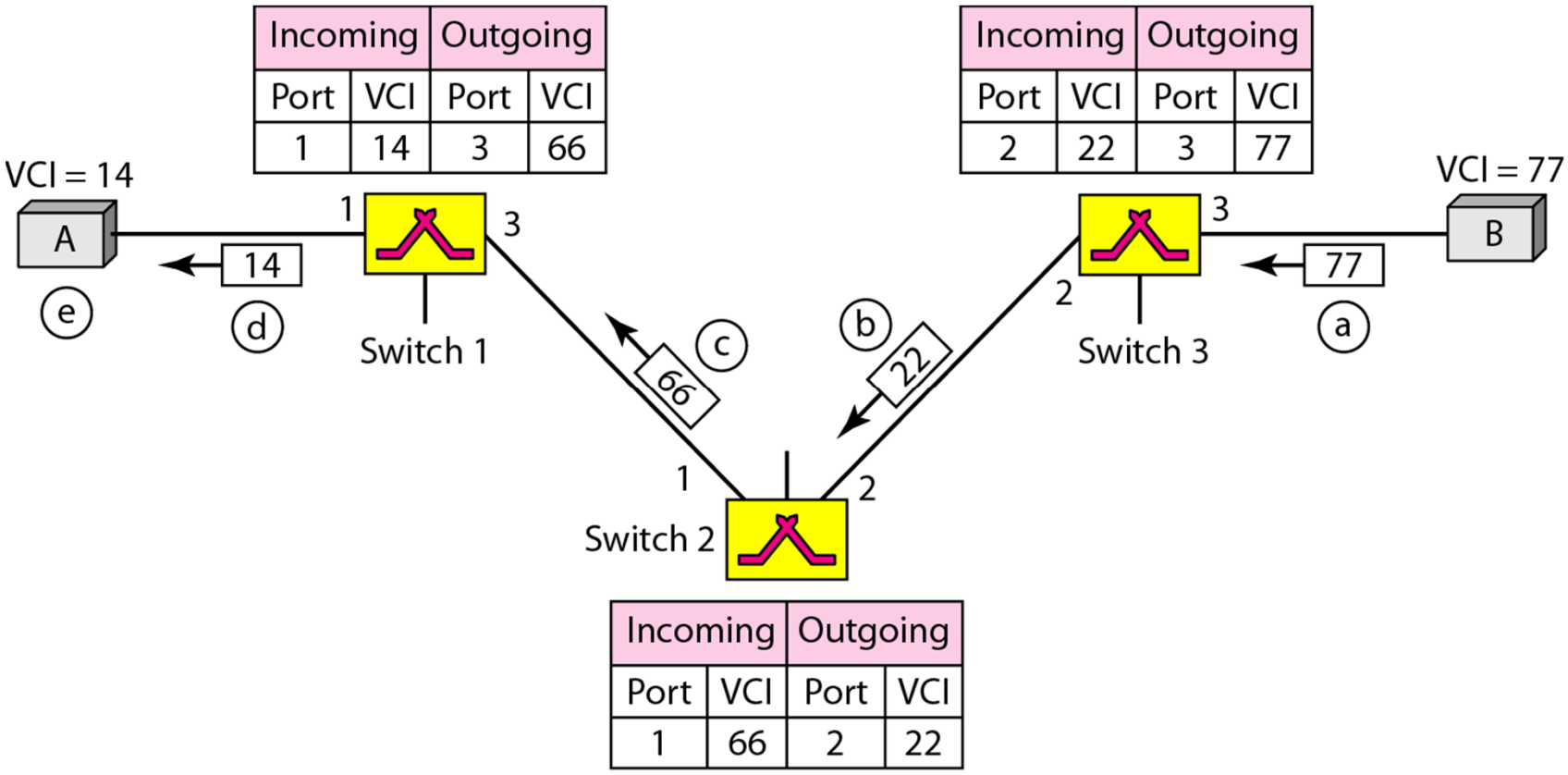
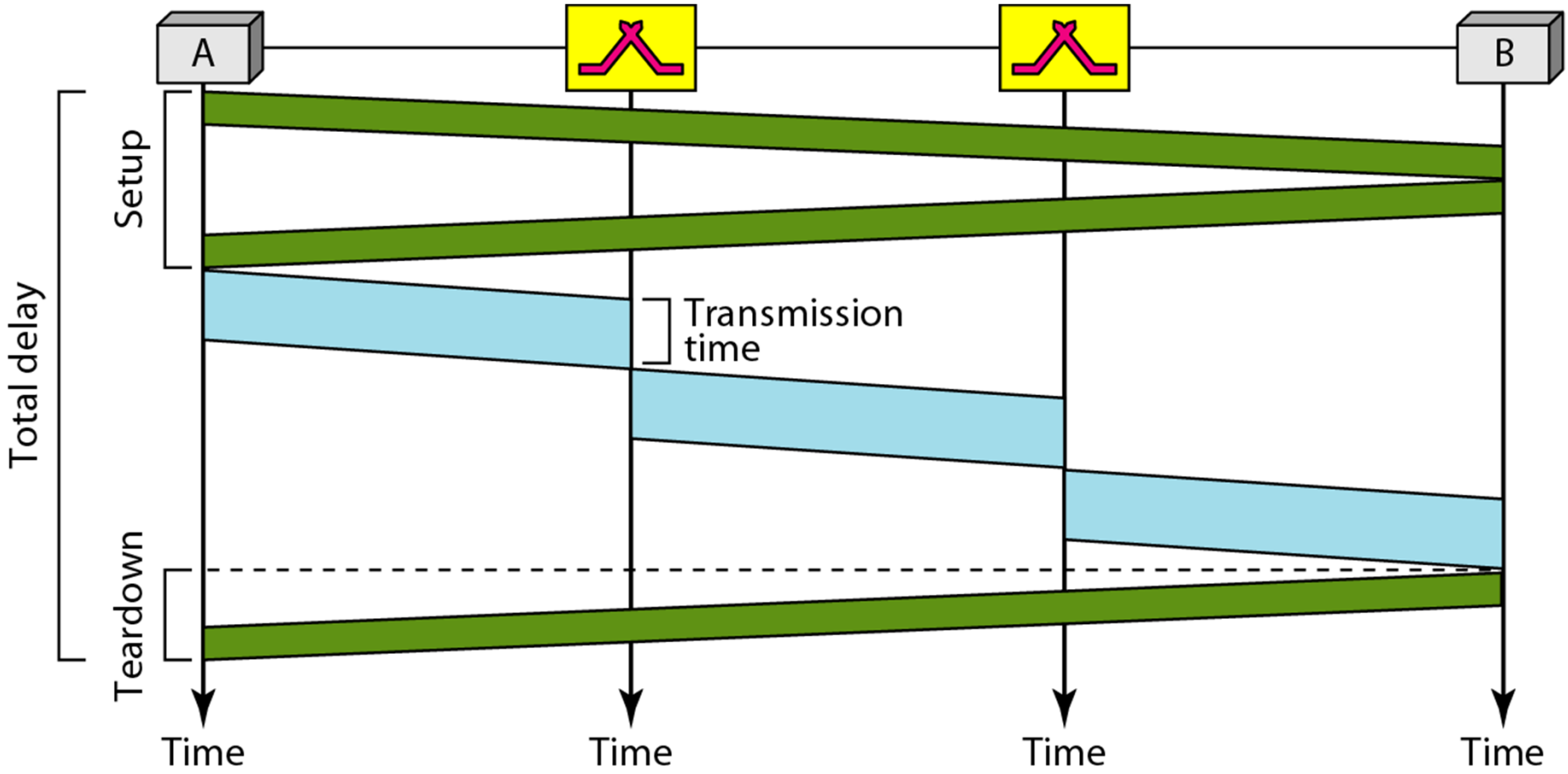


Figure 8.15 *Setup acknowledgment in a virtual-circuit network*



In virtual-circuit switching, all packets belonging to the same source and destination travel the same path; but the packets may arrive at the destination with different delays if resource allocation is on demand.

Figure 8.16 *Delay in a virtual-circuit network*



Switching at the data link layer in a switched WAN is normally implemented by using virtual-circuit techniques.

Figure 8.21 *Packet switch components*

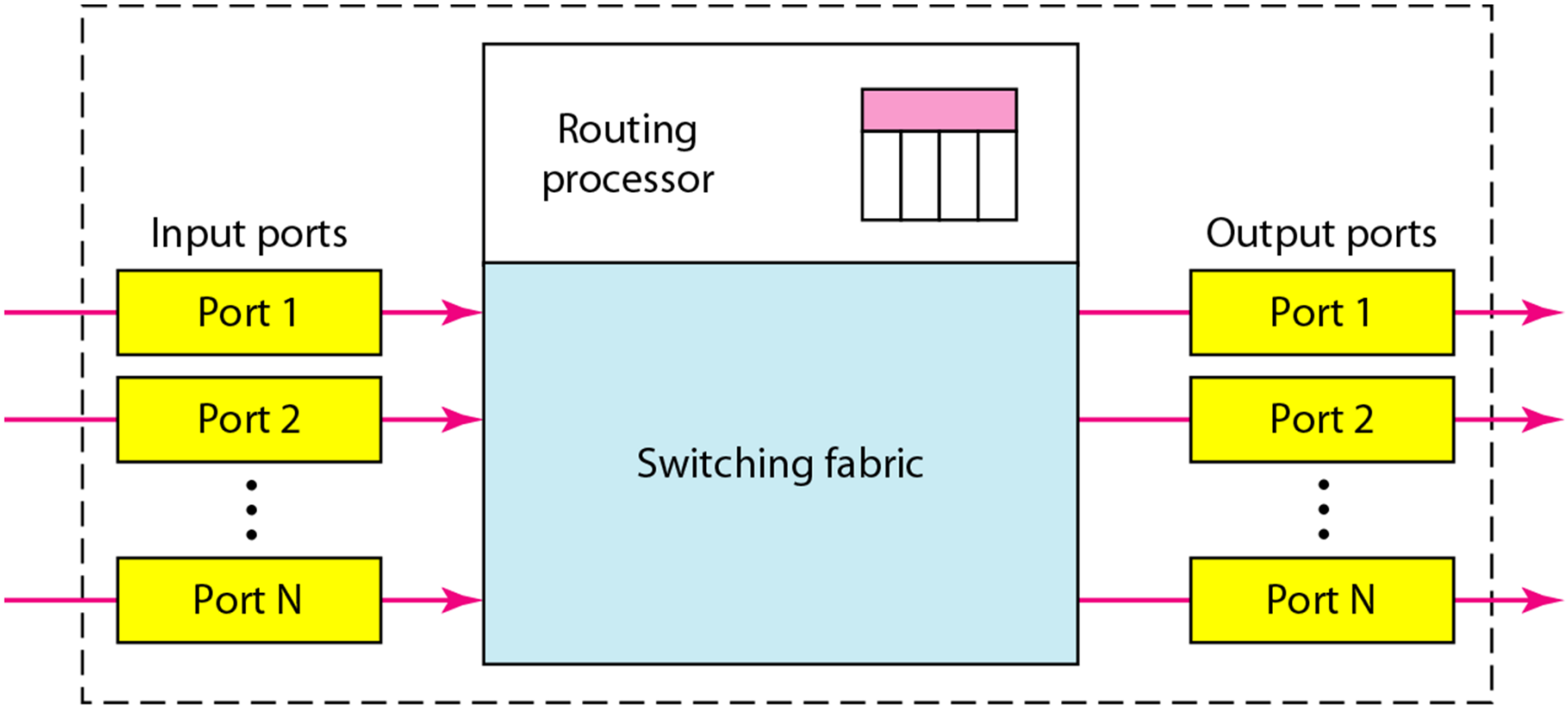


Figure 8.22 *Input port*

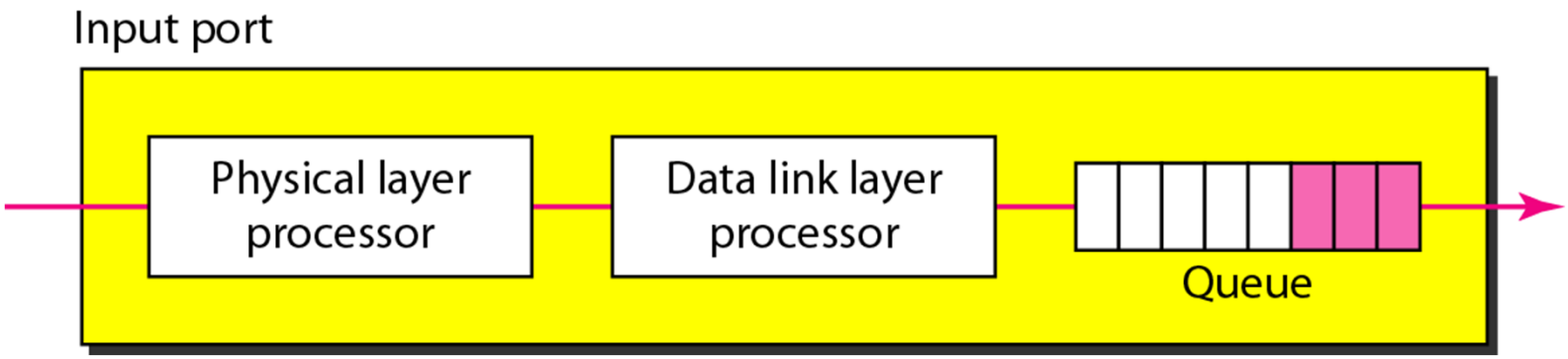


Figure 8.23 *Output port*