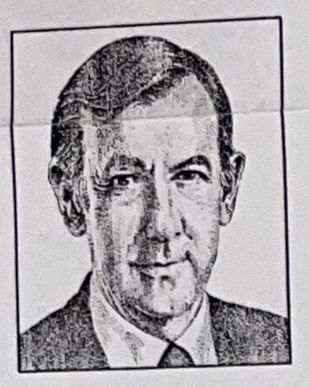
APPLIED INTELLIGENCE

ISDN: Telecomm Information Network of the Future



JAMES MARTIN

This is the first in a six-part series on Integrated Services Digital Network—a communication technology that will have great strategic importance in the future.

Imagine sitting at a workstation that, with a few simple keystrokes, could give you access to the world's information bases, displaying on a single screen anything from text to complex color graphics and video.

The same workstation lets you send voice and text messages, and access all the facilities of a corporate computing and communications network, regardless of the information type. You would also have access to a common public telecommunications network capable of handling all types of information, such as voice, text, data, video, at whatever speed.

This is the information network of the future.

Integrated Services Digital Network (ISDN) is a major step toward establishing a telecommunications network of this type. Information networks of the future will only slightly resemble the telecommunications facilities of today. They will be completely digital; all switching, transmission and network control will be governed by computers, and the networks themselves will have enough intelligence built into them to handle anything from the most complex routing and diagnostic problems to protocol conversion and software emulation.

Many transmission systems will use fiber-optic cables, rather than copper wires, due to their capacity to transmit huge quantities of information, including television and video. However, the biggest breakthrough of future information networks will be the ability to provide all of these facilities and more, not as enhanced services requiring special circuits and equipment, but as standard network services available to all users on demand.

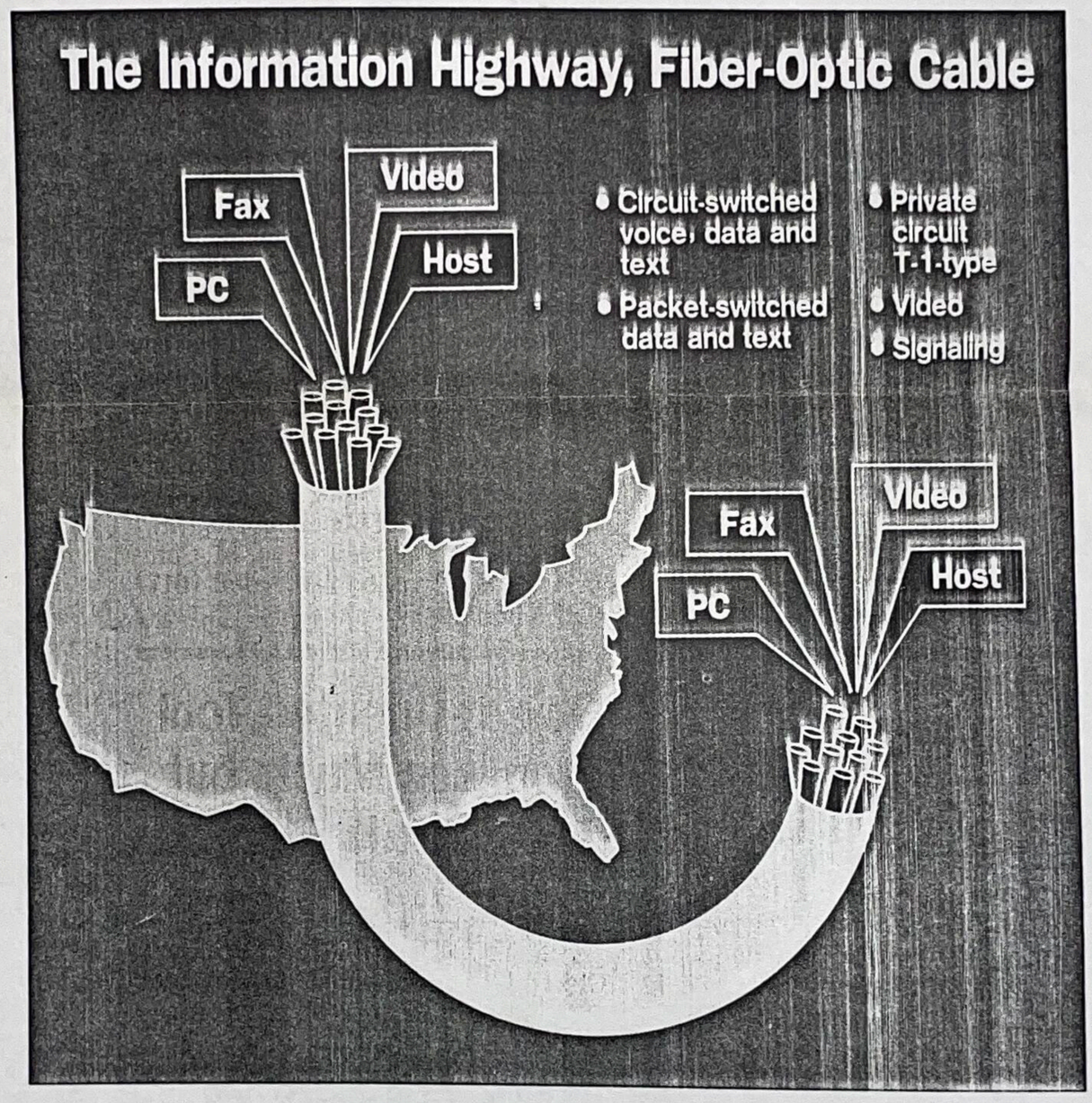
To provide this level of service, existing telecommunications networks will have to undergo fundamental and rapid change and make full use of techniques only now reaching their early stages of development (for example, optical transmission at speeds of hundreds of millions of bits per second). One of the biggest obstacles in the progress toward this information network of the future is not technology, but the creation and application of a framework of effective international standards that will promote development of these networks on a truly global basis.

Some aspects of this information network, however, are already in place. Many countries around the world are rapidly replacing much of their existing analog switching and transmission systems to digital, computer-controlled systems.

In the United States, Japan and much of Europe, this process has been under way for many years. Many networks that use digital switching and interoffice transmission still provide, essentially, an analog telecommunications service to most of their customers.

Corporations have been the first to benefit from conversion to digital. Via either satellites or more conventional terrestrial circuits, large corporate users can make use of digital, point-to-point circuits for voice, data or video.

Over the past few years, a host of new networks and services has become available, some based on existing equipment and technologies, others on new technologies. It is only now, however, that we are beginning to see substantial progress in the area of a single, common network capable of handling all of our information needs.



Maryellen Zawatski

One of the biggest obstacles in this information network is not technology, but the creation and implementation of effective global standards.

An ISDN network has a number of basic operational characteristics. First, as shown in the accompanying figure, most users of the network will have a "telephone line" capable of transmitting at a speed of 144K bits per second (bps).

The 144K-bps path is divided into three separate channels, two which operate at 64K bps and can be used to transmit information, and a separate 16K-bps channel that carries all the necessary control and signaling information from the user to the network and back.

In ISDN parlance, the two information-carrying channels are referred to as the Bearer, or B, channels. The signaling channel is referred to as the Data for control, or D channel. The other main ISDN channel is the H channel, the high-speed channel.

ISDN uses a form of shorthand notation to refer to the various channels. The basic 144K-bps ISDN channel is referred to as 2B+D (two 64K-bps B channels and one 16K-bps D signaling channel). Standards for the 2B+D channel were unanimously accepted at the CCITT plenary session held in Melbourne, Australia, in December 1988.

Second, there will be a standard, multipurpose interface connecting ISDN users to the network. This standard interface will remove the present need for a variety of different interfaces, one for each network application.

Third, the present array of different networks supporting different applications (such as voice, telex and packet-switched networks) will be integrated into a single common network with enough capacity to handle anything from the transmission of a simple telephone message to full-motion video.

From these acorns, the telephone companies hope mighty oaks will grow. Oak trees, however, take many years to mature. The recently adopted CCITT standards for the 2B+D channel concentrate mainly on a standard means of providing the 144K-bps transmission path and the common terminal-to-network interface.

The single common network that will handle all our information requirements is some years away. It requires further developments in both optical switching and transmission and a new set of standards for the implementation of broadband networks.

Many of the technologies necessary for the implementation of broadband networks are evolving rapidly. Standards for a broadband ISDN giving users access to channels with a transmission speed of more than 100 million bits per second are currently being formulated and will be presented at the 1992 CCITT plenary session in Geneva for ratification. The first implementation of broadband ISDN networks is likely to occur during the first half of the 1990s.

The keyword in present and future ISDN networks is flexibility: to attach a variety of terminals to the network; to choose whatever network service is required from a single terminal and interface; to send whatever type of information is necessary over a single network and have the network available on a worldwide basis.

Impact of ISDN

Every major development in communications has a direct impact on existing economic and social structures. ISDN will be no different.

Global ISDN information networks will be a major factor in stimulating international trade, especially in the service sector.

ISDN, and the availability of switched digital networks in general, will have a great effect on the further development of computerized links between individual corporations. Corporations can be "on-line" to their suppliers, customers, distributors, retailers, agents, banks and transport companies. The major economic benefits from this include greatly reduced paperwork, just-in-time inventory control, better purchasing opportunities, better services to customers and, generally, tighter management and control.

Integrated information networks, of which ISDN represents a beginning, will have a major impact on the way corporations are managed and operate. Global information networks will allow corporations to manage their overseas operations much more effectively.

Next week, we will look at the growing integration of computing and telecommunication techniques. The convergence of these technologies will alter the whole foundation upon which networks are designed. ■

The James Martin Productivity Series, an information service updated quarterly, is available through High Productivity Software Inc., of Marblehead, Mass. (800) 242-1240. For information on seminars, please contact (in the United States and Canada) Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402 (213) 394-8305. In Europe, contact Savant, 2 New St., Carnforth, Lancs., LA5 9BX United Kingdom (0524) 734 505.