

**BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554**

In the Matter of)
)
IP-Enabled Services; Implementation of Sections)
255 and 251(a)(2) of The Communications Act) WC Docket No. 04–36
of 1934, as Enacted by The Telecommunications)
Act of 1996: Access to Telecommunications) CG Docket No. 03–123
Service, Telecommunications Equipment and)
Customer Premises Equipment by Persons With) WT Docket No. 96–198
Disabilities; Telecommunications Relay Services)
and Speech-to-Speech Services for Individuals) CC Docket No. 92–105
With Hearing and Speech Disabilities; The Use of)
N11 Codes and Other Abbreviated Dialing Arrangements)

COMMENTS OF THE VOICE ON THE NET (VON) COALITION

Introduction

The Voice on the Net Coalition (“VON Coalition”), hereby submits these comments in response to the Commission’s request for comment in the above-captioned proceeding regarding the petitions filed by the VON Coalition, the United States Telecom Association (USTelecom), and Hamilton Telephone Company (Hamilton) seeking a stay or waiver of certain aspects of the Commission’s Voice Over Internet Protocol (VoIP) Telecommunications Relay Services (TRS) Order (VoIP TRS Order).

In general, the VON Coalition does not seek a further extension of time to meet the 711 dialing obligations beyond the 6-month extension already granted by the Commission. However, we highlight two key issues that, despite herculean efforts to date, are technically insurmountable

because they involve capabilities that are outside the control of Interconnected VoIP providers. They involve 1) TRS emergency dialing capabilities for calls that originate with a non-native telephone number, and 2) TTY capability when the user chooses a broadband connection with high latency or jitter.

Background:

Ensuring VoIP services are as accessible as is readily achievable is important to people with disabilities and to the VoIP industry. The VON Coalition commends the Commission for its recognition that VoIP technology has the potential to radically improve communications for the 54 million Americans with disabilities and for its efforts to bring the tremendous flexibility and benefits of Interconnected VoIP services to all Americans. As the Coalition described previously, VoIP providers have a strong history of being proactive with regard to disability access issues. They have sought to be leaders in addressing disability access issues as a forethought, and not an afterthought.¹ As a result, VoIP technologies are already enabling breakthrough advantages for people with disabilities – able to provide new benefits often not possible in today’s legacy phone network.

Since the Commission issued its order requiring VoIP providers to comply with Subpart F of the Commission’s Part 64 Rules, Interconnected VoIP providers have been committed to achieving the Commission’s goals, making implementation a paramount priority and achieving significant progress. . In some cases, obstacles that initially appeared to be onerous challenges were overcome as creative minds and committed innovators found ways to achieve solutions. In

¹ Motion for Stay or Waiver of the Voice on the Net (VON) Coalition at 6-7 (Sept. 14, 2007) (*VON Coalition Petition*).

other cases, unanticipated and unexpected issues (or in some cases issues that initially appeared simple to address), turned into formidable challenges.

The Commission's appreciation of the challenges and the resulting decision to waive for six months certain of the TRS requirements for VoIP and TRS providers has provided the industry a more accurate sense of the bounds of technical and operational feasibility.

I. Transmitting 711 Calls to the Appropriate Relay Provider.

The Commission waived for six months the requirement set forth in its VoIP TRS Order that interconnected VoIP providers must transmit 711 calls to an appropriate relay provider. A rush to implementation does not always serve the public interest and the VON Coalition commends the Commission for finding that sufficient time for "*Interconnected VoIP providers, states, and TRS providers to fully develop and test TRS and 711 abbreviated dialing services prior to introduction to the public, thereby facilitating a one-time change [thus] provid[ing] customers with complete and accurate dialing, and accommodating the Commission's stated goal of ensuring that these advanced communications systems are made available to and promote the safety and welfare of all Americans.*"² The 6 month waiver granted by the Commission appears to be sufficient to allow VoIP providers to fully develop, route and test 711 calling systems. The Coalition of Organizations for Accessible Technology (COAT) indicated that "a brief extension of time for each of these requests may be merited." In this case, the VON

² *Id.*

Coalition does not seek a further waiver of the 711 dialing obligations beyond the 6 months granted previously.

II. TRS Provider Transmission of Emergency Calls

One issue that neither the Commission nor the VON Coalition initially anticipated is the challenge to TRS providers in complying with TRS call handling requirements for VoIP originated emergency calls. Based on the evidence submitted by Hamilton regarding the technical and operational difficulties raised by 711-dialed emergency calls, the Commission waived “*for six months traditional TRS providers’ obligation to call to an appropriate PSAP when receiving, via interconnected VoIP service, a 711 call concerning an emergency.*” In temporarily waiving the TRS provider emergency calling obligations, the Commission stated that “*[w]e also expect that interconnected VoIP providers, relay service providers, and members of the industry and community work closely together to achieve a solution as expeditiously as possible that will enable emergency 711 calls placed through interconnected VoIP to be handled in accordance with our emergency call handling procedures.*” Given the Commission’s direction to work expeditiously with others stakeholders, immediately upon release of the Commission’s waiver order, the VON Coalition reached out to public safety and TRS providers in order to begin a dialogue to address these issues. In addition, the VON Coalition co-hosted a roundtable summit with the National Emergency Numbering Association (NENA), the Association of Public Safety Communications Officials (APCO), the National Association of State 9-1-1 Administrators (NASNA) and CTIA, the Wireless Association to address emerging emergency services issues. The summit included participation from nearly 100 public safety and 9-1-1 leaders from the field. At the VON Coalition’s urging, the summit included a focus on the

best way to advance TRS emergency access solutions. Summit participants acknowledged that no solution yet exists, and public safety participants took on the task of incorporating this issue into ongoing efforts and helping to coordinate the various parties needed to advance solutions.

Given the state of the technology utilized by most State TRS providers, which makes virtually impossible the automatic routing of emergency 711 calls from non-native phone numbers, the VON Coalition urges continued cooperation to find a technically and operationally feasible routing solution. In the Coalition's experience, such cooperative efforts, combined with the manual system for immediate routing of calls to the appropriate PSAP will ensure a rapid resolution of the issues in a manner that will benefit consumers. Moreover, in the interim, the VON Coalition agrees with the Commission that users should dial 911 and not 711 in an emergency and is proud to report that dialing 911 utilizing an Interconnected VoIP service is robust and dependable and can ensure that the caller receives the necessary emergency response.³

III. The Quality of the Underlying Network May Impact TTY Capability

The Wireless Communications Association (WCA) requested the Commission afford providers of wireless interconnected VoIP service a limited extension of one year for compliance with certain TRS obligations citing the relationship between the quality of the underlying broadband access service and the ability to enable TTY access. As WCA explains, "*[i]n an IP-based environment, the quality of an analog TTY signal is difficult to sustain due to the latency and packet loss inherent to packet-based broadband networks. Indeed, while an ordinary VoIP conversation might survive some packet loss and latency, this is not true of VoIP conversations*

³ See <http://www.fcc.gov/cgb/consumerfacts/711.html> stating that "In the event of an emergency, TTY users should call 911 directly, and not make a TRS call via 711."

*conducted via TTY devices – even small levels of latency and packet loss can create incoherent lettering at the “far end” TTY device and, therefore, garbled conversations.”*⁴ WCA raises the important issue of TTY capability over networks with high packet loss and latency. Network capabilities and the resulting packet loss and latency can vary significantly depending on provider, type of Internet access (DSL, cable, T1, wireless, satellite, etc), the amount of traffic on the network at any moment in time, and whether the broadband network utilizes available quality of service (QoS) technologies.

Much of the Internet’s traffic involves non-real time applications such as e-mail, web surfing, or file transfer. Such applications generally are not impacted by a momentary hiccup in the flow of data because the application retransmits the dropped packets. However, VoIP utilizes Real-time Transmission Protocol (“RTP”) which, as WCA points out, does not have a mechanism to recover lost packets or insert exceptionally late packets. Thus, VoIP services often require a stream of packets which must arrive with almost uniform spacing, very little delay and virtually no loss of the transmitted packets. Nonetheless for standard voice communication, the human brain does a wonderful job of piecing the information together even when dropped packets occur during a VoIP conversation often making packet latency imperceptible to the human ear. When utilizing an analog TTY system over a digital VoIP service, a significant amount of dropped packets or jitter can lead to a garbled message and the possibility of a garbled TTY digit.

While packet loss can be mitigated through network engineering and QoS solutions, the issue of packet loss as it related to TTY capability is not new. In the Commission’s 2000 Further

⁴ See Letter from Andrew Kreig, President, WCA, to Marlene H. Dortch, Secretary, Federal Communications Commission, WC Docket No. 04-36 *et al.*, at 2 (filed October 1, 2007).

Notice of Inquiry concerning access issues and VoIP, the VON Coalition provided information regarding industry efforts to ensure that legacy assistive devices, such as TTYs, remain functional in packet-based networks. As the record reflects, the quality of the TTY transmission is dependent primarily on the underlying network rather than the VoIP application or service. The VON Coalition is also not the only group to file comments with the Commission highlighting this technical limitation. For example, the Rehabilitation Engineering Research Center on Telecommunications Access has told the Commission that “*VoIP’s ability to handle TTY depends on network conditions (with heavy traffic more likely to result in garbling).*”⁵ The group further notes that “[e]ven low amounts of packet loss, under 2%, disproportionately garble TTY in comparison to voice,” and that “*that disruption of TTY transmission can occur at various points of transmission in such an IP system.*”

A variety of labs have also confirmed the impact of network limitations on TTY capability. For example, Miercom Communication, Inc. Lab Testing Summary Report, shows that over robust broadband networks, that 0% packet loss is achievable and TTY capability is workable.⁶ However over some slow speed networks, including some wireless networks, losing a 20ms VoIP packet within the 165ms TTY character would destroy that whole TTY character. Miercom’s test shows that using a G.711 codec over a network with certain QoS can lead to acceptable TTY performance – but bursty networks (burst packet loss of 1%) could make TTY use unacceptable.⁷ Other reports indicate that well engineered broadband networks can support

⁵ http://trace.wisc.edu/docs/2005-FCC-04-36/Docket_04-36_VoIP_9-1-1.pdf

⁶ <http://ftp.tiaonline.org/tr-30/tr30MAIN/Public/2002%20Contributions/00212029.pdf>

⁷ *Id.*

TTY over VoIP, while networks with more than 0.12 percent packet loss can result in greater than one percent Total Character Error Rate (TCER), which will make the network unusable for TTY devices.⁸ For many VoIP users who have chosen capable broadband networks, TTY capability should not be a problem because the network can deliver packet loss rates lower than .12%.

Despite nearly a decade of progress and improvements in broadband networks, we agree with WCA, the Rehabilitation Engineering Research Center on Telecommunications, and other laboratory analyses that a limited subset of broadband networks – those that have high latency, packet loss, or that are bursty -- are constrained in their ability to support TTY access over VoIP.

This is an especially important issue for “over the top” VoIP providers, including those providers offering services over a wireless network, who do not dictate the type of broadband service a user chooses and have no ability to control the quality of the underlying broadband connection. As the Commission has previously found, “*an over-the-top VoIP provider’s ability to assure a particular quality of service could vary depending upon whether it has its own IP switches and long-haul fiber (or a virtual private network (VPN)), or whether it relies on the public Internet to carry subscribers’ communications.*”⁹ The ability to use a nomadic Interconnected VoIP service over any network from any location is a major advantage in many circumstances.¹⁰ It means, however, that an over-the-top VoIP provider has no independent

⁸ “Fact Or Fiction - TTY Works Over Voice Over IP” <http://www.csun.edu/cod/conf/2004/proceedings/265.htm>

⁹ Verizon Communications Inc. and MCI, Inc. Applications for Approval of Transfer of Control, Memorandum Opinion and Order, WC Docket No. 05-75 (Oct. 31, 2005).

¹⁰ For example disconnecting voice from the underlying network, allows people to communicate in geographically dispersed locations, provides new mobility, and has unique benefit in an emergency if one network goes down but another network still works. It also allows users to choose their underlying broadband provider independently from their VoIP service.

ability to guarantee the quality of the broadband connection and can provide no assurances that the underlying broadband provider's network will have sufficient quality of service to control packet loss and latency rates to ensure TTY capability. This inability to affect the underlying quality of service is very different from traditional wireline service, for which the Section 255 rules were originally intended, where the carrier owns, controls, and manages its phone network, and barring a catastrophic event, is responsible for ensuring consistent quality of service.

In the vast majority of cases, we expect a high-speed, low-latency broadband connection will suffice to limit TTY access problems and ensure their availability over Interconnected VoIP services.¹¹ Further, as broadband connection speeds continue to increase and quality continues to advance, TTY quality problems will be mitigated.. We, therefore, support WCA's request for additional time to meet the service quality standards for TTY provision.

Moreover, if the Commission grants an additional waiver as requested by WCA, people with disabilities who utilize broadband connections with high packet loss and latency would not be hindered substantially in their ability to utilize text based services to communicate with other TTY users. This very limited number of broadband enabled users,¹² nonetheless have free access to a Department of Education funded¹³ text over IP (ToIP) tool¹⁴ that is being "designed as a

¹¹ As Cisco's whitepaper, "*TTY & TTD Over VoIP: Dispelling the "Packet Loss" Myth*," points out, "packet loss is not a problem in properly engineered and implemented IP networks"
http://www.cisco.com/web/about/responsibility/accessibility/downloads/wvl/regaffairs/pdf/Dispelling_the_Packet_Loss_Myth.pdf

¹² By definition, Interconnected VoIP services utilize a broadband connection, and therefore people with disabilities utilizing an Interconnected VoIP service can also most likely utilize broadband.

¹³ Development was funded by the National Institute on Disability and Rehabilitation Research and the U.S. Department of Education under grant # H133E040013

replacement for TTY/TDDs when using IP-based networks.”¹⁵ While we recognize that some users may still prefer hardware based analog TTY devices, the availability of multiple tools can help provide an alternative means of communicating with other TTY users over their broadband connection.

Conclusion

For these reasons, the VON Coalition requests a limited waiver of the State TRS provider obligation to immediately and automatically route emergency 711 calls to the appropriate PSAP as required by section 64.604(a)(4) as well as a limited waiver of the TRS requirements set forth in Part 64, Subpart F of the Commission’s Rules (excluding 47 C.F.R. § 64.604(5)(iii)) as requested by WCA.

Respectfully submitted,
THE VON COALITION

By: /s/ Staci L. Pies
Staci L. Pies
President

¹⁴ For example the free open–source SIPcon is a standards-compliant soft phone using text over IP with accessibility features. It is available for free download at: <http://sourceforge.net/projects/tipcon1/> Some ToIP-TTY Gateways have also been developed e.g. by Omnitor, AnnieS and RNID that also support ToIP.

¹⁵ Defined by the IETF in RFC 4103 <http://en.wikipedia.org/wiki/Text-over-ip>