

The Future of Internet Phone Calling

Regulatory Imperatives to Protect the Promise of VoIP for Industry and Consumers

December 2003

Bibliographic Information:

New Millennium Research Council (2003). Washington, D.C.

Copyright Notice:

This electronic file is copyrighted and may not be reproduced or distributed in a format other than a specialized format exclusively for use by blind or other persons with disabilities. This publication may not be reproduced or used in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without permission from the New Millennium Research Council.

Copyright 2003. New Millennium Research Council. All Rights Reserved.

TABLE OF CONTENTS

Preface	ii
Author Biographies	iii
Executive Summary	iv
<i>The Policy Dilemma of IP Networking</i> David P. McClure, President and Chief Executive Officer, U.S. Internet Industry Association	1
<i>VoIP: Rights and Responsibilities</i> Debbie Goldman, Research Economist, Communications Workers of America	4
<i>The Regulatory Treatment of Internet Telephony</i> Lee W. McKnight, Associate Professor of Information Studies, Syracuse University, and Martha Garcia-Murillo, Assistant Professor of Information Studies, Syracuse University	8
<i>Access to Voice-over-Internet Protocol (“VoIP”)</i> Gregg C. Vanderheiden, Professor of Industrial Engineering, University of Wisconsin-Madison	11
<i>Poking Holes in the Regulatory Landscape: Harnessing the Disruptive Power of Voice-over-IP Technology</i> Glenn A. Woroch, Adjunct Professor of Economics, University of California-Berkeley	14

Preface

This report is a project of the New Millennium Research Council (NMRC), established in 1999 to foster policy research focused on developing workable, real-world solutions to the issues facing policymakers primarily in the fields of telecommunications and technology. The Council consists of independent academics and researchers who are experts in their fields. Both seated experts and invited scholars author NMRC reports.

During the past year, the NMRC has investigated a range of issues related to competition in the telecommunications industry. The NMRC has also sponsored a number of roundtable events in Washington, D.C., and legislative briefings on various topics.¹

In this report, the NMRC continues to explore telecommunications policy issues by providing a compendium of papers from noted telecommunications experts and academics on the future of Internet telephony provided by voice-over-Internet Protocol (VoIP) technologies. While the Federal Communications Commission (FCC) is presently examining whether and how to regulate this new technology, small and large carriers (as well as cable companies) have announced plans to deliver VoIP services.

This report explores several critical policy issues surrounding Internet-based telephony technologies like VoIP such as whether, and if so, how to regulate VoIP services, whether a national or state-by-state approach should guide oversight of VoIP services, what social or statutory obligations should apply to VoIP service providers of telephony services (e.g., E911, assistance for law enforcement, universal service, disability access), and the relationship between the underlying networks and VoIP applications riding on the networks (e.g., access charges, intercarrier compensation).

This report presents the views of six telecommunications experts who in their own unique voice provide perspectives and recommendations to policymakers currently examining VoIP issues.

The NMRC publishes this report at a critical time for the telecommunications industry. The Federal Communications Commission has already conducted its first hearing on VoIP services and expects to issue a rulemaking proceeding on VoIP services by February 2004 and to complete that rulemaking in about a year. How regulators decide to treat new Internet-based technologies will have wide-ranging, transformative effects on the entire industry.

The New Millennium Research Council wishes to thank the authors for their time and insight on these critical and timely issues.

December 2003

¹ See our website at www.newmillenniumresearch.org for copies of the reports and transcripts of prior events.

Author Biographies

Debbie Goldman is a Research Economist with the Communications Workers of America, where she is responsible for regulatory affairs and telecommunications policy. The Communications Workers of America represents more than 730,000 women and men working in telecommunications, broadcasting, publishing, healthcare, government, manufacturing, and other industries. She also serves as the Public Policy Chair of the Alliance for Public Technology. Ms. Goldman holds a Master's degree in Public Policy from the University of Maryland and a Master's degree in Education from Stanford University. She earned her B.A. in History from Radcliffe College.

David P. McClure is President and Chief Executive Officer of the U.S. Internet Industry Association, the primary U.S. trade association for Internet commerce, content, and connectivity. A technologist by education and experience, Mr. McClure has held positions in the Internet, computing, aerospace, and environmental services industries. He has served on the staff of the Aviation and Space Writers Association (AWA) and the Software Publishers Association (SPA). He has served at the helm of the USIIA since it was founded in 1994. He is also a member of the American Society of Association Executives and its Technology Section Council. Mr. McClure has written and lectured extensively on management and technology issues, and is considered an authority on technology applications for business.

Lee W. McKnight is an Associate Professor of Information Studies at Syracuse University; a Research Associate Professor of Computer Science at Tufts University; a Research Affiliate of the Program on Internet and Telecoms Convergence at M.I.T., which he founded in 1996; and President of Marengo Research, a consultancy. His research focuses on the global information economy, networked multimedia, national and international technology policy, the convergence of the Internet and Telecommunications industries, and Internet Telephony policy. Professor McKnight received a Ph.D. in 1989 from M.I.T.; an M.A. from the School of Advanced International Studies, Johns Hopkins University in 1981; and a B.A. magna cum laude from Tufts University in 1978.

Martha Garcia-Murillo is an Assistant Professor of Information Studies at Syracuse University. She worked at the University of Southern California's Center for Telecommunications Management where she was involved in developing industry-sponsored reports in telecommunications and cable. She also worked as a regulatory officer at the International Telecommunication Union in Geneva, Switzerland, where she wrote the working document for the negotiations among Central American countries for the harmonization of telecommunications regulation in the region. Prof. García-Murillo is currently on sabbatical as a visiting scholar at the Internet and Telecommunications Convergence Center at M.I.T. She has an M.S. in Economics and a Ph.D. in Political Economy and Public Policy from the University of Southern California.

Gregg C. Vanderheiden is a Professor of Industrial Engineering at the University of Wisconsin at Madison. His interests cover a wide range of research areas in technology, human disability, and aging. Current research includes development of new interface technologies, network-based services, techniques for augmenting human performance, enhancing the usability of the environment, and matching enhanced abilities to environmental demands. He also studies and develops standards for access to Web-based technologies, operating systems, and telecommunications systems. He is director of the university's Trace R&D Center, which works to make current and emerging information and telecommunications technologies accessible for as many people as possible.

Glenn A. Woroch is an Adjunct Professor of Economics at the University of California at Berkeley, and Executive Director of the Center for Research on Telecommunications Policy located in the Haas School of Business. He conducts theoretical and empirical investigations of competition and regulation of network industries, with particular application to the telecommunications and computer sectors. His research also examines antitrust policy toward intellectual property protection and various business practices. Professor Woroch has been an economic advisor to government agencies including the U.S. Departments of Commerce, Energy, and Justice. He regularly consults to private-sector clients and testifies on matters involving monopolization claims, mergers, intellectual property infringement, and economic damages.

Executive Summary

The promise of voice-over-Internet Protocol (VoIP), both to consumers and providers, as well as the investment needed in the underlying telecom infrastructure, is great. Some experts predict that consumer use of VoIP could skyrocket to 40% of the U.S. market by 2009.¹ However, this maturing industry is being threatened by increasing attempts at state and federal regulation. Recent state utility commission actions in California, Wisconsin, Minnesota, and other states to regulate VoIP as a traditional telephone service highlight VoIP's growing importance.

In the absence of clear directives from the Federal Communications Commission (FCC), state regulatory bodies are taking it upon themselves to initiate VoIP regulation. The FCC has also recently begun to examine the critical issues surrounding new VoIP services in order to give clear regulatory direction to the states in this arena. On December 1, 2003, the FCC held a forum on VoIP to present a range of findings and hear from a number of experts as to the proper role of regulation with regard to this new technology. FCC Chairman Michael Powell has commented that he expects the FCC to issue a rulemaking notice on this important topic shortly.

In addition to smaller companies like Vonage offering VoIP service, there has been an influx of major telecom industry players gravitating toward providing this new technology. On December 12, 2003, AT&T announced its plans to offer residential VoIP. Time Warner Cable also recently announced plans to offer VoIP service. Qwest Communications noted it would begin providing a small number of customers in Minnesota with the service. Verizon and SBC Communications also have plans to enter the ring.

As a way of contributing to this important debate, the New Millennium Research Council (NMRC) invited a diverse range of academics, Internet scholars, and think-tank experts to comment on ways in which the FCC could best ensure that this new but maturing industry is allowed to advance while at the same time guarding statutory social responsibilities to consumers. The authors were asked to submit their views on four key questions:

1. Is there a need for a clear national VoIP framework (as opposed to a patchwork of state regulations)?
2. Should services that function like telecom services be subject to certain telephony rules, but not all?
3. Should all VoIP service providers be regulated equally?
4. Should existing statutory social responsibilities be met (e.g., E911, law enforcement assistance, universal service, disability access)?

While authors do have differences of opinion with regard to the four principles, and some offer alternative views, the consensus of authors call on the FCC to (1) develop a clear national VoIP framework; (2) subject VoIP applications that function like telecom services to *certain* telephony rules; (3) regulate all VoIP service providers equally; and (4) ensure that statutory social responsibilities are met.

The authors find that to ensure VoIP's continued growth, VoIP service providers, regardless of the technology used, should adhere to certain rules of the telecommunications landscape, especially those that advance important public policy objectives such as universal access, access for law enforcement, and emergency services. At the same time, VoIP providers should be exempted from the full weight of state and federal regulation. Full compliance with every federal, state, and local telecom regulation would most likely slow VoIP's entry into the consumer market.

The authors note that VoIP occupies a "middle ground" between traditional telephone service and newer data services to which some, but not all, practices and regulations should apply to expand the promise of VoIP without undermining the building blocks of the telecom industry. VoIP is a technology whose great promise should be realized without resorting to cumbersome regulation.

¹ Jeff Pulver, President and Chief Executive Officer, Pulver.com, *Communications Daily* audio conference on VoIP, Nov. 13, 2003. Consulting firm Frost & Sullivan note that VoIP will account for about 75% of global services by 2007, March 2002.

➤ **The Case For A Clear National VoIP Framework**

“Whether or not VoIP should be regulated at the national or state level has been discussed for a number of years...Although the division between federal and state regulation has worked in many instances, it is difficult to administer in the case of information and communications technologies (ICTs). Advances in computing communications and the transition that is happening towards IP-based networks makes it difficult to distinguish between a local, national, or international call...Trying to maintain a distinction between state and national communications will lead to the establishment of artificial and, in our opinion, arbitrary mechanisms to determine whether or not a voice or data transmission was intra or inter-state. On the basis of this argument, a national policy should be considered not just for this technology but ideally in the long term for the regulation of all ICT-related services”, write **Lee W. McKnight**, associate professor at Syracuse University and an M.I.T. research affiliate, and **Martha Garcia-Murillo**, assistant professor, School of Information Studies, Syracuse University.

Dave McClure, president and chief executive officer of the U.S. Internet Industry Association (USIIA), says, “It is no longer possible to treat the network as a small and isolated set of circuits over which any single city, county, or state holds jurisdiction – particularly when the network is designed to route packets across whatever portion of the network is most favorable, regardless of its geography.”

Debbie Goldman, research economist for the Communications Workers of America (CWA), submits that, “The states and the FCC will need to work together to hash out the jurisdictional issues related to voice-over-IP services. VoIP services are not tied to a specific geographic location...VoIP services will rely on robust broadband infrastructure and states should create incentives to rollout these networks and bring the future to consumers more quickly.”

➤ **‘Voice’ VoIP Applications Require Some Telephony Rules**

Debbie Goldman of CWA says that regulators need to develop a new regulatory framework that recognizes, “that new Internet voice services, regardless of the technology used, should be subject to some of the same rules as traditional telecommunications providers.” This approach, she says, is consistent with the FCC principle of “competitive neutrality.” In other words, “the same rules should apply to all providers of similar voice services.”

Mr. McClure of USIIA says there is a need for standardized relationships between the diverse packet interfaces. “If disparate networks combine packets with frequencies sliced into channels, there must be some means to manage the interface between these networks, the payment for services, and intercarrier compensation,” he says. “While such standards are best derived through the actions of a free market, some of the standards and conventions will need to be codified into law in order to provide for oversight and enforcement.” He also comments that there is a need for regulatory restraint. “It is critical that regulators not attempt to simply transfer existing regulations for telephony – designed for a different technology in a different century – to advanced IP networks. No regulation should be adopted for VoIP unless it is first proven to be necessary and, in fact, proven to be the best and only solution to a specific and quantifiable problem. Even in this case, it should be required that the burden of proof lie with the proponents of any new regulation rather than the opponents.”

Mr. McClure also notes, “While it is pleasant to contemplate the reduction in costs and taxes that IP services foster, the reality is that local governments in the U.S. derive tens of billions of dollars in revenues through hidden taxes on the telecommunications networks. This revenue cannot be easily replaced in a global IP network environment, nor can it simply be transferred to other services without the risk of a taxpayer revolt.” According to **Glenn Woroch**, associate professor of economics from the University of California at Berkeley, “attempts to ‘tax’ services using VoIP are likely to be futile, as they, like Holey Moley, will simply pop up elsewhere. This point was made at a recent FCC hearing that domestic regulation of VoIP could very well drive VoIP services off shore.”

“When VoIP rolls into apartment houses, nursing homes, and elder care facilities it will be important that individuals with disabilities and people who are older will be able to access and use those phones,” says **Gregg Vanderheiden**,

professor of Industrial Engineering, University of Wisconsin-Madison. “Profit driven companies are not bad...However, regulations are sometimes needed. Regulations are our way of putting societal factors into the profit equation – so that the natural market forces and the natural forces within companies – can come into play and cause access to appear in products.

“The distinction between telecommunication and information services has been helpful in preventing over-regulation of innovative new technologies such as Internet Telephony,” say **Mr. McKnight** and **Ms. Garcia-Murillo**. But that distinction “may no longer be meaningful” following the adoption of a new, uniform legislatively grounded framework for an open communication policy...Because of the difficulties associated with the transition, it is necessary to determine what the implications are of adopting transitional measures before we move toward a policy that is likely to require important changes in the actual telecommunications law.”

➤ **Regulate VoIP Providers In A Technology-Neutral Manner**

The original VoIP technology began in the mid-1990s with computer-to-computer networks that, through special agreements with traditional carriers, were able to complete voice calls in the public switched telephone network (PSTN), note **Professors McKnight** and **Garcia-Murillo**. “If we were to determine that all VoIP carriers should be treated the same way it basically means that all carriers will be eventually qualified for VoIP regulation...Since the ultimate goal of regulation is to generate competition and foster innovation while fulfilling social responsibilities, the long-term goal should be to release carriers from traditional regulations either by regulations being applied to all of them [VoIP providers] over time or by simply making that decision from the beginning,” they contend.

Dave McClure of USIIA agrees that there is a need for equal regulatory treatment for VoIP providers. “Efforts by the Federal Communications Commission and the Congress to apply 20th Century policies to the 21st Century IP networks have been an unmitigated disaster,” he says. “Technologies are treated differently even when they perform the same services – some so heavily regulated they are unable to invest in network improvements, while others are so unregulated as to run rampant. The dilemma for regulators now is to craft policies that stimulate investment and growth while remaining technology neutral.”

“The portability of VoIP technology underscores the need for parity in treatment across services, platforms, and networks. ‘Regulatory parity’ has become a common refrain in today’s increasingly crowded telecommunications marketplace. It is especially critical in the case of VoIP, however, since its deployment is so responsive to financial incentives at the same time the technology holds so much promise of long-run consumer benefits,” according to **Glenn Woroch**.

The enormous price-cost discrepancies erected by the international settlements process offered regulatory arbitrage opportunities to carriers using technologies like VoIP, says Professor Woroch. “Over time, the competition that materialized helped close some of these gaps and it is safe to say that, today, the structure of international rates is better aligned with economic reality as a result,” he says.

The valuable lesson of this experience is that “new technologies enable competition that expose distortions in the regulatory fabric – whether well-intentioned cross-subsidies or brazen attempts to redistribute rents – and proceed to instigate reform of those policies that caused the distortions in the first place,” says Professor Woroch. “*If allowed to do so, VoIP has the potential to overhaul domestic regulation of telecom markets in this same way.*”

➤ **Statutory Social Responsibility Goals Should Be Met**

Ms. Goldman of CWA writes, “All VoIP-based service providers should be subject to the same rules, and most importantly, all voice service providers, regardless of the technology used, should meet important social obligations.” These include obligations for universal services support, support of telecommunications relay services (TRS), access for people with disabilities, intercarrier compensation (e.g., access charges), public safety obligations such as E911 and

CALEA, privacy protections, advance notice of termination of service, and other consumer protections. “Regulators must ensure that *all* providers of voice telephony, regardless of the technology or functionality employed, contribute in an equitable manner to these goals,” she says.

Ms. Goldman notes that VoIP challenges the regulatory distinction between “telecommunications” and “information” services. VoIP providers offer a voice service (telecommunications) by means of the Internet, she says. “Improper regulation of VoIP local service would have negative impact on many important public policy goals including universal service, access for people with disabilities, and public safety. VoIP regulation should lead to the adoption of a new regulatory framework consistent with the goal of universal, affordable, quality broadband service for all.”

“Social responsibilities must be respected, and enforced, whatever technology is used for communication, including for continued recognition of the social value of the principle of universal service, or access, for which there is political consensus within the United States and other nations,” say **Professors McKnight** and **Garcia-Murillo**. “Having said that, given the growth of new low-cost technologies for information and communication including for communication by voice-over-IP–based systems, the mechanisms, and costs of universal service support should be rethought as part of a broader effort to define an open communications policy for the 21st Century.”

“As people move from PSTN phone technologies to voice-over-IP phone technologies there is a danger that, if accessibility regulations are not carried forward to the new technology, people with disabilities and those who are older will lose access to telecommunications,” says **Mr. Vanderheiden**. “We have observed that, when new technologies are introduced...disability access considerations are often on the list, but market forces never are strong enough to move them high enough on the list to get to the action level,” he says. “The exception is when there is regulation (or concern about regulation) to cause the access issues to move up the action list. Often, when there is even talk of regulation, there is action.” But, he warns, if that talk goes away, the action goes away – and accessibility groups and task forces within companies have repeatedly been disbanded when regulations failed to appear or when regulations failed to be enforced.” Accessibility is cheapest to build in at the early stages of technology development, he says.

Mr. McClure of USIIA says that telecommunications falls into the category of “essential life services” – integral to life, liberty, the pursuit of happiness, and the common defense. “Policies related to the new generation of IP services must provide for the continuation of essential social services that include 911 emergency services, universal service funding for rural and remote regions, access to the networks by law enforcement, and even the maintenance of the highest levels of quality of service,” he says.

The Policy Dilemma of IP Networking: A Summary of Critical Policy Issues in VoIP

David P. McClure
President and Chief Executive Officer
The U.S. Internet Industry Association

In the business of people going about their lives, the evolution of technology nearly always brings benefits – things may be done more efficiently, or with less waste of resources, or perhaps, just faster. Technology brings benefits. That is not the case with public policy, however, where technologies are nearly always disruptive. Technology brings, in the policy arena, little benefit and much consternation.

So it was with the advent of sailing vessels that required new maritime laws among nations. So it also was when the automobile replaced the horse and buggy, when radios and televisions gained dominance in entertainment, and when computers replaced humans in the full range of everyday transactions.

So it is today with telephony, as packet-switched networks and “voice-over-IP” (VoIP) technologies replace the existing circuit-switched networks.

For the first hundred years of telephony, calls were connected between two parties and that connection was maintained in both directions, establishing a “circuit” for the duration of the call. While this provided exceptional reliability, it is dreadfully inefficient.

Calls along the network of telephone circuits, known as the “public switched telephone network” (PSTN), are transmitted at a fixed rate of about 64 kilobits per second (Kbps), or 1,024 bits per second (bps), in each direction, for a total transmission rate of 128 Kbps. Since there are 8 kilobits (Kb) in a kilobyte (KB), this translates to a transmission of 16 KB each second the circuit is open, and 960 KB every minute it's open. In a 10-minute conversation, the total transmission is 9600 KB, which is roughly equal to 9.4 megabytes (MB).

Of this amount, much is wasted time. While one person is speaking, the other is silent, so that the actual data being transmitted is cut in half. And in a typical conversation, much of the time is spent in silence on both ends of the circuit.

With the advent of the Internet, a new switching method called “packet switching” came into being. In this method, data of all kinds – voice, fax, email, web browsing, or other content – could be broken into small chunks called “packets” or “frames.” Each packet contains 1,000 to 1,500 bytes of data, and carries all of the information needed to carry the packet and re-assemble it into a whole piece when it is received. These packets are transmitted using the protocols “Transmission Control Protocol/Internet Protocol” or “TCP/IP.”

Packet switching is more efficient for two reasons. First, each packet can be sent across the network using the fastest and best route. Second, each element of the network can be tested on a millisecond-by-millisecond basis and the packets re-routed if any portion of the network is becoming overworked. And reliability is enhanced, because if any single packet is lost or damaged it can be easily re-sent.

Already, vast numbers of circuit-switched networks have been replaced with packet-switched networks, enabling organizations to realize significant savings on telecommunications costs. At the same time, packetization of services is slowly being pushed down the telecommunications networks to the desktop.

But this additional efficiency has thrown a sizeable wrench in the policy platforms that have governed telecommunications for more than a century. For those policies were based on a now-obsolete technology in which traffic on the network could be measured by the amount of time a circuit was kept open – that is, it was established as “policy by the minute.”

Charges to the customer, taxes, contributions to social programs, and even measurements of efficiency and effectiveness are all based on per-minute calculations. Even the advent of flat-rate local calling and cellular communications are measured in this way (cellular telecommunications are essentially two-way radio signals over a pair of frequencies).

What happens to these policies when minutes become irrelevant is the challenge of the packet-switched age. It might be easy to assume that the measurement could merely be transferred to a per-packet schema, but here technology also proves disruptive. Packets are not all of the same size, and even if they were there are differing types of compression algorithms and other methods that could render any uniformity or standardization meaningless.

It gets even worse when the telecommunications services are carried over coaxial cable, as they are in the rapidly emerging cable Internet industry. Here, the data and voice signals are first split not into packets but rather into signals, with each assigned a channel of 6 Megahertz. They are then digitized into packets to interface with the larger Internet, and translated back when they are delivered to another cable Internet subscriber.

There is also the dilemma of how IP networking is spreading to other services. While much of the attention is being given to “voice-over-IP” telephony, there are equal revolutions occurring in “fax-over-IP” and even “video-over-IP.”

The policy implications of the end of “policy by the minute” are enormous in and of themselves. But regulators and legislators must also come to terms with the reality of global telecommunications and the end of assumptions that framed the policy decisions of a century ago. Specifically, they must come to terms with five critical policy dilemmas:

- **The need for a national VoIP policy.** It is no longer possible to treat the network as a small and isolated set of circuits over which any single city, county, or state holds jurisdiction – particularly when the network is designed to route packets across whatever portion of the network is most favorable, regardless of its geography. As is often said, “The Internet perceives regulation as damage and routes around it.”
- **The need for regulatory restraint.** It is critical that regulators not attempt to simply transfer existing regulations for telephony – designed for a different technology in a different century – to advanced IP networks. No regulation should be adopted for VoIP unless it is first proven to be necessary and, in fact, proven to be the best and only solution to a specific and quantifiable problem. Even in this case, it should be required that the burden of proof lie with the proponents of any new regulation rather than the opponents. As noted by FCC Chairman Michael Powell, “the policy environment must begin with the recognition that the Internet is inherently a global network that does not acknowledge narrow, artificial boundaries.”
- **The need for standardized relationships.** If disparate networks combine packets with frequencies sliced into channels, there must be some means to manage the interface between these networks, the payment for services, and intercarrier compensation. While such standards are best derived through the actions of a free market, some of the standards and conventions will need to be codified into law in order to provide for oversight and enforcement.
- **The need for equal regulatory treatment.** Efforts by the Federal Communications Commission and the Congress to apply 20th Century policies to the 21st Century IP networks have been an unmitigated disaster. Technologies are treated differently even when they perform the same services – some so heavily regulated they are unable to invest in network improvements, while others are so unregulated as to run rampant. The dilemma for regulators now is to craft policies that stimulate investment and growth while remaining technology neutral.
- **The need to provide for social and economic services.** Telecommunications falls into the category of essential life services – integral to life, liberty, the pursuit of happiness, and the common defense. Policies related to the new generation of IP services must provide for the continuation of essential social services that

include 911 emergency services, universal service funding for rural and remote regions, access to the networks by law enforcement, and even the maintenance of the highest levels of quality of service.

- **The need to replace lost local revenues.** While it is pleasant to contemplate the reduction in costs and taxes that IP services foster, the reality is that local governments in the U.S. derive tens of billions of dollars in revenues through hidden taxes on the telecommunications networks. This revenue cannot be easily replaced in a global IP network environment, nor can it simply be transferred to other services without the risk of a taxpayer revolt. This creates a potential crisis for local governments that will not be easily resolved.

The need for attention to these policy dilemmas is critical and immediate. At the same time, regulatory and legislative bodies often lack either the technical knowledge or the long-term view to allow for good policy to develop in a short amount of time. A rapid or poorly conceived policy platform for IP networking could be far more damaging than simply doing nothing.

Those who would craft these policies would do well to heed the advice of Hippocrates:

"Declare the past, diagnose the present, foretell the future; practice these acts. Make a habit of two things – to help, or at least to do no harm."

About the USIIA

Formed in 1994, the U.S. Internet Industry Association is the primary national trade association for Internet commerce, content and connectivity. USIIA advocates for public policy initiatives in support of the growth and stability of the Internet, sound business practices within the industry, and the rapid deployment of broadband technology worldwide. Representing a broad cross-section of leading Internet companies in North America, USIIA is affiliated with other Internet associations throughout the world. The association is headquartered in Washington, D.C., and more information may be found at <http://www.usiia.org>.

VoIP: RIGHTS AND RESPONSIBILITIES

Debbie Goldman
Research Economist
Communications Workers of America

New services using voice-over-Internet Protocol (VoIP) raise multiple complex and far-reaching issues that have broad implications for the future of the nation's telecommunications systems. Regulators need to develop a new regulatory framework for voice Internet services that include important communications policy goals mandated by the Communications Act and Federal Communications Commission (FCC) rules.

This new framework must recognize that new Internet voice services, regardless of the technology used, should be subject to some of the same rules as traditional telecommunications providers, that all VoIP-based service providers should be subject to the same rules, and most importantly, that all voice service providers, regardless of the technology used, should meet important social obligations.

These include obligations for universal service support, support of telecommunications relay services (TRS), access for people with disabilities, intercarrier compensation (e.g., access charges), public safety obligations such as E911 and CALEA, privacy protections, advance notice of termination of service, and other consumer protections. Regulators must ensure that *all* providers of voice telephony, regardless of the technology or functionality employed, contribute in an equitable manner to these goals.

Regulators must also decide the appropriate role for state utility commissions in regulating intrastate voice telephony services. Once the regulatory framework for VoIP services is established, regulators should focus on policies that will expedite the rollout of broadband networks, regardless of the technology deployed, so that these and yet unimagined new services can flourish.

VoIP Doesn't Fit Neatly Into a Telecommunications or an Information Service 'Box'

VoIP services are a hybrid service with definitional issues that will have profound implications for many important communications policy goals. VoIP providers seek to portray VoIP voice services as "information services" beyond the reach of state and federal regulators. But the services these providers offer to the public are simply a substitute for basic voice communication services. Telecommunications carriers are subject to numerous obligations. Information providers are not subject to these obligations.

Trying to fit VoIP service into the information services box doesn't make sense. VoIP providers market local and long-distance voice wireline telephony service to consumers. VoIP operators provide voice service using various applications that allows communication between users of the Internet and users of the public switched telephone network (PSTN).

If VoIP voice services are declared information services prior to regulatory reform that would require all providers of voice telephony service to meet the obligations currently prescribed for telecom carriers, that decision would undermine current systems of support for universal service, access for people with disabilities, public safety, and other important policy goals.

This decision would open a multitude of arbitrage opportunities advantaging VoIP carriers who are not subject to fees and charges that are imposed on traditional wireline voice telephony carriers. Abandoning some of these requirements would do serious harm to public safety, of particular concern in the post-September 11 environment.

VoIP Voice Services Don't Change the Nature of Voice Calling

Many VoIP providers offer unlimited local and long-distance calling as well as features such as Caller ID, Call Waiting, and Voice Mail. The customer uses an ordinary touch-tone phone to make calls and talk to other people. The consumer is provided with service that is functionally the same as any other telephone service. The VoIP service usually intersects with the public switched telephone network.

The customer places and receives calls to anyone with a telephone number by establishing a connection over the Internet to a VoIP server. The service uses computerized media "gateways" that provide an interface between the Internet and the PSTN. This includes protocol conversion between the incompatible digital formats of the Internet and the PSTN.

VoIP providers argue that this protocol conversion service is not a telephone or "telecommunications" service but rather is properly classified as an "enhanced service" under the Commission's *Computer II* test and an "information service" under the definitions in the 1996 Act. But previous FCC precedent contradicts this assertion.

In a 1998 report to Congress on Universal Service (known as the "*Universal Service Report*"), the FCC identified computer-to-computer IP telephony as an "information service." The Commission repeated at least eight times that phone-to-phone IP telephony was a "telecommunications service." Although it reached only tentative conclusions, the FCC identified phone-to-phone IP telephony as a *telecommunications service*. "The record currently before us suggests that certain forms of 'phone-to-phone' IP telephony services lack the characteristics that would render them 'information services' within the meaning of the statute, and instead bear the characteristics of 'telecommunications services,'" the FCC said.¹

The FCC provided a tentative definition of "phone-to-phone" IP telephony in which the provider meets four conditions: 1) it holds itself out as providing voice telephony services; 2) it does not require the customer to use equipment different from equipment necessary to place an ordinary touch-tone call over the PSTN; 3) it allows the customer to place calls to telephone numbers assigned by the North American Numbering Plan, and associated international agreements; and 4) it transmits customer information without net change in form or content.²

VoIP service requires *both* traditional telephony equipment and additional equipment (such as a computer). The Commission in the *Non-Accounting Safeguards Order* concluded that "certain protocol processing services that result in no *net* protocol conversion to the end user are classified as basic services; those services are deemed telecommunications services" (emphasis added).³ Among the protocol processing services that the FCC identified that result in "no net protocol conversion" is "protocol processing in connection with the introduction of a new basic network technology (which requires protocol conversion to maintain compatibility with existing [equipment])."⁴

In the *Universal Service Report*, the Commission was aware that to promote equity and efficiency, it should avoid creating regulatory distinctions based purely on technology. "Congress did not limit 'telecommunications' to circuit-switched wireline transmission, but instead defined that term on the basis of the essential functionality provided to users," the FCC said.⁵

The FCC was also concerned with what might happen if VoIP providers of voice services were exempt from contributing

¹ In the Matter of Federal-State Joint Board on Universal Service, Report to Congress ("*Universal Service Report*"), CC Docket No. 96-45, 13 FCC Rcd 11501, paras. 83, 90, April 10, 1998.

² *Id.*, para. 88.

³ In the Matter of Implementation of the Non-Accounting Safeguards of Sections 271 and 272 of the Communications Act of 1934, as amended. CC Docket No. 96-149. First Report And Order And Further Notice Of Proposed Rulemaking, Released December 24, 1996 (Non-Accounting Safeguards Order), 11 FCC Rcd 21905, para. 107.

⁴ *Id.*, 11 FCC Rcd at 21955-58, paras. 104-07.

⁵ *Universal Service Order*, para. 98.

to the Universal Service Fund. It reasoned that carriers might try to find ways to avoid paying into the fund itself or the universal service contributions embedded in interstate access charges. “If that occurs, it could increase the burden on the more limited set of companies still required to contribute. Such a scenario, if allowed to manifest itself, could well undermine universal service.”⁶

The Commission recognized that “carriers with universal service contribution obligations should not be at a competitive disadvantage in relation to providers on the basis that they do not have such obligations.” This approach, the Commission noted, is consistent with its principle of competitive neutrality.⁷ In other words, the same rules should apply to all providers of similar voice services.

Consumer Protection, Public Safety Coordination for States/FCC

Section 152(b) of the Communications Act of 1934 expressly grants state jurisdiction over intrastate communications.⁸ The Commission has explicitly stated that federal preemption of state regulation should be narrowly tailored to specific state actions that are likely to interfere with federal policies. States also must develop mechanisms to ensure that all voice telephony carriers, including those providing voice telephony over the Internet, are subject to similar regulatory requirements.

States impose obligations on the intrastate services of telephone companies, including obtaining a certificate of authority, contributions to universal service mechanisms, payment of access charges (for intrastate toll services), 911 public safety requirements, filing of rates, tolls, and price lists, adherence to service quality standards, privacy and other consumer protections, and advance notification of intent to discontinue service. In addition, incumbent local exchange carriers (ILECs) are subject to an array of state regulation, including rate regulation, which typically are not imposed on competitive local exchange carriers.

States establish procedures for emergency response centers. Most states require each competitive local exchange carrier to submit a plan detailing how it will provide 911 services consistent with state law that is “comparable” to the service provided by the ILEC. There may be a range of technical solutions that would allow VoIP voice providers to make available “comparable” 911 services that would identify the location of the caller.

The states and the FCC will need to work together to hash out the jurisdictional issues related to voice-over-IP services. VoIP services are not tied to a specific geographic location. This problem will require a balanced solution that gives states some control over VoIP services while not impeding the rollout of these new services. VoIP services will rely on robust broadband infrastructure and states should create incentives to rollout these networks and bring the future to consumers more quickly.

Conclusion

Voice-over-Internet Protocol providers want to have it both ways – the rights of a telecommunications carrier without the obligations. Certainly, these providers can negotiate interconnection agreements with incumbents to interconnect with E911 trunks for a fee. Apparently they fear that would impose additional costs on VoIP services that they don’t want to incur, at the expense of the safety of its customers.

VoIP challenges the regulatory distinction between “telecommunications” and “information” services. VoIP providers offer a voice service (telecommunications) by means of the Internet. The FCC cannot address the regulatory tensions in the current policy framework in a piecemeal manner. Improper regulation of VoIP local service would have negative impact

⁶ *Id.*

⁷ *Id.*, para. 133

⁸ 47 U.S.C. § 151(b). “...nothing in this Act shall be construed to apply or to give the Commission jurisdiction with respect to (1) charges, classifications, practices, services, facilities, or regulations for or in connection with intrastate communication service by wire or radio of any carrier....”

on many important public policy goals including universal service, access for people with disabilities, and public safety. VoIP regulation should lead to the adoption of a new regulatory framework consistent with the goal of universal, affordable, quality broadband service for all.

The Regulatory Treatment of Internet Telephony

Lee W. McKnight, Associate Professor and Martha Garcia-Murillo, Assistant Professor
School of Information Studies
Syracuse University

In this document we summarize our views on the factors that should be considered when making regulatory decisions regarding Internet telephony in particular and other new technologies in general. We address four areas: 1) national versus state regulation for new information and communication technologies 2) Regulatory treatment of voice-over-Internet Protocol (VoIP) service providers, or Internet Telephony Service Providers (ITSPs) 3) Regulation of Information versus telecommunication services, and 4) Social responsibility.

Our general views are that: 1) nationally uniform treatment of voice-over-Internet Protocol is preferable, but state experimentation as a 'laboratory of democracy' may be appropriate in advance of new federal legislation for a unified 'open communication policy' whose key elements are discussed below; 2) that if and when ITSPs can be defined, they should be treated equally and equitably; 3) that the distinction between telecommunication and information services has been helpful in preventing over-regulation of innovative new technologies such as Internet Telephony, but that such a distinction may no longer be meaningful following adoption of that aforementioned, but as yet non-existent, new uniform legislatively grounded framework for an open communication policy; and 4) that social responsibilities must be respected, and enforced, whatever technology is used for communication, including for continued recognition of the social value of the principle of universal service, or access, for which there is political consensus within the United States and other nations. Having said that, given the growth of new low-cost technologies for information and communication including for communication by voice-over-Internet Protocol-based systems, the mechanisms, and costs of universal service support should be rethought as part of a broader effort to define an open communications policy for the 21st Century. Our views are explained in greater detail below.

National versus State Regulation

Whether or not VoIP should be regulated at the national or state level has been discussed for a number of years. State regulation of telecommunications came about because of the belief that intrastate communications was a business activity conducted within the context of boundaries of the state and, according to the general rules of a federal system, it should thus be regulated at that level. Although the division between federal and state regulation has worked in many instances, it is difficult to administer in the case of information and communication technologies (ICTs). Advances in computing communications and the transition that is happening towards IP-based networks makes it difficult to distinguish between a local, national, or international call. The routing mechanisms do not follow the traditional single switched connection and many alternate routes can be taken before a packet-based voice file reaches its destination. Trying to maintain a distinction between state and national communications will lead to the establishment of artificial and, in our opinion, arbitrary mechanisms to determine whether or not a voice or data transmission was intra or inter-state.

On the basis of this argument, a national policy should be considered not just for this technology but ideally in the long term for the regulation of all ICT-related services. Although there has been a long tradition in the regulation of the telecommunications industry, convergence is making this distinction more difficult to sustain. Even though we argue that the differentiation between state and national rules are no longer appropriate for this field we also understand that it is impossible to eliminate the existing framework overnight. Therefore, one alternative is to maintain for the time being the status quo regarding regulation of VoIP and for states to experiment with alternatives, until a new national framework is developed. This has the disadvantage of being administratively expensive for operators that, in the absence of national rules, will be required to comply with different state rules. There is also the likelihood of multiple court challenges that will add to the administrative costs to carriers, which ultimately would be passed on to users.

Regulatory Treatment of VoIP

To determine who is a VoIP subscriber, one needs to be aware of the different types of VoIP telephony that are currently offered, and additional variants such as voice-over-Wi-Fi which may become more prevalent in the future. The original VoIP technology began in the mid-1990s with computer-to-computer networks that, through special agreements with traditional carriers, were able to complete voice calls in the public switched telephone network (PSTN). Internet providers are now able to use the Internet infrastructure to carry voice packets using conventional phones. But 'VoIP telephony' companies are not the only ones using this technology. Traditional carriers are making the switch to IP technologies, as is evident by SBC's IP Communications unit that offers similar types of services as those of Vonage, an ITSP.

Thus, if we were to determine that all VoIP carriers should be treated the same way it basically means that all carriers will be eventually qualified for VoIP regulation. If asymmetric regulation remains across technologies, there will thus be an artificially strong incentive for the traditional carriers to upgrade their networks to switch to IP. Because the new IP-based entrants receive more favorable treatment, the traditional carriers will also claim that they should be subject only to VoIP regulation, effectively releasing them from all previous traditional carrier-based rules. Since the ultimate goal of regulation is to generate competition and foster innovation while fulfilling social responsibilities, the long-term goal should be to release carriers from traditional regulations either by regulations being applied to all of them [VoIP providers] over time or by simply making that decision from the beginning. But political support for such a forward-looking move by the FCC might require legislative support, which we discuss further below.

Regulation of Information versus Telecommunication Services

The recent U.S. District Court in Minneapolis (District of Minnesota) decision against the Minnesota Public Utilities Commission, which attempted to regulate Internet Telephony providers, simply brought back the debate regarding the distinction between information and telecommunications services. This differentiation that the FCC made in their rules is rapidly becoming obsolete, as convergence of industries and technologies has led to the development of services that do not easily fit exclusively into those two categories. This progression has to be kept in mind when regulators attempt to determine whether VoIP is an information or telecommunications service.

This should also be considered when policymakers begin making decisions with respect to the way new services are regulated. An issue that has been discussed in academic research is the direction of regulation when you have convergence. Should you try to impose computer-type regulation into the telecommunications industry or telecommunications-type regulation into computer-related services? In essence, should policy move towards greater regulation by trying to fit the new services into the old framework or should it move towards an environment where there are fewer restrictions, in the hope of motivating both new and old entrants to continue their innovation efforts?

Because of the difficulties associated with the transition, it is necessary to determine what the implications are of adopting transitional measures before we move towards a policy that is likely to require important changes in the actual telecommunications law. In the concluding section of this summary, we suggest the development of several scenarios to help determine the best course to take. In essence, however, our expectation is as was stated above, that is, ultimately new legislation supporting uniform treatment of information and communication services will be needed.

Fulfillment of Social Responsibilities

In the United States, as in many other countries, there has been a commitment to provide communication services to all citizens. In the U.S. this has been done by making sure that low-income users, libraries, schools, and hospitals have affordable access to information networks and services. Similarly, the E911 Services and law enforcement tools are essential for safety, so there will need to be mechanisms in place that will allow them to be supported.

The allocation of funds to support universal service obligations is currently done by the contributions of carriers, and end-user fees or more properly, taxes. The challenge for regulators now is to decide if companies that have entered the market with new technologies should be included among those who contribute. The decision in this case is likely to be made at two levels. In the short term, the government will have to decide who should contribute. In the long term, the government has to decide if the progression of technology has reached a point where prices have fallen to the extent that more people can afford communications services and schools and libraries can simply make special contractual arrangements directly with the competing carriers to obtain more favorable terms. The idea is thus to move away from a system of subsidies to a system where new entrants such as ITSPs can pressure prices downward to a level that makes telecommunications affordable to almost everybody.

Conclusion: The Need for Scenarios for a New Information Environment

In the FCC's efforts to decide the policies that will guide the ICT industries in coming years, it should attempt to determine the impacts that these decisions will have on the industries and users as a whole, including social obligations. To inform the debate on the goals and final shape of this effort, a series of scenarios should be constructed. Any changes will necessarily affect many interested parties, including the level of revenues available to fund social obligations. The imposition of contributions will also necessarily have an impact on prices. A natural progression toward lower price levels due to the adoption of lower-cost new technologies could be impeded. This would also increase the likelihood that some will argue that subsidies continue to be necessary. Similarly the decisions about contributions will have a negative impact on the development of new technologies. There are clearly substantial risks that the realization of benefits of the new VoIP technologies may be limited by adverse policy and regulatory decisions if this process is not thoughtfully designed.

Although it is not possible to present the details of those scenarios here, it is possible to identify at least three possibilities: 1) maintain the current system; 2) oblige all carriers to contribute; or 3) reduce the contributions of all types of ICT service providers. Regulatory changes will also require transition periods because of legislative restrictions. We look forward to contributing further to the debate on these alternative futures for VoIP regulation.

References:

García-Murillo, Martha, "Assessing The Impact of Internet Telephony on The Deployment of Telecommunications Infrastructure," *Computer Networks Journal* (under review)

García-Murillo, Martha, and Ian MacInnes, "The impact of technological convergence on the regulation of ICT industries," *Journal of Media Management*, Vol. 5 No. 5 2003

García-Murillo, Martha and Ian MacInnes, "FCC organizational structure and regulatory convergence," *Telecommunications Policy*. Vol. 25 Issue 6, July 2001.

McKnight, Lee W., William Lehr, David Clark, *Internet Telephony* (MIT Press, 2001)

Neuman, W. Russell, Lee McKnight, Richard Jay Solomon, *The Gordian Knot: Political Gridlock on the Information Highway* (MIT Press 197, 1999)

Access to Voice-over-Internet Protocol (“VoIP”)

Gregg C. Vanderheiden, Ph.D.
Professor Industrial Engineering
University of Wisconsin - Madison

Introduction

The adoption of voice-over-IP as a mainstream telecommunication technology is happening at an ever-increasing rate. Just this month, Time Warner Cable reached agreement with Sprint and MCI to market telephone services delivered over the Internet. The voice-over-IP services (to be called Digital Phone) will include number portability and other mainstream features. Increasingly, companies, government agencies, and other large organizations are turning to voice-over-IP.

As people move from PSTN phone technologies to voice-over-IP phone technologies there is a danger that, if accessibility regulations are not carried forward to the new technology, people with disabilities and those who are older will lose access to telecommunications. This is a key area when considering voice-over-IP regulation – and the one on which I would like to focus my comments.

The regulatory obligations were created by Congress to address issues that have not been addressed by regular market forces. As we move to VoIP some of the market dynamics are changing and some of the problems that were not naturally addressed under PSTN would be addressed under the market forces of VoIP. The dynamics around competition for example are quite different.

However, a number of areas are not competition based, and the new VoIP market will not provide them via normal market pressures. These include:

1. E911,
2. law enforcement assistance,
3. universal service, and
4. disability access

Disability access in mainstream products is one of the areas that has never been addressed by natural market forces. Occasionally, a mainstream feature that has benefit to one subgroup or another will appear, but accessibility for most all disabilities is not something that is addressed by normal market forces. And telecommunications products have presented a host of access issues to people with disabilities and those who are older.

In our work, we communicate frequently with companies that are introducing new technologies. We do this because accessibility is cheapest to build in at the early stages of development. We have observed that, when new technologies are introduced, unforeseen technical issues always pop up, and companies address the most important ones and work on them first. Disability access considerations are often on the list, but market forces never are strong enough to move them high enough on the list to get to the action level. All companies have long lists of things they never get to.

The exception is when there is regulation (or concern about regulation) to cause the access issues to move up the action list. Often, when there is even talk of regulation, there is action. But if that talk goes away, the action goes away – and accessibility groups and task forces within companies have repeatedly been disbanded when regulations failed to appear or when regulations failed to be enforced.

For example, hearing aid compatibility disappeared when a new speaker technology came along. Congress passed the Hearing Aid Compatibility Act to get it back in, but left an exception for cell phones. When cell phone technology advanced and the market exploded, hearing aid compatibility was not provided again – since it was not required –

and those who use hearing aids again lost out. The FCC exhorted the wireless industry and hearing aid industry to solve the problem voluntarily. Although this led to some technical work on a standard, it did not result in hearing-aid-compatible cell phones. It was not until the agency again turned its attention to this by adhering to the provision in the law directing the FCC to monitor the cell phone exception for problems that we began to see progress.

When Section 255 accessibility standards were first announced a lot of action was taken looking at accessibility. People from industry even demonstrated a prototype phone that could talk for people who were blind. Today, however, companies do not see Section 255 as having any teeth. It is for this reason that, for the first 7 years of the law's existence, cell phones accessible to the blind did not appear on the market. Although there are some special phones now appearing, the vast majority of those who are blind still have no access to even basic cell phone functionality beyond dialing by feel. They cannot tell if they are roaming (and are going to be hit with big surcharges); they can't tell if they have a signal; they can't even tell if their battery is going to die soon; and they have no access to the phone menus. This is true even on cell phones that have speech technology built in for mainstream features but it's not used to provide accessibility.

People who are older, have lower vision, are hard of hearing, or have physical disabilities are all having problems with cell phones – problems that could have been addressed by simply changing the software in the phones.

The same pattern is appearing in the voice-over-IP technologies.

Access to voice-over-IP is very important to people with disabilities and those who are older. It is already starting to take the place of traditional phones in many enterprises – and many individuals are concerned with their ability to function within those enterprises.

When VoIP rolls into *apartment houses, nursing homes, and elder care facilities* it will be important that individuals with disabilities and people who are older will be able to access and use those phones. And with the rapidly aging population, the need for access by these individuals is going to continue to increase.

For some people with particular types or degrees of disabilities, VoIP technologies may be easier to use even without regulation. But these will be the exception – and only occur where mass market needs happen to coincide with their needs. There is no market force to ensure that general access will occur – or that the needs of people with most types or degrees of disabilities will be addressed whenever their needs differ from those of the mass market.

The current discussions around VoIP by companies and standards groups have shown that the aspects of voice-over-IP that are getting serious discussion are those where there are regulations, enforcement, or threat of enforcement.

That's not to say that there are not advocates within companies – because there are. But they often find that they are unable to sell their initiatives within the companies because of the highly competitive nature of the market. It's simply not good business to pay attention or devote resources to disability access if you're not required to – or more importantly – if your competitors are not required to.

Market pressures have not and will not cause telecommunication to be accessible by people with disabilities and those who are aging in any but spotty, specific, and temporary ways. And we often see even these anecdotal instances disappear later.

But companies are not to blame for this. Profit driven companies are not bad. In fact those are the ones that we all want in our investment portfolios and in our retirement funds. However, regulations are sometimes needed. Regulations are our way of putting societal factors into the profit equation – so that the natural market forces and the natural forces within companies – can come into play and cause access to appear in products.

The wonderful thing about voice-over-IP is that this transmission format, and the types of telecommunications technologies used to implement it, will make it easier to implement accessibility than in any technology before.

For example, one technology company called Avaya has just released a phone program that, when loaded onto the phone server, immediately allows much of the phone functionality on all of the phones to be accessible to those that are blind. And these don't require any change to the phones. With small changes to the phone software, full access could be gained to the phones without any hardware changes.

Trace Center and Gallaudet University are currently working with Cisco on a technique that would allow every phone within the organization to be instantly capable of text communication (with or without voice carryover) simply by installing a software program on the call manager server. A deaf person could then walk up to any of the 10,000 phones within the company and be able to communicate in text (or in text and voice) without needing any special equipment. They could then not only use the phone on their desk, but also on a colleague's desk, in the conference room, or the lunchroom phone on the wall. This can be done without change to the software on the phones and in fact this can be done on phones that are installed today.

These are just two examples – and both efforts have been enabled by the FCC's recent interest in voice-over-IP – that have enabled individuals to move forward within their companies.

There is nothing about voice-over-IP that makes accessibility harder than with PSTN. VoIP does present some new issues, but solutions for them are already known. We are hearing from those in industry that they cannot move forward with access implementations until it is clear that their companies will either have some advantage, or at least not be at a disadvantage, for implementing access while competitors are doing something else.

It is both important and necessary to carry disability access forward into voice-over-IP. It is technically feasible and, as the regulations are enforced so that there is a level playing field, it is commercially feasible and practical to implement VoIP technologies – with great effect for those with disabilities and for those who are older.

Poking Holes in the Regulatory Landscape: Harnessing the Disruptive Power of Voice-over-IP Technology

Glenn A. Woroch
Professor of Economics
University of California-Berkeley

Whack-a-Mole is a zany arcade game that can be found on a few boardwalks and midways around the country, wedged between the much flashier electronic video games. Children and adults alike delight in attempting to smack down a mechanical mole named “Holey Moley” as he randomly pops out of his many holes, and quickly ducks into the safety of his underground den.

Curiously, Holey Moley comes to mind as I survey the emerging debate over the regulation of Voice-over-Internet Protocol (VoIP). Yet another innovative technology has tunneled through the manicured landscape of telecom regulation unannounced. Grounds keepers are now gathering to deliberate whether to exterminate the varmint or to somehow weave its damage into their intricate handiwork.

Recently the FCC, and several states before it, grasped the regulatory thistle created by this technology when it opened an inquiry into VoIP. U.S. regulators have been able to dodge the issues raised by VoIP as long as technical weaknesses limited its commercial potential. The technology has advanced to the stage where it now threatens to be the next “disruptive technology” of telecommunications – one that could replace circuit-switched delivery of traditional services and to give birth to a stream of innovative applications.

Events have unfolded much differently in the area of international telecommunications. In the 1990s, several foreign governments came down decisively on the use of VoIP for international services. While their policies show little consistency – ranging from outright ban to explicit subsidization – it is instructive that regulatory action first occurred in these markets. The huge price-cost discrepancies erected by the international settlements process offered arbitrage opportunities to carriers using innovate technologies including VoIP. Over time, the competition that materialized helped close some of these gaps and it is safe to say that, today, the structure of international rates is better aligned with economic reality as a result.

The valuable lesson of this experience is that new technologies enable competition that expose distortions in the regulatory fabric – whether well-intentioned cross-subsidies or brazen attempts to redistribute rents – and proceed to instigate reform of those policies that caused the distortions in the first place. *If allowed to do so, VoIP has the potential to overhaul domestic regulation of telecom markets in this same way.*

The current inquiries will begin, as they should, by questioning whether services using VoIP technology should be regulated at all. Economists approach this question by asking whether VoIP services have demand and supply characteristics that would likely rob consumers of the full potential of the technology. The presumption is that, when those characteristics are absent, the market trumps regulation as a way to organize provision of these services. In fact, it is hard to see how VoIP as a network application would result in market power, the usual source of consumer harm. Services using VoIP have many close substitutes and the supply of those services does not exhibit scale and scope economies that are unusual relative to other telecommunications services.

If doubts regarding the efficacy of the market mechanism persist, as I expect they will, the analysis should proceed by first articulating clearly what policy would be imposed in its place. Before counting the benefits that may flow from any regulation of VoIP, policy makers should consider only “incentive compatible” outcomes, i.e., when consumers and firms all behave in ways that serve their self-interest. In particular, policy needs to obey the common-sense principle of economics that, if an activity is taxed, less of it will occur – along with its corollary, a taxed activity will seek out more hospitable locations. Attempts to “tax” services using VoIP are likely to be futile as they, like Holey Moley, will simply pop up elsewhere. This point was made at a recent FCC hearing that domestic regulation of VoIP could very well drive VoIP services off shore.

The ease with which VoIP technology can re-locate derives from its cross-platform nature. Voice and other content sent over Internet Protocol are simply applications that ride on a standardized transport layer of physical networks of all kinds – copper pair, coaxial cable, optical fiber and terrestrial wireless and satellite. In recent months, each of the four RBOCs, all three of the major long distance carriers, and the largest cable operators have announced plans to offer VoIP services to business and/or residential customers within the year. Already most of these providers have been transporting voice over their packet networks to some extent.

The portability of VoIP technology underscores the need for parity in treatment across services, platforms, and networks. “Regulatory parity” has become a common refrain in today’s increasingly crowded telecommunications marketplace. It is especially critical in the case of VoIP, however, since its deployment is so responsive to financial incentives at the same time the technology holds so much promise of long-run consumer benefits. The great danger is that regulators will attempt to achieve parity by imposing existing regulations applied to traditional telecom services on new services using VoIP technology. This move could choke off use of this technology by both incumbents and entrants, and send it off to elsewhere.

The questions addressed in the present policy debate need to be re-framed. Rather than asking if and how to regulate VoIP services, it should ask how this technology can be employed to identify regulations that are now, or will soon be, unnecessary or harmful to consumer welfare. Of course, revisiting old regulations is not much fun – certainly not as much fun as crafting new policy for new technologies. It is downright painful to contemplate re-opening issues like access charges, the funding of universal service and E911, even if these rules themselves continue to evolve. But therein lies some of the great benefits that technologies like VoIP offer: they create the opportunity and the capability to purge the regulatory system of obsolete rules.

The FCC and the states should be commended as they embark on their policy debates over VoIP. I wish them well protecting those processes from special interests seeking to secure rents from this promising technology. In all likelihood, the outcome of these proceedings will in many cases be a call to “exempt” VoIP from regulation, if only temporarily. While I would agree with such a move, I fear that it sends the implicit message that the preferred long-run policy is regulation. Far more importantly, however, it would represent the loss of a much greater opportunity. The industry, and the U.S. economy, would be better served by enlisting the forces enabled by these technologies to identify flaws in the current regulatory system and to dismantle those parts that are no longer justified. The alternative of the *status quo* is a seemingly endless, and ultimately futile, defense of the current system, with regulators whacking the technological moles that unexpectedly and incessantly poke holes in their regulatory landscape.