BEFORE THE

Federal Communications Commission

WASHINGTON, D.C.

In the matter of	)	WC Docket No. 07-52
Broadband Industry Practices	)	

**COMMENTS OF LAURENCE BRETT ("BRETT") GLASS,
d/b/a LARIAT, A WIRELESS INTERNET SERVICE
PROVIDER SERVING ALBANY COUNTY, WYOMING**

Laurence Brett ("Brett") Glass, a sole proprietor doing business as LARIAT, a wireless Internet

service provider in Albany County, Wyoming, responds to the Public Notices issued by the FCC's

Wireline Competition Bureau on January 13, 2008[1] with the following comments. He further prays for

dismissal of the Petition for Declaratory Ruling and Petition for Rulemaking filed by Free Press et al and

Vuze, Inc., respectively.[2] This document, which contains corrections of minor typographical and

grammatical errors, supercedes and replaces an earlier comment also submitted on February 13, 2008.

1. INTRODUCTION AND SUMMARY

LARIAT was among the first, if it was not the very first, of the approximately 8000 wireless

Internet service providers (WISPs) now doing business within the continental United States. With more

---

[1] *See* Public Notice, Wireline Competition Bureau, FCC, *Comments Sought on Petition for Declaratory Ruling Regarding Internet Management Policies*, DA 08-91, WC Docket No. 07-52 (Jan. 14, 2007) (*"Declaratory Ruling Public Notice"*); Public Notice, Wireline Competition Bureau, FCC, *Comments Sought on Petition for Rulemaking To Establish Rules Governing Network Management Practices by Broadband Network Operators*, DA 08-92, WC Docket No. 07-52 (Jan. 14, 2007) ("*Rulemaking Public Notice*").

[2] *In re Petition of Free Press et al. for Declaratory Ruling That Degrading an Internet Application Violates the FCC's Internet Policy Statement and Does Not Meet an Exception for "Reasonable Network Management"*, WC Docket No. 07-52 (Nov. 1, 2007) ("Free Press Petition"); *In re Vuze, Inc. Petition To Establish Rules Governing Network Management Practices by Broadband Network Operators*, WC Docket No. 07-52 (Nov. 14, 2007) ("Vuze Petition").

than 15 years of experience and an Electrical Engineer (MSEE Stanford 1985) at the helm, LARIAT provides high quality broadband Internet to a large and growing service area, less than 5% of which has access to "wired" broadband options (e.g. DSL or cable modem service). It also competes gamely with much larger providers – including Bresnan Communications and Qwest – in the few more densely populated areas of Albany County where these services are deployed.

While LARIAT has been severely disadvantaged by current spectrum allocation policies, which make it impossible for any small ISP to obtain licensed radio spectrum at a reasonable cost, it has nonetheless been able to employ careful engineering and unlicensed (Part 15) spectrum to provide service to areas which other providers cannot reliably reach. It likewise employs sophisticated technological solutions – including P2P mitigation, traffic prioritization, and caching – to provide customers with fast, economical service despite the extremely high cost of Internet backbone bandwidth in Albany County, where wholesale monthly charges range from $100 per megabit per second (Mbps) to several hundred dollars per Mbps.

Petitioners, as well as commenters who advocate an overly expansive definition of "network neutrality," are in essence asking the FCC to ban these technologies. However, these technologies constitute reasonable network management and are vital to keeping networks running smoothly – often in the face of attempts, by computer hardware and software, to monopolize and/or abuse them.

Should the FCC mandate that small, independent, and/or rural ISPs cease to employ these and similar technological measures to ensure the quality of their service, many or most small, local operators would have to raise prices dramatically or quit business.

47 USC § 230(b) states that it is the policy of the United States to "promote the development of the Internet and other interactive computer services and other interactive media" – and also "to preserve the vibrant and competitive free market that presently exists for the Internet and other interactive computer services, unfettered by Federal or State regulation." Regulation and micromanagement of Internet service providers would be contrary to this policy and would hinder innovation and broadband deployment.

2. **DISCUSSION**

Both the Vuze Petition and the Free Press Petition ask the FCC to prohibit network management practices such as the prioritization of certain forms of traffic and restrictions on the use of so-called peer-to-peer (P2P) protocols – including, but not limited to, BitTorrent. This discussion will explain why prohibitions on reasonable network management could hobble or preclude the deployment of many useful Internet applications, such as VoIP. It will also explain the economic motivations of Vuze and similar companies who may petition the Commission to force ISPs to allow unfettered use of P2P.

To understand why reasonable network management practices must include prioritzation of network traffic, it is necessary to understand the constraints under which key services such as VoIP (Voice over Internet Protocol), or Internet telephony, work. Audio – in particular, the voices and other sounds transmitted by a telephone – consists of a continuous stream of information which must be precisely synchronized in time. Therefore, to operate properly, VoIP hardware and software must attempt to make the Internet – which offers only "best effort" delivery of data packets and no guarantee of how long they will take to reach their destinations – into a medium with *isochronous* delivery – that is, in which packets are delivered reliably and at very regular intervals. To do this, the CODEC ("coder/decoder") inside a VoIP phone or program plays all manner of tricks to stretch, squeeze, and buffer data so as to mask variations in delivery time (often called "jitter"). It also transmits redundant information to help mask both jitter and lost packets. Nonetheless, there's only so much it can do. If the delay (latency) increases to as little as a tenth of a second, or the jitter is even as much as tens of milliseconds (less than an eyeblink), or even 1% of the data packets are lost due to congestion, the sound will become "choppy" and the connection will become unusable. For this reason, LARIAT has devoted extensive effort to prioritizing VoIP data streams – both on our wireless networks and on our wired connections – so that customers receive satisfactory VoIP service.

We likewise prioritize interactive activities such as Web browsing, in which a human being's productivity would be markedly affected by long delays, over and above non-interactive activities such as file downloads, which are less time-critical.

Like most ISPs (including Comcast), we also prohibit residential users from operating network servers – including repositories that distribute files within (usually illegal) file "sharing" networks. We do this because such activities consume large amounts of expensive network resources. Prohibiting these activities allows us to maintain a razor thin profit margin – often as little as $5 per customer per month – while providing the most economical and competitive service possible.

Absent such constraints, LARIAT could not continue in business unless it raised prices for flat rate broadband service by at least 50% – or, in the alternative, began charging users by data volume rather than charging a flat rate. Either of these practices would be unpalatable to consumers and would raise many of their bills – potentially causing customers to depart. And if those prices caused the market for LARIAT's services to shrink sufficiently, it could well force us to shutter our business.

Another key reason why it is fair and reasonable – and in fact necessary – for ISPs to be able to throttle or block P2P activities is that many for-profit entities, including Petitioner Vuze, Inc., are openly using P2P protocols not to provide better service but to shift costs from themselves to ISPs without the ISPs' consent. In its petition, Vuze, Inc. states:

> "Torrent technologies make use of resources — bandwidth, storage, and processing power — on a decentralized basis, allowing large data transfers to be made more efficiently and cost-effectively than ever before. Torrent technologies leverage the power of many individual computers by enabling each computer interested in a piece of content to obtain small pieces of it from multiple other computers, and simultaneously play the same role to others who seek the same content in the future.

> "Accordingly, a distributor of content need not have many large central servers to store and send a file each time an Internet user is interested in a particular piece of content; instead, the content distributor need only have a handful of servers that operate as initial "seed servers" for the content, and can then rely on the distributed computing capacity of all of the individual user

computers (the "swarm") that have that have agreed to be used as a "seed" for others."[3]

Vuze thus admits that it saves money – thousands and perhaps millions of dollars – by not "paying its freight" – that is, by not buying all of the bandwidth that is required to transmit its products to all of its users. Where, then, does the bandwidth come from? The answer is that it comes from the users' ISPs, who are not compensated when Vuze's BitTorrent software takes control of users' machines and uses them as distribution points for Vuze's for-profit content. Vuze is, in effect, establishing servers on the ISPs' networks without their permission and without compensating them for the bandwidth and other resources that are consumed by those servers. What's more, because placing the server software on users' machines is a precondition for receiving desired content, Vuze and other content providers which use P2P protocols are inducing residential users to breach their contracts with their ISPs, which virtually always include provisions prohibiting the operation of servers.[4]

What Vuze and other P2P-based content providers are doing, in shifting costs to ISPs via their "flat rate" users, is akin to what would happen if a third party were to encourage customers to smuggle food out of an "all you can eat" buffet. The owner of such a buffet sets the price of a meal based on reasonable expectations about the amount one person can eat. However, if customers smuggle food out of the buffet to feed third parties, they can easily cost the buffet owner many times the amount that was paid for their meals. The buffet owner has every right to prohibit this behavior and to stop customers from engaging in it. Likewise, an ISP is fully within it rights to enforce terms of service which prohibit the use of "flat rate" residential connections to host P2P servers for third parties.

In its petition, Vuze, Inc. also misrepresents the characteristics of the BitTorrent protocol. It

---

[3] *Ibid.*

[4] To our knowledge, no lawsuit has yet been brought against a content provider such as Vuze alleging tortious interference with contract. However, because these providers are arguably inducing users to violate their ISPs' terms and conditions of service, such suits could be a possibility should P2P continue to sap ISPs' resources.

writes:

> "For both downloading and uploading content, torrent technology uses fewer resources than traditional non-P2P protocols such as HTTP because distributed computing permits uploads and downloads to be resumed mid-way rather than restarted, and transmission errors can easily be fixed without resending an entire file."

This statement is misleading for three reasons. Firstly, interrupted HTTP downloads are a relatively rare event and would have a statistically insignificant impact on bandwidth consumption even if they had to be started again from scratch. Secondly, contrary to what Vuze claims, both HTTP and FTP downloads are capable of being restarted in the middle without requiring the entire file to be retransmitted, and both use TCP – a protocol which corrects errors. Finally, because copies of files downloaded via BitTorrent cannot be saved by the ISP's Web cache, as HTTP and FTP downloads can be, there is no way for the ISP's Web cache to keep a copy of a file on hand locally, completely eliminating additional bandwidth costs when another user requests the same file.

Furthermore, it takes only the most rudimentary arithmetic to demonstrate is that BitTorrent simply cannot be more efficient than HTTP or FTP. It is sometimes faster, but to attain this extra speed it consumes far more resources than a simple file transfer because more connections are being created and terminated and more data packets are being sent and received. (The overhead of communicating with the central server that's in charge of the file being downloaded – called the "tracker" – is completely absent in HTTP and FTP downloads, as are the many "handshakes" used to establish connections with peers.) And because the BitTorrent protocol requires nodes to transmit as much data as they receive (except during the initial stages of distribution of a file), BitTorrent can easily double the use of the ISP's backbone resources during the download, and then will continue to use yet more resources as the machine remains online acting solely as a server. The impact on ISPs is thus substantial, and they are well within their rights to prohibit and to stop this unauthorized use of their networks.

There have been many claims – in the press and in many comments filed in the present docket – that some measures used by ISPs to mitigate the impact of P2P protocols constitute "forgery." These comments refer to the generation of RST ("reset") packets – commands which the TCP/IP protocol uses to terminate connections. While the packets do bear the IP addresses of the computers which are parties to the connection, they do so not because those parties are being impersonated but because those addresses are necessary information; they are required by the protocol to identify the connection which is to be closed. Internet routers routinely generate such packets to quell traffic when a host has departed a network – for example, when a dialup Internet user has disconnected.

3. SUMMARY AND CONCLUSION

Internet service providers have a difficult row to hoe – selling a commodity product, with extremely narrow margins, in a very competitive and often anti-competitive business environment. At the same time, they must keep users satisfied – offering conveniences such as flat rate service and providing the fastest browsing and the best VoIP performance possible. To prevent them from innovating by micromanaging their businesses, and/or regulating the technologies they use, would be not only counterproductive but contrary to the national policy set into statute by Congress. I and my company therefore respectfully request that the Free Press and Vuze petitions be denied with prejudice, and that the FCC instead focus on prohibiting only those business practices which are blatantly anti-competitive – such as wholesale/retail price inversion (in which wholesale services are priced above retail) and the blocking or hindrance of competitive content and services by providers (e.g. cable companies and telephone companies) which offer similar products.

Respectfully submitted,

Laurence Brett ("Brett") Glass, d/b/a LARIAT
PO Box 383
Laramie, WY 82073-0383