

# Can VoIP Providers Meet Their Social Obligations?

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## **I. Introduction**

*“When the inventors of KaZaA are distributing for free a little program that you can use to talk to anybody else, and the quality is fantastic, and it’s free – it’s over. The world will change now inevitably.”*—Michael Powell, Chairman of the US’s Federal Communications Commission (FCC), Fortune Magazine, February 2004.

As Powell’s quote suggests, Voice-over-Internet-Protocol (VoIP) is increasingly popular among consumers and businesses for sending reliable and affordable voice communications around the globe. VoIP allows not only efficient conversations, but also the ability to sidestep law enforcement intercepts, provide user anonymity, avoid tolls and taxes imposed upon traditional telecoms service providers, and confound ISP content filters. It also enables entirely new Web-based services and bundles unseen to this point.

It is this popularity and flexibility that has branded VoIP a threatening and disruptive technology which in turn has prompted legislators, law enforcement agencies, and traditional telecommunications firms to push aggressively for stringent VoIP regulations.

These proposed regulations risk damaging not only the VoIP industry, but also the fine balance struck between the light-touch regulatory model of the IT industry and the generally more prescriptive regulations found in the traditional telecommunications industry. Yet at the core of this pro-regulatory effort is a legitimately deep concern for the potentially negative impact VoIP may have on network security, user privacy, data protection, and social services such as 911.

The question is thus whether wild and heretofore unregulated VoIP innovation can be successfully reconciled with a conservative regulatory environment that is most concerned about meeting social obligations and has historically protected incumbent operators from emerging technologies and competitors.

## **II. Articulating VoIP**

The term “VoIP” is an increasingly abstract term whose many architectural flavors routinely frustrate otherwise straightforward policy discussions. And the policy discussions are now nonstop: VoIP represents billions of dollars in revenue for worldwide technology and telecommunications firms, serves as a key business differentiator for competing constituencies ranging from home-based businesses to multinational call centers, and increasingly struggles with a schizophrenic global regulatory environment. So what does “VoIP” mean?

At its most basic, VoIP is simply the technique for sending digital voice bits over an Internet Protocol-based network instead of sending the bits via dedicated non-IP circuits. While VoIP is often portrayed as a newly emergent technology, realtime packetized voice was demonstrated as early as August 1974 between the University of Southern California’s Information Sciences Institute (ISI) and MIT’s Lincoln Laboratory.<sup>1</sup> A realtime two-way voice conversation came later that December.<sup>2</sup>

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<sup>1</sup> <http://www.cs.columbia.edu/~hgs/rtp/history.html>

<sup>2</sup> Robert M. Gray, "Digital Speech and the Internet Protocol: The 1974 Origins of VoIP," *IEEE Signal Processing Magazine*. Volume 22, Issue 4, pp. 87-90.

The year 1974 also marked the publication of the article “A Protocol for Packet Network Intercommunication” by Vint Cerf and Bob Kahn.<sup>3</sup> Published in the *IEEE Transactions on Communications*, this article laid the foundation for the TCP/IP protocol suite, from which IP would spring in 1978, and introduced the latter half of the VoIP moniker. Over the next couple of decades, IP and packetized voice technologies improved, with Vocaltec’s release of Internet Phone Software in 1995 a notable VoIP milestone.<sup>4</sup>

### **VoIP Architectures**<sup>5</sup>

Today, business models, technical efficiency, and customer demand have made it viable to replace virtually any portion of a traditional circuit call with an IP-based link, thus enabling a huge variety of VoIP architectures. The most common general categories of VoIP are: 1) PC-to-PC VoIP exemplified by Skype’s peer-to-peer network, 2) Public Switched Telephone Network (PSTN) VoIP that is offered by firms such as Vonage that utilize traditional phones, customer premises equipment, and broadband Internet connections to enable voice calls to and/or from the PSTN, and 3) Backend Infrastructure VoIP that arises from companies routing their voice traffic on intranets or via the Internet using their own equipment. Any of these buckets can incorporate wired or wireless technologies, and employ encryption and user authentication.<sup>6</sup>

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<sup>3</sup> Cerf, V.G. and R.E. Kahn. “A Protocol for Packet Network Interconnection,” *IEEE Transactions on Communications* COM-22 (May 1974): 637-48.

<sup>4</sup> <http://gigaom.com/2004/09/19/the-voice-over-ip-insurrection/#more-525>.

<sup>5</sup> <http://www.fcc.gov/voip/voipforum.html>.

<sup>6</sup> See 2. Forbes, Scott C. (2005). “*Wi-Fi, Wi-Max, and New Uses for Unlicensed Spectrum*.” Presented at Law Seminars International’s Tenth Annual Telecommunications Law Conference in Seattle, WA. May 19, 2005 and Forbes, Scott C. (2005). “How to Effectively Address Security Requirements in an ESP [Enterprise Security Program].” TeleConference and Live Audio Webcast. ABA Center for Continuing Legal Education. March 9, 2005.

### **III. VoIP Regulatory Environment**

Partly as a result of the myriad technical flavors of VoIP and dearth of regulatory precedent, regulators around the globe are increasingly challenged to pigeon-hole VoIP into established regulatory buckets such as the FCC's telecommunications and information services categories. These two categories have a long history and are presently articulated in the US's Telecommunications Act of 1996: An information service is "[T]he offering of a capability for generating, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunications."<sup>7</sup> A telecommunications service is "[T]he transmission, between or among points specified by the user, of information of the user's choosing, without change in the form or content of the information as sent and received."<sup>8</sup>

Given these vague definitions and the litigation, numerous congressional hearings, FCC Orders, industry petitions, and academic attention devoted to clarifying the two terms, it is not surprising that VoIP just doesn't seem to fit existing regulatory buckets, or any existing international regulatory schema for that matter. Several providers have attempted to use the VoIP label to sidestep traditional telecommunications regulations. For example, AT&T argued in a 2002 AT&T petition that its phone-to-phone was not subject to access charges or universal service fees was denied. In 2004, the FCC denied the petition, noting that the service was not an information service and that it was liable for intrastate access charges.<sup>9</sup>

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<sup>7</sup> 47 U.S.C. Sec. 153(20)

<sup>8</sup> 47 U.S.C. Sec. 153(44)

<sup>9</sup> *Petition for Declaratory Ruling that AT&T's Phone-to-Phone IP Telephony Services are Exempt from Access Charges*, WC Docket No. 02-361, Order, 19 FCC Rcd 7457 (2004) .

While the FCC has noted in its Vonage decision that VoIP is interstate and thus subject to federal jurisdiction<sup>10</sup> and has made other limited decisions on company-specific issues<sup>11</sup>, it has not yet ruled on its IP-Enabled Services Notice of Proposed Rulemaking or provided a definitive classification matrix for VoIP services.<sup>12</sup>

### **A. US VoIP Regulations**

The FCC's regulation of VoIP formally began with its Pulver ruling indicating that Pulver's peer-to-peer Free World Dialup service was not a telecommunications service.<sup>13</sup> It has continued, as noted above, with an IP-Enabled Services NPRM, an E911 Order, and a Communications Assistance for Law Enforcement Act (CALEA) NPRM. A CALEA Order is expected in 4Q 2005. Universal service, accessibility, taxation, and ultimately whether VoIP is a telecommunications, information, or some other type of service remain unaddressed topics. It is most likely that additional social obligations such as accessibility will be addressed before VoIP is formally classified.

### **B. European VoIP Regulations**

European telecommunications law is governed broadly by a common regulatory framework enacted in 2002.<sup>14</sup> Most countries have yet to delve deeply into VoIP regulation, but in general the classification challenge is the same as faced in the US: is VoIP a telecommunications or a

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<sup>10</sup> Vonage Holdings Corporation Petition for Declaratory Ruling Concerning an Order of the Minnesota Public Utilities Commission, WC 03-211 (filed Sept. 22, 2003) and Vonage Order, [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/FCC-04-267A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-267A1.pdf).

<sup>11</sup> See <http://www.fcc.gov/voip/>.

<sup>12</sup> *IP-Enabled Services*, WC Docket No. 04-36, Notice of Proposed Rulemaking, 19 FCC Rcd 4863 (2004).

<sup>13</sup> *Petition for Declaratory Ruling that pulver.com's Free World Dialup is Neither Telecommunications Nor a Telecommunications Service*, WC Docket No. 03-45, Memorandum Opinion and Order, 19 FCC Rcd 3307 (2004)

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[http://europa.eu.int/information\\_society/policy/ecommm/info\\_centre/documentation/legislation/index\\_en.htm#dir\\_2002\\_21\\_ec](http://europa.eu.int/information_society/policy/ecommm/info_centre/documentation/legislation/index_en.htm#dir_2002_21_ec)

data service? Or rather, if a VoIP service is not merely a data service, is it an electronic communications service (ECS) or instead a Publicly Available Telecommunications Service (PATS), the latter of which is subject to several social obligations such as access to emergency services.<sup>15</sup>

In addition to efforts by EU working groups<sup>16</sup>, several European countries have initiated VoIP proceedings to clarify the broader EU regulatory scheme, often to reinforce the perception that VoIP is an emerging technology that warrants regulatory leeway sufficient for it to grow while still protecting consumers. At this point, there is little difference between regulating commercial VoIP providers and companies who use VoIP internally, as long as those corporate networks do not sell their services or make them available for public consumption. For example, the French telecommunications regulator, l'Autorité de Régulation des Télécommunications (ART), only requires VoIP providers to register with ART if they provide service to third parties or intend to apply for traditional numbering resources.

As for specific European regulatory activities, the United Kingdom, Germany, and Ireland provide a good snapshot. The United Kingdom initiated a consultation on new VoIP services in late 2004<sup>17</sup> as well as a larger strategic review of its telecommunications regulations where recent comments have suggested that it intends to give VoIP more leeway than traditional telecommunications providers.<sup>18</sup> Ireland's Commission for Communications Regulation (ComReg) required VoIP providers to formally apply to ComReg for numbers and interconnect

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<sup>15</sup> [http://europa.eu.int/eur-lex/pri/en/oj/dat/2002/l\\_108/l\\_10820020424en00330050.pdf](http://europa.eu.int/eur-lex/pri/en/oj/dat/2002/l_108/l_10820020424en00330050.pdf)

<sup>16</sup> For example, <http://erg.eu.int/> and [http://europa.eu.int/information\\_society/policy/ecomms/index\\_en.htm](http://europa.eu.int/information_society/policy/ecomms/index_en.htm).

<sup>17</sup> [http://www.ofcom.org.uk/consult/condocs/new\\_voice/anev\\_voice/new\\_voice\\_pes/new\\_voice.pdf](http://www.ofcom.org.uk/consult/condocs/new_voice/anev_voice/new_voice_pes/new_voice.pdf)

<sup>18</sup> [http://www.ofcom.org.uk/static/telecoms\\_review/index.htm](http://www.ofcom.org.uk/static/telecoms_review/index.htm)

with other telecoms providers to ensure PSTN accessibility. Nomadic VoIP services—those not tied to a specific geography—can use the “076” prefix. Germany’s Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway announced in September 2005 that it had reached initial conclusions on VoIP.<sup>19</sup> It noted that VoIP is important, that access to emergency services is key, and that local numbers may be used and obtained by VoIP providers. The German regulator also highlighted the work of its interconnection advisory group that will be doing work into 2006. The relevant press release was clear that final rules have not yet been adopted, which explains why there are no implementation guidelines for E911 despite a recognition of its importance. The Official Gazette has the detailed regulatory treatment.<sup>20</sup>

### **C. Asian VoIP Regulations**

Unlike the EU where there is at least a baseline telecommunications regulatory framework in place that individual countries can use to guide them, Asian regulations follow a less common theme, although there are similarities in geographically and economically-tied countries. For example, China’s Ministry of Information Industry has not formally passed comprehensive VoIP regulation, but is expected to address the topic in the coming months.<sup>21</sup> In a practical commercial sense, only licensed telecommunications operators and licensed ISPs can offer VoIP service. Many analysts have argued China will likely classify PC-to-PC VoIP as value-added services. Value-added services may benefit from less stringent foreign investment restrictions and are subject to fewer licensing requirements. In Hong Kong, the Office of the

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<http://www.bundesnetzagentur.de/enid/e644b4d2d745eb631bc784b61d618242,0/10d.html#Federal%20Network%20Agency%20ensures%20clarity%20in%20the%20case%20of%20VoIP>. Detailed regulatory treatment is available in the Official Gazette: <http://www.bundesnetzagentur.de/enid/e644b4d2d745eb631bc784b61d618242,0/1qo.html>.

<sup>20</sup> <http://www.bundesnetzagentur.de/enid/e644b4d2d745eb631bc784b61d618242,0/1qo.html>

<sup>21</sup> <http://www.mii.gov.cn/mii/>.

Telecommunications Authority (OFTA) requires VoIP operators to obtain a fixed telecommunications network services license. Yet OFTA initiated a consultation on VoIP, and is arguing for a new licensing category to specifically address VoIP and promote technological neutrality.<sup>22</sup>

India is a particularly good example of how VoIP can drastically complicate a regulatory space. The Telecom Regulatory Authority of India (TRAI) prohibits any IP-based network from interconnecting with the PSTN in India. India also prohibits a corporation from extending the network to another corporation or agent, however, unless they have the same ownership and a commonality of interest. These restrictions benefit incumbent telecommunications providers.<sup>23</sup>

Like India, Thailand limits VoIP service; it only allows its incumbent operators to provide both internal and outgoing VoIP service. Thailand's National Telecommunications Commission has created a VoIP task force and will be investigating how to regulate VoIP throughout the latter part of 2005 and likely into 2006.<sup>24</sup>

Australia is also investigating VoIP, and recently issued a discussion paper in October 2004 similar in tone to the EU where there was an emphasis on both the rights and benefits of being a regulated telecommunications provider.<sup>25</sup> Australia also emphasized the “hook” of voice—if an application or service includes voice, then quite likely it's a telecommunications service.

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<sup>22</sup> <http://www.ofta.gov.hk/zh/report-paper-guide/paper/consultation/20041221/org/15.pdf> and <http://www.ofta.gov.hk/en/tips/servicetype/local/voip.html>.

<sup>23</sup> <http://www.trai.gov.in/internet-telephony-index.htm>.

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[http://www.apectelwg.org/document/download.jsp?fname=Policy%20%5E%5E%5E%20Regulatory%20Update%20-Thailand.pdf&all\\_cd=010101&d\\_seq=2136](http://www.apectelwg.org/document/download.jsp?fname=Policy%20%5E%5E%5E%20Regulatory%20Update%20-Thailand.pdf&all_cd=010101&d_seq=2136).

<sup>25</sup> [http://www.acma.gov.au/acmainterwr/aca\\_home/issues\\_for\\_comment/discussion/aca\\_voip\\_dp.pdf](http://www.acma.gov.au/acmainterwr/aca_home/issues_for_comment/discussion/aca_voip_dp.pdf)

Finally, in South Africa, the Independent Communications Authority of South Africa (ICASA) recently initiated a VoIP liberalization program. The program permits both the incumbent wireline provider and its competitors to provide VoIP. Under this program, VoIP is categorized as value-added network services if they connect to the PSTN and receive payment for the provision of services. To provide these value-added services, a provider must obtain a license. To get the license, they provider must certify that “historically disadvantaged individuals” will hold 15% of the shares in the company a year after the effective date of the license, and 30% within two years.<sup>26</sup>

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<sup>26</sup> <http://www.icasa.org.za/Default.aspx?Page=2>.

#### **IV. Comparison of US and Canada E911 Rulings**

On May 19, 2005, the FCC adopted an Order to that required certain VoIP providers to meet E911 obligations.<sup>27</sup> The Order followed an action in April by Canada's Canadian Radio-television and Telecommunications Commission (CRTC) that described the E911 obligations of VoIP providers.<sup>28</sup> The intent of both orders was to deal with the public perception that VoIP providers were not adequately meeting the emergency service access expectations of the public which is likely why neither of the orders provided detailed implementation guidance.

The FCC order also presented the US's most complete and specific definition of VoIP to date by applying its regulations to "interconnected VoIP service providers." These interconnected providers are those who can "generally" receive calls from and terminate calls to the PSTN and whose services enable real-time, two-way voice communications and require both a broadband connection from the user's location and IP-compatible CPE.<sup>29</sup> Given FCC Commissioner statements and conversations between industry and the FCC, it is likely that subsequent Orders requiring VoIP providers to comply with specific social obligations will follow a similar definition.

In the Order, the FCC also asked for comments on whether VoIP services and VoIP customer premises equipment (CPE) should be required by June 2006 to automatically determine a caller's location so that such information could be transmitted along with a 911 call. The FCC has also

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<sup>27</sup> *IP-Enabled Services*, WC Docket No. 04-36, First Report and Order and Notice of Proposed Rulemaking, May 19, 2005. Available at: [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/FCC-05-116A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-05-116A1.pdf).

<sup>28</sup> <http://www.crtc.gc.ca/archive/ENG/Decisions/2005/dt2005-21.htm>.

<sup>29</sup> Order, para. 24.

asked whether the scope of its 911/E911 decision should be expanded to include a broader array of VoIP services, such as peer-to-peer.

Below is a matrix comparing the FCC order with the CRTC order.

Topic	FCC Order (United States)	CRTC Order (Canada)
<b>Type of Service Covered</b>	Interconnected VoIP Service	Local VoIP Service
<b>Definition of Service Covered</b>	<ul style="list-style-type: none"> <li>• Enables real-time, two-way voice communications.</li> <li>• Requires a broadband connection from the user’s location.</li> <li>• Requires IP-compatible Customer Premises Equipment (CPE).</li> <li>• Permits users generally to receive calls that originate on the Public Switched Telephone Network (PSTN) and to terminate calls to the PSTN.</li> </ul>	<ul style="list-style-type: none"> <li>• Uses telephone numbers that conform to the North American Numbering Plan (NANP).</li> <li>• Provides subscribers with universal access to and/or from the PSTN.</li> <li>• Provides the ability to make and/or receive calls that originate and terminate within an exchange or local calling area.</li> </ul>
<b>Routing Requirements</b>	<ul style="list-style-type: none"> <li>• Must transmit all 911 calls, as well as a call back number and the caller’s location to the local PSAP (or an appropriate fallback).</li> <li>• Calls must be routed through the use of Automatic Number Identification (ANI) and, if necessary, a pseudo-ANI, via the dedicated Wireline E911 Network.</li> <li>• The caller’s Registered Location must be available from or through the Automatic Location Identification (ALI) Database.</li> </ul>	<ul style="list-style-type: none"> <li>• Where an Incumbent Local Exchange Carrier (ILEC) offers 911/E911 capabilities, providers of fixed (non-nomadic) services must transmit 911/E911 calls to the local PSAP.</li> <li>• Providers of nomadic services (i.e., where the calling device and/or account are transportable) and providers who issue numbers that are not “native” to a local calling area must implement an interim solution that provides a level of service functionally comparable to Basic 911.</li> </ul>

<b>Location Requirements</b>	<ul style="list-style-type: none"> <li>• Providers must obtain from each customer, prior to the initiation of service, the physical location at which the service will first be utilized.</li> <li>• Those who offer services that can be utilized from more than one physical location must provide their end users one or more methods of updating location information, including at least one option that requires use only of the CPE necessary to access the service.</li> </ul>	<ul style="list-style-type: none"> <li>• The fixed provider must populate end-user information in the ALI database associated with the end-user's serving PSAP and route calls, along with ANI and ALI data, to the correct PSAP in a manner that is compatible with the PSAP's systems.</li> <li>• The nomadic provider must ensure that a 911 call originating from a local VoIP service is not routed to a PSAP that does not serve the geographic location from which the call is placed.</li> </ul>
<b>Reporting/Contracting Requirements</b>	Providers must submit letter of compliance to FCC no later than 120 days after effective date.	Canadian telecom carriers must include in their service contracts with local VoIP service providers the requirement that the VoIP providers abide by the decision.
<b>Customer Notification</b>	Providers must: <ul style="list-style-type: none"> <li>• Advise every subscriber of the circumstances under which E911 service may not be available or is limited relative to traditional E911 service.</li> <li>• Keep a record of subscriber's affirmative acknowledgement of such advisory.</li> <li>• Distribute to all subscribers warning stickers or other labels warning subscribers if E911 service may be limited or not available.</li> </ul>	Providers must: <ul style="list-style-type: none"> <li>• Notify customers of any 911/E911 limitations before service commencement and during service provision.</li> <li>• Obtain explicit customer consent about any limitations before service commencement.</li> </ul>
<b>Funding</b>	Existing regulations allow interconnected VoIP providers to be assessed 911 fees.	Municipalities could impose fees on VoIP service providers to help pay for the 911 infrastructure.
<b>Liability</b>	Providers of E911 services are NOT immunized from liability under state laws.	Not addressed.

<b>Future Actions</b>	Notice of Proposed Rulemaking (NPRM) was issued on topics such as: <ul style="list-style-type: none"> <li>• REQUIRING devices and providers to deliver location information by June 1, 2006.</li> <li>• Extending obligations to other VoIP providers.</li> <li>• Application of privacy and accessibility requirements.</li> </ul>	The CRTC Interconnection Steering Committee (CISC) will provide a report on operational challenges regarding deployment in 6 months for fixed/non-native VoIP services and in 12 months for nomadic VoIP services.
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**B. Law Enforcement Access**

As VoIP becomes more popular, so too does the level of law enforcement concern that modern communications technologies are advancing beyond their surveillance technologies. While the federal government is funding research to help advance its VoIP understanding and potential tracing abilities<sup>30</sup>, most focus by both industry and the government is centered around the Communications Assistance for Law Enforcement Act (CALEA). CALEA was enacted in 1994 to help ensure that law enforcement could conduct lawfully authorized electronic surveillance of telecommunications services such as local and long distance telephone service.

CALEA requires that telecommunications carriers ensure that their equipment, facilities, and services enable law enforcement to intercept call content, dialing, and signaling (“call flow”) information. A telecommunications carrier is responsible for decrypting communications if it provided the encryption and has the information to decrypt it. The FBI is responsible for implementing CALEA.

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<sup>30</sup> [http://news.com.com/Feds+fund+VoIP+tapping+research/2100-7348\\_3-5825932.html](http://news.com.com/Feds+fund+VoIP+tapping+research/2100-7348_3-5825932.html)

In August 2004, the FCC adopted a CALEA Notice of Proposed Rulemaking (NPRM) that tentatively concluded that CALEA applies to facilities-based providers of broadband access services and IP-based services.<sup>31</sup> These services include managed Voice-over-Internet-Protocol (VoIP) services, even if such services would otherwise be excluded because they are now classified as information services. In August 2005, the FCC issued a press release stating that facilities-based ISPs and interconnected VoIP providers would be required to comply with CALEA.<sup>32</sup>

The main concerns about law enforcement's push (and the FCC's willingness) to expand CALEA circulate around a small number of core issues: authority, scope, call-identifying information, trusted third parties, standards, compliance, and enforcement.<sup>33</sup>

Authority and Scope. Many VoIP providers question whether the FCC has the authority to expand the scope of CALEA to include VoIP, especially since CALEA was explicitly designed to apply only to telecommunications providers. Specifically, the definition of "telecommunications carrier" in CALEA excludes "persons or entities in so far as they are engaged in providing information services."<sup>34</sup> and Section 103(b)(2)(A) notes that CALEA's intercept capability requirements "do not apply to . . . information services."<sup>35</sup> VoIP has not been classified as a telecommunications service.

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<sup>31</sup> [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/FCC-04-187A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-187A1.pdf).

<sup>32</sup> [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-260434A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-260434A1.pdf).

<sup>33</sup> See [http://www.sia.org/fillings/CALEA-SIA%20Reply%20Comments%20\(12-21-04\).pdf](http://www.sia.org/fillings/CALEA-SIA%20Reply%20Comments%20(12-21-04).pdf), and <http://www.usispa.org/pdf/ISP%20CALEA%20Comments.pdf>.

<sup>34</sup> 47 U.S.C. § 1001(8)(C)(i).

<sup>35</sup> 47 U.S.C. § 1002(b)(2).

Call-identifying Information (CII) and Trusted Third Parties (TTPs). It is unclear thus far what packet-based call-identifying information law enforcement would need from VoIP providers. In addition, defining the CII that is reasonably available and thus needs to be given to law enforcement is another area that the FCC has yet to rule on. Such a ruling could significantly affect the operators' and law enforcement's cost to meet CALEA's requirements. The concern regarding TTPs is that in coordination with law enforcement, they could be given special status or bundle packet tracing/investigation services not required by CALEA with those that are required, thereby increasing the cost of CALEA compliance.

Standards. Most industry observers agree that industry-led standards efforts and organizations (e.g. CableLabs) are the most effective way to comply with CALEA. Law enforcement argues that industry-led efforts tend not to incorporate law enforcement's needs as completely as other standards bodies such as ANSI. Industry's counterargument is that ANSI has been co-opted by law enforcement and thus industry needs would not be adequately addressed in such forums. Per their position on call-identifying information, industry is also advocating that law enforcement articulate the deficiencies in the current standards instead of arguing for "any and all" packet information that could conceivably be obtained from a VoIP provider.

#### Compliance and Enforcement.

While the FCC and law enforcement are hinting that the FCC has the authority to enforce CALEA, the text of CALEA is explicit that the courts have that role. To that end, industry is also concerned about the time required to implement CALEA requirements into their network

architecture. Typical development times for new equipment can be 18-36 months, thus making any type of compliance deadline less than that period either infeasible or very expensive.

## **V. The Future of VoIP**

Some thoughts:

- The current pricing advantage enjoyed by for independent VoIP providers is not sustainable against the larger, cash-rich incumbent telephone and cable providers and thus consolidation in the VoIP industry is likely.
- VoIP will become an important, but inexpensive accessory within more robust audio/video media bundles. VoIP will remain a killer application, but given the 50%+ household broadband penetration rate in the US<sup>36</sup> and the increasing carrier push to increase broadband speeds and deploy video applications, it will not likely stand alone. Even with increasing focus on quality of service and encryption, VoIP will have a relatively light IP payload and will take up a relatively small percentage of a person's bitstream, thus leaving significant room for bandwidth-intensive services. Providers will not be able to sustain VoIP-only business models.
- Free peer-to-peer VoIP will continue to thrive, and will likely be bundled with messaging clients.

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<sup>36</sup> This is somewhat a disputed figure as how that percentage is calculated varies; it can be "connections" as Nielsen uses, "households", "users", "families", "dwelling units", etc. Nielsen announced it at 51% of connections in August 2004. See Nielsen, "U.S. BROADBAND CONNECTIONS REACH CRITICAL MASS, CROSSING 50 PERCENT MARK FOR WEB SURFERS, ACCORDING TO NIELSEN//NETRATINGS, August 18, 2004, available at [http://www.nielsen-netratings.com/pr/pr\\_040818.pdf](http://www.nielsen-netratings.com/pr/pr_040818.pdf). If you follow households and research such as LRG's, then the penetration rate is likely in the 40's: <http://www.leichtmanresearch.com/press/051005release.html>. Others like Park Associates, put the number in the 30's: <http://blogs.zdnet.com/ITFacts/index.php?id=P2912>. Most of the major cities are above 50%: <http://www.internetretailer.com/dailyNews.asp?id=12888>.

- Web and video conferencing incorporating VoIP will continue to grow, as will mobile device-based VoIP applications, esp. those using WiFi and WiMax networks.
- Municipal networks will serve as a growth catalyst for VoIP if the traditional telecommunications carriers continue to fail in their state-level efforts to prohibit these networks.
- VoIP providers will indeed have to meet the social obligations heretofore only met by traditional telecommunications providers. In many cases, their obligations will be greater than those imposed upon their circuit-switched ancestors.