

**Roussel, Anne-Marie:
European ISDN Reaches Critical Mass .
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ISDN may be a homeless technology in the U.S., but it is alive and well and ready to set up permanent residence on the right side of the Atlantic. Demand for national ISDN offerings is soaring in Europe, spurred by a combination of attractive tariffs and extensive geographic coverage. The imminent arrival of a pan-European ISDN Standard promises not only to pave the way for transnational ISDN offerings but also to enable equipment makers to develop one set of products for all of Europe, ultimately cutting user costs.

For many European users, ISDN represents the best chance to get digital service without paying astronomical rates for leased lines. In France and Germany two countries with notoriously exorbitant leased-line rates-ISDN usage is growing exponentially. For corporations with intermittent need for bandwidth, ISDN offers a low-cost alternative to digital leased lines. Even where leased lines are a must, users are turning to ISDN for backing up those lines and supplementing them with additional bandwidth on an as-needed basis. Applications like videoconferencing and disaster recovery also are helping to drive demand for ISDN.

One of the key attractions of ISDN is that it can meet bandwidth needs for both small and large applications. The entry-level-service, known as ISDN basic-rate interface (BRI), offers two 64-kbit/s B channels, which carry voice and data, and one 16-kbit/s D channel, used primarily for the signaling needed to set up and tear down the circuit-switched calls. Users can split the two B channels between two different ISDN terminals or combine them to provide 128-kbit/s of bandwidth for a single terminal. If more than 128 kbit/s is needed, users can run several ISDN BRIs to a single terminal. The high-end ISDN offering, primary-rate interface (PRI), provides 30 B channels at 64 kbit/s each (for a total of 1.92 Mbit/s) and one 64kbit/s D channel.

Some national carriers have sweetened the ISDN pot further by giving users the option of deploying the D channel to access public X.25 services. By accessing X.25 via ISDN, users avoid the need to install leased lines and pay only for connection time. In some countries, such as Denmark, access to X.25 services is offered via ISDN's B channel to provide more bandwidth than the D channel's 16 kbit/s.

Connections to ISDN require the installation of either special ISDN terminal equipment or ISDN terminal adapters for non-ISDN equipment. The terminal adapter approach is problematic because it doesn't account for D channel signaling. In most conventional bridges and routers, signaling information is carried in the same channel as data. Terminal adapters don't separate and convert that information for use on ISDN's D channel - they only pass traffic from routers and bridges to B channels. However, a growing number of terminal adapters can set up and tear down ISDN calls automatically, in response to V.25bis signals from attached equipment, and many bridges and routers now support such signaling.

THE MARKET SIZZLES

ISDN usage is on the rise in several European nations (see table). Interest is particularly strong in Germany, where the number of subscribers is nearly double that of France, which boasts Europe's second highest ISDN subscriber base.

As of January 1991, Deutsche Bundespost Telekom (Bonn) had installed about 7,500 BRI lines, according to Ovum Ltd. (London), a consultancy that tracks carrier services. By March 1993, that number increased more than 18 times, to nearly 139,000.

Growth also has been strong in France, where the number of BRI subscribers has jumped from about 5,000 in January 1991 to 70,000 in March 1993. More recent figures show that as of September 1993, Germany's Telekom had about 204,000 BRI and 15,000 PRI subscribers, while France Telecom had 87,000 BRIs and 11,500 PRIs in service. Thierry Zylberberg, France Telecom's manager for digital Services, estimates that between now and 1995, ISDN subscribers in France will double - a projection that he thinks also will hold true for Germany.

Growth in ISDN usage has been less heady in the U.K., because of some extenuating circumstances. Compared with prices in France and Germany, leased-line tariffs are a bargain in the U.K., which means users have less incentive to switch to ISDN. The U.K.'s main carrier, British Telecommunications PLC (BT, London), also held back on its ISDN deployment until service standards settled. BT didn't start offering ISDN until 1991, a full three years after France Telecom rolled out its first service.

Like conventional deal-up service, ISDN tariffs have three elements: a onetime installation fee, a monthly subscription fee, and a per-minute usage fee. In most countries, usage charges for voice or data transmission over an ISDN B channel are the same as for ordinary phone calls. One exception to this is in France; France Telecom differentiates between voice and data calls, charging about 30 percent more for ISDN data connections.

Generally speaking, users in Belgium and Denmark are the big winners in the tariff game-installation, subscription, and per-minute usage charges are low across the board. Deutsche Telekom and France Telecom offer decent fixed fees, but their ISDN transmission costs are among the highest in Europe. BT has very high installation fees, coupled with one of the lowest per-minute transmission fees.

The upsurge in ISDN interest also is due to the widening geographic coverage provided by operators. Several carriers, including France Telecom, say ISDN BRI and PRI coverage is available nationwide. Germany's lower territorial coverage (about 70 percent, according to figures supplied by Fisher & Lorenz European Telecommunications Consultants A/S [Copenhagen]) is the result of minimal deployment in what used to be East Germany. Coverage in the former West Germany is close to 100 percent, according to Deutsche Telekom.

Complete coverage means that any given user is never too far from an ISDN-compatible PTT switch to be connected. The catch is that it takes longer for a carrier to connect a user located outside of urban areas because the switch closest to that user may not be ISDN-compatible. In such cases, ISDN traffic

has to be routed to a more distant switch.

Along with increased national age, European PTTs are building up transnational ISDN links. Since the inauguration of international ISDN service 1990, many European carriers have established ISDN connections with one another, as well as with carriers in the U.S., Canada, Japan, Singapore, and Hong Hong.

The push for international service is expected to accelerate with the deployment of the long-awaited European ISDN standard. That standard, known as ISDN, has been issued in Part by the European Telecommunications Stand Institute (ETSI, Sophia-Antipolis, France). The Overall standard so far comprises more than 200 specifications that define how European PTTs should implement ISDN services in their networks and how these services will be accessed by users.

Euro-ISDN defines two types of basic services: bearer services, which are unrestricted, 64-kbit/s digital service for data voice, and 3.1-kHz audio signals; and supplementary services. Five supplementary services-for calling-line identification presentation, calling-line identification restriction, direct dial-in, multiple subscriber number, and terminal portability-are mandatory for Euro-ISDN compliance. Other supplementary services defined in Euro-ISDN are optional.

Euro-ISDN also defines a common protocol to be used by all PTTs for the link between user equipment and the network. That D channel. Any user equipment that complies with EDSS No.I can work with a national ISDN service based an the Euro-ISDN standard.

This means equipment vendors will be able to make ISDN terminals that work in any European country. Up to now, each PTT has implemented its own ISDN protocol; as a result, ISDN phones that work in Germany don't work in France or Italy. Equipment makers have had to manufacture different versions of their products for each country. Euro-ISDN will eliminate this burden - which should spark new interest among equipment vendors.

THE BIG PUSH

In late 1989, 26 carriers from European countries signed an agreement to begin deploying Euro-ISDN by the end of this year. Initial deployment doesn't mean that Euro-ISDN will be available nationwide in every country; it will take at least a year or two for some carriers to install new switches or upgrade the existing ISDN switches to the standard.

Two PTTs-BT and Tele Denmark (Copenhagen) - say basic-rate Euro-ISDN will be available on a nationwide basis in January 1994, according to Ovum.

Meanwhile, Euro-ISDN is schedule for its first multinational demonstration next month, at Eurie (for European IS D Event) '93. The one-day event, organize by the European Commission, will involve 22 European carriers and more than European-based suppliers of ISDN equipment. Among the applications slated to 1 demonstrated are videotelephony, G4 facsimile, and file transfer.