

# BusinessWeek

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How Mike  
Armstrong  
reinvented  
Hughes  
Electronics

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# LIFTOFF



# TRY BEATING THESE LONG-DISTANCE RATES

More and more, the technically adept are making cheap calls over the Internet

From his home in Guam, David C. Sykes used to pay as much as \$1.25 a minute to call relatives and friends back in the U.S. But now, as part of a hobbyist organization called the Free World Dial-Up Project, he can call many of those people for just pennies a minute. There's no scam involved and no illegal phone "phreaking." He's just using the Internet. Equipped with the proper software, personal computers almost anywhere on the Net can create the cheapest voice-communication links around. For the \$15 to \$20 a month that Internet-access services charge, you can make all the calls you want—to anybody who has the same set-up—with no limit on length or destination.

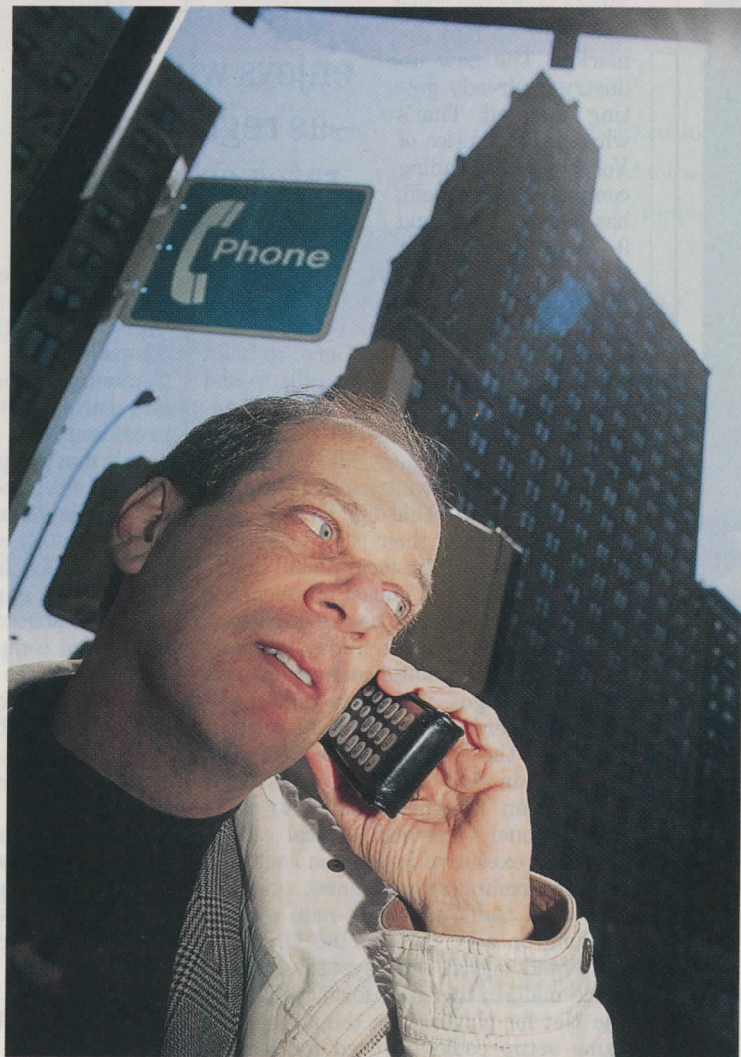
Sykes and other technically adept Internauts are taking advantage of an imbalance in the pricing of communications capacity, or bandwidth. Phone companies charge according to time and distance—the longer you talk and the farther you call, the more you pay. Internet connections, even though they travel the same wires, are sold at flat monthly fees devised with E-mail in mind, and the connection to an Internet access company is usually a local call. So, with the right software and some forbearance—sound quality is not up to snuff—you get long-distance calling at Internet prices.

Is the Internet,

which has already swept through the computer business, rewriting the rules for phone companies, too? "In the short term, the answer is no, but in the longer term, yes," says Eli M. Noam, professor of economics at Columbia University. Clearly, the Net calling phenomenon, which began as an amusing pastime a year ago, is going mainstream. Technologically hip businesses are using Internet calling to bypass high international tolls and cut costs of nonvoice traffic such as faxes. An estimated 1.5 million Internet phone products have been

shipped, although not all are in use. By yearend, Internet phoning will be a standard feature in Web browser programs from Netscape Communications Corp. and Microsoft Corp., opening Net calling to millions of Internauts.

**"BEST MINDS."** Phone companies point out the drawbacks of Internet calling—poor quality and the need to make sure the person you're calling is logged on—but many telecom executives admit that advancing technology will erase such limitations. "You have the best minds out there working on Internet calling.



## Telephony On the Net

### MOVERS AND SHAKERS

**VOCALTEC** Its I-phone is the leading software, but more than a dozen other companies are on its heels, including Quarterdeck and NetSpeak

**VOXWARE** Its voice-compression software was chosen by Netscape Communications for use in its Web browser

**INTEL AND MICROSOFT** They've rallied more than 100 companies around new telephone and video standards for the Net

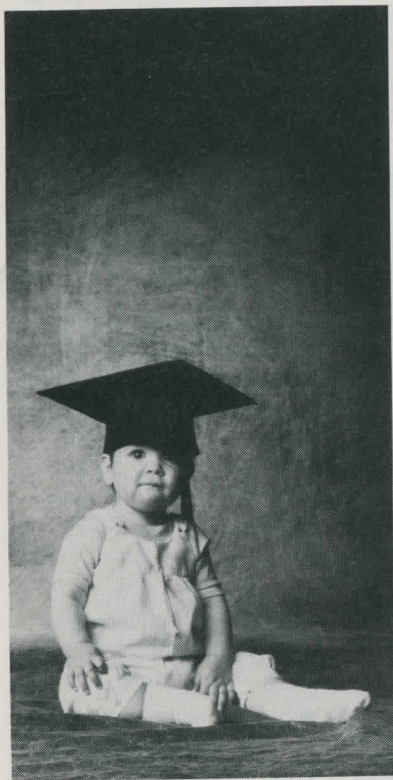
### HOW TO GET STARTED

**VOICE-ON-THE-NET (VON)** coalition offers a list of all Internet-calling products at [www.von.com](http://www.von.com)

**FREE WORLD DIAL-UP PROJECT** has volunteers working worldwide to patch Internet calls into local phone networks ([www.pulver.com/fwd](http://www.pulver.com/fwd))

**VOCALTEC'S GANOR:**  
*Net carriers oppose FCC regulation of their business*

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The Great American Investment

## Information Processing

They will make it work," says Catherine M. Hapka, executive vice-president for markets and chief strategist at U S West Communications Group.

The most promising applications will be those that combine voice calling with other Internet-based services. At AT&T, executives talk about ways to help corporations build phone or even video-phone connections into their public Web pages. That could enhance online shopping or game-playing, or give customers quick lines to a supplier's help desk. Companies such as Netscape, Quarterdeck, Connectix, and White Pine, meanwhile, are developing collaboration schemes that will let people converse while viewing and jointly editing a document on the Web. Internet phoning "will become quite competitive with traditional telephone service," says Michael Goldstein, president and CEO of Voxware Inc.

Voxware is one of more than a dozen makers of Internet calling software that have jumped into the market. The new industry is already getting crowded. That's why the stock price of VocalTec, the leading company in the field, has plunged to around 9—down from 19 at its initial offering in early February.

**SIDESTEPED.** To make Internet calling easier for corporations, VocalTec has teamed up with Dialogic Corp. to build gateways that link Internet calls to and from local phone systems. Internet enthusiasts around the world are doing the same for consumers. More than 300 volunteers in 80 countries have formed the Free World Dial-Up Project and have programmed their PCs to complete Internet calls on the local phone line.

The Net's largest impact on telephone rates will be where they're highest—on international routes. Today, as many as 50% of transatlantic connections carry fax messages, which are digital and therefore perfectly suited for transmission over the Net. CallWare Technologies Inc. in Salt Lake City has come up with an Internet scheme to make international voice-mail a local call. A traveling executive in London could use a laptop computer to connect over the Net to a CallWare voice-mail system running on a PC back in the U.S. The PC would signal that system to send voice mail, in digitized form, back over the Net for playback on the laptop. The same setup could be used for leaving

messages for others. No long-distance phone call would be required.

CallWare is also working on a Net-based "callback" scheme: Via the Net, that same executive could command the U.S. computer to dial another U.S. number over the phone network as well as call him back in London. The computer would then link those two calls, and he would have a call from London to the U.S. that avoided Britain's relatively high tariffs on outbound calls.

**MONKEY WRENCH.** Before more than an enterprising few start calling across the Internet, though, the technology will have to improve. Now, the calls are clearest when just one person speaks at a time. That's because the Net's pathways are unpredictable and, depending on traffic conditions, the data "packets" into which a digitized voice has been broken may arrive out of order, or de-

layed. Intel, Microsoft, and 100 other companies have lined up behind new standards that will reduce the problem by giving packets with voice or video data higher priority on the Net.

Another monkey wrench has been the response from phone carriers. Alarmed at the prospect of Inter-

net calling, America's Carriers Telecommunication Assn. (ACTA), a trade group representing 130 small long-distance companies, has petitioned the Federal Communications Commission to regulate Internet telephony. Elon Ganor, president and CEO of VocalTec, says ACTA's move "upsets me." To fight ACTA, Net-phoning hobbyists and software companies have formed the Voice-on-Net (VON) coalition.

Ultimately, industry executives say, the pricing gap that makes Internet calling so attractive may narrow. Newly unfettered competition in phone service will force rates down for ordinary service. And as more telephoning and video soak up gobs of Internet capacity, carriers are likely to charge more for Internet services. Already, Internet access providers such as BBN, MCI, and Uninet have instituted usage-sensitive pricing for certain high-capacity connections. Instead of paying BBN a flat \$995 a month for so-called T1 service, heavy-usage customers can end up paying as much as \$3,000. Even on the Internet, a giveaway can't last forever.

By John W. Verity in New York with bureau reports

The price gap that  
Internet calling  
enjoys will narrow  
—as regular phone  
rates come down