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From credit-card readers in gasoline pumps to ATM machines in a walk-in banking center, the ISDN D channel offers inexpensive yet virtually dedicated connections to the almost unlimited reach of the world's X.25 packet network.

The excitement ISDN brings to what is broadly called *POS* (for Point-of-Sale or Point-of-Service) *transaction processing* flows directly from the capabilities and technologies involved.

The Power of the D Channel

The ISDN D channel is, by definition, an X.25 packet-switched channel designed for call signaling and set-up. Yet because it is packet-switched, it can also be used for hundreds of other purposes: caller-to-caller messages, for commands that can control the telephone network, and – most important here – for user interconnection to the worldwide X.25 packet network.

This direct interconnection of the D channel to the X.25 network gives virtually any data device, from a telephone to a cash register, a dedicated, full-time connection to the NYNEX X.25 packet network – and thus, through interexchange carriers and public networks, to any other computer or data device, anywhere in the world. The potential uses are almost limitless:

- ◆ *Transfer files and messages.* Users can send and receive electronic mail, as well as share many smaller computer files. For these small messages and files, the speed of X.25 is quite acceptable.
- ◆ *Access information services.* Most users today access data and information services through dialed analog connections to either the public packet network or the private X.25 networks of major services. Direct ISDN D-channel connections, however, mean *lower costs and faster response times*. Several of today's most popular services, including *CompuServe* and *GENie*, are instituting special direct packet connections to accommodate ISDN users.
- ◆ *Access databases.* Many systems, including those for work-at-home and call-center applications, offer access to a mainframe database through the D channel. Data most often consists of small alphanumeric files where packet speeds are more than adequate. A typical 500-character customer purchase record, for example, could be transmitted in less than half a second.

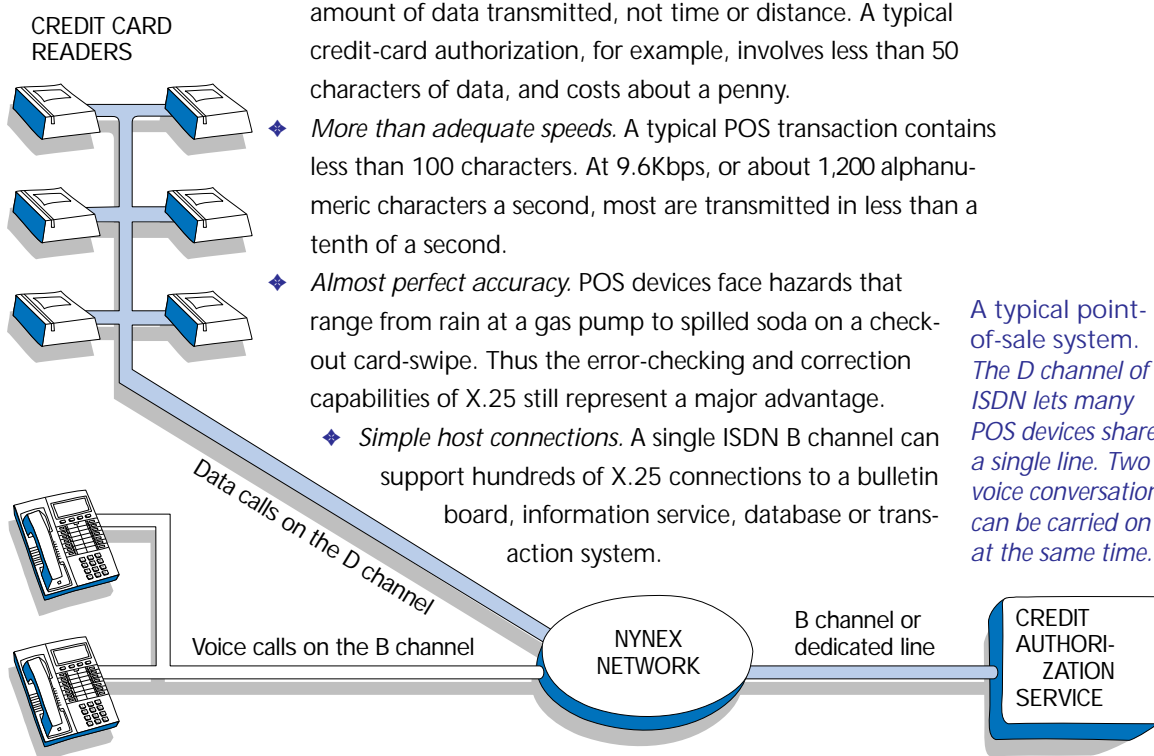
"D channel speeds are fairly mundane by today's standards," said *TeleSystems Marketing Applications'* John Mazalewski, an ISDN consultant serving New York and New England. "Yet the primary need for most POS applications isn't speed but low cost, and end-to-end accuracy. In these uses, packet switching is as important today as it ever was in the past."

X.25 and ISDN

Packet today has become the almost perfect vehicle for extending and exploiting the power of ISDN. It offers:

- ◆ *Dedicated user dial-out capabilities.* Because most ISDN telephones and terminal adapters contain PADs, virtually every ISDN telephone, PC or data terminal can be a *dedicated host station* on the NYNEX X.25 network. It can *direct packet messages to – and receive messages from – virtually any location on any public packet network anywhere in the world.*
- ◆ *Fast connections.* Because D-channel devices are linked directly to the X.25 network, there is no dialing into modem pools, no waiting for a connection. Credit authorizations that took 12-45 seconds on analog lines are now completed in 2-7 seconds.
- ◆ *Low access costs.* Packet network access costs from \$2-4 a month for each D channel, and up to eight primary devices can be linked to an ISDN BRI . In addition, several "access controllers" exist that let multiple point-of-sale terminals send and receive through the D channel simultaneously.
- ◆ *Low transmission costs.* Transmission costs are based on the amount of data transmitted, not time or distance. A typical credit-card authorization, for example, involves less than 50 characters of data, and costs about a penny.
- ◆ *More than adequate speeds.* A typical POS transaction contains less than 100 characters. At 9.6Kbps, or about 1,200 alphanumeric characters a second, most are transmitted in less than a tenth of a second.
- ◆ *Almost perfect accuracy.* POS devices face hazards that range from rain at a gas pump to spilled soda on a check-out card-swipe. Thus the error-checking and correction capabilities of X.25 still represent a major advantage.
 - ◆ *Simple host connections.* A single ISDN B channel can support hundreds of X.25 connections to a bulletin board, information service, database or transaction system.

A typical point-of-sale system. The D channel of ISDN lets many POS devices share a single line. Two voice conversations can be carried on at the same time.



- ◆ *Simplified host equipment needs.* A host's permanent B-channel packet link to the X.25 network can totally eliminate the need for modems at the host site.
- ◆ *All this and telephones, too.* While transactions take place on the D channel, B channels of a BRI can simultaneously carry telephone and fax calls, video meetings, and more.

A VIRTUAL TRANSACTION NETWORK

ISDN offers closed, private networks through public telephone lines – for a growing number of transactions:

- ◆ Several major oil companies, including *BP Oil* and others, are using ISDN telephone lines to carry information from gas pumps and cash registers to regional data networks. BP, for example, has ISDN links to more than 500 stations nationwide. It uses ADAK terminal controllers that allow multiple gas-pump and in-station credit-card readers to be linked to a single D channel. Regional computers authorize purchases, control inventory, and schedule timely gas and oil replenishment. "Credit processing with ISDN takes about eight seconds now," says BP Oil's Tony Gibbons, "compared with 25-30 seconds before, and our line costs are significantly less. Higher speeds, greater functionality and lower costs: it's a combination that's hard to resist."
- ◆ In tests conducted by all major card processors, transaction times have been reduced from 30-plus seconds through dialed analog lines to less than four seconds with ISDN. Costs have been cut to literally pennies per transaction.
- ◆ Many health maintenance and health insurance companies use ISDN-linked point-of-sale card readers at clinics and physicians' offices to authorize medical insurance benefits.
- ◆ A growing number of state agencies are using "food stamp debit cards" to reduce fraud and speed payment
- ◆ Many banks now link remote ATMs through ISDN. D channels virtually eliminate the need for dedicated lines, and make it economical to reach many more locations.
- ◆ State lottery agencies are experimenting with ISDN for state lottery and numbers games. D channels can replace dedicated analog connections, and make lotto terminals much more widely available.
- ◆ Colleges and universities use D channels and student ID cards for meal payments, library check outs and more.

Multiple devices. While up to eight devices can be linked to an ISDN D channel, each device can itself be an access controller supporting additional card readers, scanners or the like. The result: virtually any number of POS terminals can share a single D channel – up to the capacity of the D channel itself to handle the transmission load.

