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Circuit Breaker: Battered Telecoms Face New Challenge: Internet Calling --- Once a Minor Player, Service Captures Growing Share Of Home, Business Market --- The `Pac-Man' of Protocols

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There's a new gold rush in telecom, and it's reshaping an industry still staggering from the collapse of its huge bubble of the late 1990s.

All over the industry, large and small players are working on ways to send calls over the Internet or another data network, with potentially big savings for consumers and companies alike. The technology, known as VOIP (voice over Internet protocol), was introduced to the public in the mid-1990s, but it wasn't ready to deliver many of the new efficiencies and services that its backers promised.

Now many of the kinks have been worked out, and demand is booming for the service. Sales of Internet phone systems to businesses are expected to more than double this year, even as most capital spending on telecom equipment remains stagnant. And the service is winning lots of fans in the residential market, as cable companies offer Internet calling over their own networks and a host of tiny start-ups offer low-cost, or even no-cost, plans.

This newfound success has sent shares in VOIP companies skyrocketing -- and sounded a warning to established telecom operators. Internet phone service is almost completely unregulated for now and requires little capital, and the improvements in technology make even the smallest start-ups a credible threat. So, some of the top names in telecom are testing their own Internet phone offerings to make sure they don't get locked out of the new market.

BellSouth Corp. is planning to deploy a form of the technology to sell phone services, initially to businesses in the Southeast. Eventually BellSouth may begin offering the service to households in its region and businesses beyond its turf. Time Warner Cable, a unit of AOL Time Warner Inc., early this year launched a VOIP service in Portland, Maine, that sells unlimited local and domestic long-distance calling for $39.95 a month. AT&T Corp. this month quietly began testing a consumer VOIP service in an undisclosed location.

Currently, VOIP accounts for less than 3% of global voice phone calls, according to an AT&T estimate. But a number of trends are working in its favor, say industry executives: the boom in demand; the evolution of the technology, which permits companies to offer services beyond the reach of conventional phones; and the spread of broadband connections, which make VOIP much easier to use. Given all that, some industry executives predict that VOIP will eventually replace the circuit-switch technology that telephone networks have used for more than a century.

IP, the Internet programming language at the heart of the technology, "is like Pac-Man," says Hossein Eslambolchi, president of AT&T Labs, the research arm of AT&T. "Eventually, it will eat everything in its way."

Many others in the telecom industry agree but caution that the transformation could take more than a decade. The existing telephone behemoths will take years to fully convert to the technology. Customers still face service glitches as Internet phone services grow. And the service is beginning to run into some regulatory hurdles.

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Another downside: The VOIP service being offered by some upstarts and most cable companies also has no independent power source, unlike conventional phone lines. That means there would be no service during an electric-power blackout.

For their part, big phone companies such as Verizon Communications Inc. and SBC Communications Inc. tend to play down the threat from upstarts, even as they roll out their own versions of Internet calling. They agree that VOIP eventually will dominate the industry's infrastructure but say they have plenty of time to convert their networks and establish their own VOIP operations.

Investors also are bullish on the technology, and have sent shares in VOIP companies soaring. Denver-based SpectraLink Corp. has seen its shares triple this year to over $21. Verso Technologies Inc., Atlanta, has risen this year from below $1 a share to over $4, and Sonus Networks Inc., Westford, Mass., has gone from under $2 to over $8 this year.

Traditional phone calls are made along circuits, dedicated paths between callers. The circuits consist of networks of copper and fiber-optic wires owned by telecom companies. They also own the circuit switches that interact with billing systems, provide features like call waiting and caller ID and set up the fixed paths over which calls travel.

Before VOIP, phone service could be sold only by businesses that owned or bought access to the telephone companies' networks and switches. VOIP bypasses part or all of that system entirely by converting voice to digits, putting those digits in "packets" and then routing the packets over the public Internet or a private network leased from a telecom company. If the call is going to a regular phone, it has to be switched into the traditional phone network. But it can avoid the regular network entirely if it's going to another VOIP subscriber.

"It destroys the incumbent telephone-company business model," says David Isenberg, founder of Isen.com, an independent telecom-analysis firm based in Cos Cob, Conn. A former Bell Labs researcher, he wrote a widely read paper, "The Rise of the Stupid Network," in 1997 that predicted many of the current Internet-phone trends.

It also offers callers new flexibility. Because the service uses the Internet and software running on personal computers, users can program their phones to do such things as redirect calls to other numbers, take messages only during certain hours, give messages only to certain callers and send a text message or an e-mail in response to a voice call.

Engineers have been playing around with "packetized" voice for more than two decades, but it wasn't until the mid-1990s that entrepreneurs got interested. A host of small companies began using the service to sell cheap long distance. By the end of the decade, large long-distance carriers were saving money by transmitting some voice calls over their data networks. AT&T even decided to stop investing in new traditional phone-network technology and focus on Internet-based systems. Internet calling also was embraced by most of the local phone companies that sprang up in the wake of massive deregulation in 1996.

The technology worked, but some of the companies selling it took longer than expected to perfect billing and other back-office functions that would turn it into a viable business. They also couldn't deliver many of the features that traditional phone companies offered, such as caller ID. Many of the VOIP companies that sprang up in the late 1990s went bust or were acquired on the cheap.

Now VOIP is bouncing back. In the residential market, its new popularity is being fueled by the sharp growth in households with high-speed Internet hookups. Many of the early VOIP systems required callers to dial up to a special service before a call could be made. Today, with a broadband connection and a simple adapter, a customer can get VOIP directly on a conventional phone.

Cable companies are using VOIP to jump into the residential phone market. The two most aggressive companies, Time Warner Cable and Cablevision Systems Corp., are starting to use VOIP to undercut local phone companies in price, offering unlimited domestic long-distance and local calling for under $40 a month. In other areas, small start-ups, such as Vonage Holdings Corp. and Packet8, a unit of 8x8 Inc., are making similar offers.

VOIP is growing even faster in the business market, as VOIP companies have smoothed out customer service and billing and added features such as caller ID and call waiting. They also have made it possible for businesses to add VOIP in stages rather than rip out their entire phone systems. World-wide spending on Internet telephone systems by businesses is expected to exceed $1 billion this year, more than double last year's total, according to Dell'Oro Group, a research firm in Redwood City, Calif. That represents nearly 20% of world-wide business spending on phone systems.

Some businesses and institutions that have switched to VOIP phone systems report that their yearly phone bills have dropped sharply, especially if they have numerous locations. "It's increased productivity and efficiency," says Mark Carrier, telecom manager for the Crate &Barrel retail chain, which purchased a $300,000 VOIP system from SBC Communications two years ago for its new headquarters in Northbrook, Ill. New stores and distribution facilities are being added to the system as they open. "As we add new sites, we'll be realizing more savings," Mr. Carrier says.

The technology division of Lehman Brothers Holdings Inc., the securities firm, bought a VOIP system from Cisco Systems Inc. for all its phone calls in early 2001 when it moved into new offices. VOIP usage was greatly expanded throughout the firm after the Sept. 11 attacks because Lehman was forced to scatter its downtown Manhattan work force throughout the New York area.

VOIP enabled Lehman to move workers around more efficiently and cheaply. An employee transferring from one desk to another, whether it was in the next office or another building in a different state, would simply take his or her phone and plug it in at the new location, keeping the same number. With a traditional phone system, such a procedure would tie up a technician for hours.

Lehman executives say they are also working more efficiently because VOIP, as a data service, can easily be merged with the firm's other data services. For example, when analysts make their morning rounds of calls to 10 or 20 top clients, they often reach voice mail. On the old phone system, they would have to leave the same long message each time. With VOIP they can record and store one stock message, and then transfer it to a client's voice mail with one click.

(MORE)

Freightliner Inc., a Portland, Ore., maker of heavy trucks, has replaced its conventional phones with cordless VOIP phones that cost $750 to $1,000 apiece including necessary VOIP infrastructure but incur no monthly charges. That compares with wireless phones that used to cost the company $100 apiece per month. The choice "is a no-brainer for us," says Brian Genz, Freightliner's internal technical consultant.

Despite its advantages, VOIP can't replace traditional phone systems overnight. For one thing, the big national and regional phone companies have huge amounts of money invested in traditional gear and aren't in a hurry to write that off. They also have long-established relationships with customers, many of whom would be reluctant to jump to a technology that isn't fully tested.

Though the quality of VOIP calls has greatly improved over the past few years, many fear the technology still doesn't offer the near-perfect level of reliability delivered by the traditional phone system. Partly for that reason, Lehman Brothers decided not to install VOIP phones on its trading floors, where even a small glitch could cost tens of millions of dollars. "We did have a couple of hiccups," says Jonathan Beyman, Lehman's chief information officer. "There's nothing worse than to be the person responsible for technology and pick up the phone and not get a dial tone."

Even more growing pains are likely as more companies deploy VOIP for residential use. Time Warner Cable, the company furthest along in doing this, has run into numerous glitches in trying to get its new VOIP service to work in Maine, including problems integrating the service with other operations, such as billing. Once, just before the service was officially launched, the whole system had to be shut down while a problem was corrected. Time Warner says the problems have been smoothed out enough that the company is preparing to roll out the service in three other areas.

In the residential market, it's also unclear how well VOIP will work on a large scale, as it grows from about 100,000 subscribers to five million or 50 million. Services such as Vonage, Edison, N.J., rely on transmitting their traffic over the Internet rather than dedicated lines guaranteed to have a fixed amount of capacity. If too many people use services such as Vonage from the same Internet access lines, the congestion could affect sound quality, experts say.

Another question is how regulatory agencies ultimately will deal with VOIP. The Federal Communications Commission makes important distinctions between voice and data traffic over phone lines. Under FCC rules, for instance, data is exempt from the access fees that local phone companies charge for moving voice traffic over their wires. So, can companies offering VOIP calls, which treat voice as just another form of data, route that traffic over local phone lines without paying access fees? The FCC has yet to rule on that issue. The stakes are huge: U.S. phone companies pay roughly $25 billion in such fees each year to send traffic over other companies' networks.

In one early test of this issue, a federal judge in Minneapolis this week ruled that Vonage was not a telecommunications company. The Minnesota Public Utility Commission wanted to treat Vonage as a telecom firm instead of an information service so that it would be subject to state telecom regulations, including those affecting rates. California's Public Utilities Commission recently asked one VOIP-phone-service provider to declare itself an operator in the state, making the company subject to the same fees and regulations that apply to other telecom companies and erasing the VOIP service provider's biggest cost advantage.

And earlier this week, the Ninth Circuit Court of Appeals reversed a March FCC ruling that said cable companies don't have to share their network infrastructure with Internet service providers. The court's decision essentially submits cable companies to the same rules that are faced by regional phone companies such as BellSouth and Verizon, which are forced to share their network infrastructure with rivals. Some VOIP advocates were disappointed by the ruling, which they said could lead to more regulation of the service.

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