Our discussion of technologies will gloss over many of the hardware details because the purpose is to highlight ways in which the underlying hardware has influenced design choices in the protocols.

2.5 Ethernet (IEEE 802.3)

*Ethernet* is the name given to a popular packet-switched LAN technology invented at Xerox PARC in the early 1970s. Xerox Corporation, Intel Corporation, and Digital Equipment Corporation standardized Ethernet in 1978; the Institute for Electrical and Electronic Engineers (IEEE) released a compatible version of the standard using the standard number 802.3. Ethernet has become the most popular LAN technology; it now appears in virtually all corporate and personal networks, and the Ethernet packet format is sometimes used across wide area networks. The current versions of Ethernet are known as *Gigabit Ethernet* (*GigE*) and *10 Gigabit Ethernet* (*10GigE*) because they transfer data at 1 Gbps and 10 Gbps, respectively. Next generation technologies operate at 40 and 100 gigabits per second. An Ethernet network consists of an *Ethernet switch* to which multiple computers attach. A small switch can connect up to four computers; a large switch, such as the switches used in data centers, can connect hundreds of computers. Connections between a computer and a switch consist of copper wires for lower speeds or optical fibers for higher speeds. Figure 2.1 illustrates the topology of a small Ethernet with three computers connected.

![Figure 2.1](image-url) Illustration of the connections used with an Ethernet. Each computer connects to a central switch.

²We will describe networks as connecting computers, but they can also connect devices, such as printers, that have network connections.