

Web Watcher

BY GLENN FLEISHMAN



No Speeding

WE EXPECT TECHNOLOGY TO GROW more powerful and cost less almost every day. Sometimes, however, we run up against limitations that slow or halt such advances. For instance, data transfer via telecommunications equipment (including Internet access via modem) has been getting faster for years, but is now beginning to reach the limits of what its underlying infrastructure—regular phone lines—can support.

Computer publications are full of articles and advertisements telling us how we can squeeze more information over a phone line—what phone companies prosaically call POTS: plain old telephone service. POTS comprises two copper wires and a modular jack that consumers can plug into. Since POTS is an analog service, you have to do something to get the bits from a computer converted to analog data and then back again to digital data. This is what a modem does, and it does fundamentally the same thing today as it did when it was invented.

The top analog rate for POTS is supposedly 33.6 kilobits per second (kbps), but modems can rarely achieve that speed in both directions (incoming and outgoing from your modem) since the quality of phone lines—and hence the speed that they can support—varies considerably even over short distances.

Recently, the speed of the parts of the modem that have to do digital signal processing (DSP)—in this case, the transformation of 1s and 0s to analog signals and back—has finally surpassed a POTS line's ability to carry data. So we can't use the

same technology to squeeze more data through POTS.

The new 56-kbps modems have limited potential to make a major difference. They use a large "hack" to achieve about 40 to 50 kbps in the direction from your service provider to your modem. (This works if your ISP connects its system directly to the phone company so that it can avoid the last conversion of digital data to analog data and back. Skipping that conversion reclaims a little bandwidth. But this is a hack because you have to have the exact combination of modem, phone line, phone company service, and ISP to get this speed improvement.)

In the other direction—for outbound e-mail or data you're sending to the Net—the 56-kbps modems act just like 33.6-kbps modems.

Several new and existing technologies get waved around as a panacea to limitations in POTS bandwidth, but each of these solutions is substantially more expensive than POTS. Right now, for instance, you can also buy an ISDN (integrated services digital network) connection, a reliable but incredibly frustrating-to-set-up technology that costs about 5 to 20 times more than a regular modem connection for dial-up, but delivers only 3 to 4 times the speed.

ADSL (asymmetric digital subscriber line) is a new technology that some claim is the future of the Internet, even though it's years away from wide deployment in the U.S. ADSL requires a pair of copper wires, just like POTS, but works only over short distances from phone-

company switching stations. Most major-city residents and businesses should be close enough, however.

ADSL has the potential to deliver 8 megabits per second (Mbps) or more from the Net to a user and between 64 kbps and 1 Mbps from the user back out. This kind of bandwidth is certainly available today with aggregated T1 or fractional T3 lines, but you'd pay nearly \$10,000 a month for it in most parts of the U.S. and considerably more in Europe. ADSL will eventually make the cost and complexity of hookup much less than that of currently available technologies with comparable bandwidth (e.g., seven aggregated T1s). But for now, while ISPs and local phone companies make the initial investments in ADSL (and pass those costs on to early adopters of the technology), the price of ADSL will put it out of reach for most consumers.

Despite the excitement over new and exotic forms of data transfer—including ADSL, wireless devices, satellite networks, and cable modems—the average consumer who can't afford ISDN today won't experience significant improvements in bandwidth anytime soon. But the growing market demand for greater speed will propel advances in data-transfer technology, and some early adopters with deep pockets will likely pay much of the cost for these infrastructure advances. The rest of us should reap the benefits sometime after the millennium. ♦

Glenn Fleishman, technology guy, has found his home on the Web at www.glenns.org. He can also be reached at glenn@popco.com.