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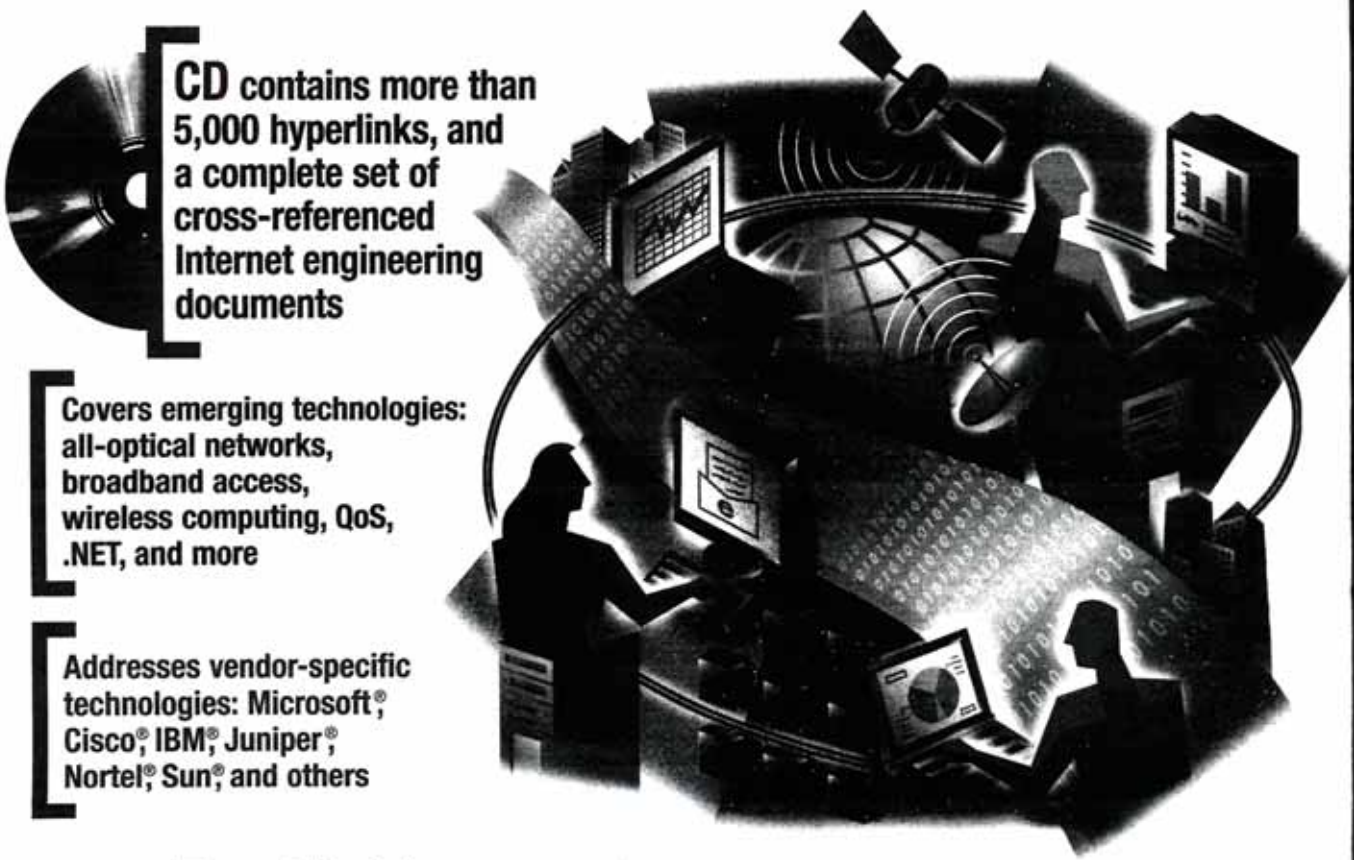

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me Switch

See Switch Fabrics and Bus Design; Switching and Switched Networks.

ming in Data Transmissions

A point-to-point connection between two computers or devices consists of a wire in which data is transmitted as a stream of bits. However, these bits must be *framed* into discernible blocks of information. Framing is a function of the data link layer. It provides a way for a sender to transmit a set of bits that are meaningful to the receiver. Ethernet, token ring, frame relay, and other data link layer technologies have their own frame structures. Frames have headers that contain information such as error-checking codes.

There are three different types of framing, each of which provides a way for the sender to tell the receiver where the block of data begins and ends:

- **Byte-oriented framing** Computer data is normally stored as alphanumeric characters that are encoded with a combination of 8 bits (1 byte). This type of framing differentiates one byte from another. It is an older style of framing that was used in the terminal/mainframe environment. Examples of byte-oriented framing include IBM's BISYNC protocol.
- **Bit-oriented framing** This type of framing allows the sender to transmit a long string of bits at one time. IBM's SDLC (Synchronous Data Link Control) and HDLC (High-level Data Link Control) are examples of bit-oriented protocols. Most LANs use bit-oriented framing. There is usually a maximum frame size. For example, Ethernet has a maximum frame size of 1,526 bytes. The beginning and end of a frame is signaled with a special bit sequence (01111110 for HDLC). If no data is being transmitted, this same sequence is continuously transmitted so the end systems remain synchronized.
- **Clock-based framing** In a clock-based system, a series of repetitive pulses are used to maintain a constant bit rate and keep the digital bits aligned in the data stream. SONET (Synchronous Optical Network) is a synchronous system in which all the clocks in the network are synchronized back to a master clock reference. SONET frames are then