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Testimony from the Federal Communications Commission Hearing on February 25, 2008

Harvard Law School, Ames Courtroom, Austin Hall, 1515 Massachusetts Avenue,  
Cambridge, MA 02138

Dear FCC,

I'd like to thank the commission for your time today and for the opportunity to speak to you this afternoon. Thank you also for your continued leadership as we address this important issue facing the public.

I would like to begin with a question: Why does BitTorrent exist? What purpose does the technology serve?

If I were to rely only on the recent FCC filings by the operators in this matter, I might come away with the impression that the BitTorrent technology only exists to relentlessly fill networks and consume bandwidth.

Rather, the reality is that BitTorrent was invented to solve an emerging problem plaguing the Internet back in 2001—the problem of moving very large files around among an audience as efficiently as possible. Since then, online media consumption, which at its core consists of moving large files, has exploded in recent years. As a result, BitTorrent has become the consumer standard for large-file distribution around the world due to its inherent efficiency.

## Who relies on BitTorrent? Whose interests does it serve?

Many artists, along with non-profit and budget-conscious organizations, depend a great deal on peer-to-peer (P2P) file delivery, specifically BitTorrent, to reduce the costs of publication on the Internet. BitTorrent technology is being utilized by independent software developers (e.g., Linux), entities such as NASA and PBS, and countless filmmakers and musicians to distribute large, high-quality files faster and more efficiently over the Internet. To block BitTorrent traffic will cripple the basic Internet experience for students, innovators, consumers, artists and organizations that need it the most.

What's more, major Hollywood studios such as our content partners 20th Century Fox, MTV Networks, Paramount Pictures, MGM and Warner Bros. have made their content available legally via BitTorrent. BitTorrent, Inc.'s commercial services also help companies such as Faith by Hearing (a distributor of audio Bibles), as well as fuel some of the largest online social networks and direct-to-consumer video properties on the Internet today.

Within the larger ecosystem, there are hundreds of companies that rely on BitTorrent technology as a foundation to their businesses. Examples of such companies include Vuze (who testified today) and emerging companies like Pando, which enables consumers to distribute large email attachments including photographs and home movies to friends and family. It should also be noted that there exist myriad other companies that rely on P2P technology similar to BitTorrent such as eBay's Skype, Joost and Vudu.

Furthermore, BitTorrent and related P2P technologies have been, and continue to be, among the most heavily researched topics in the networking and computer science fields. As this new crop of Ph.D.s enters the workforce, we can expect further innovation as they ponder the problems facing us in the years ahead.

What is “reasonable” when it comes to network management?

While I’ll reserve the most detailed material on this matter for the question and answer session to follow, it is critical to underscore that there are many network management techniques in use today that do not discriminate on the basis of a particular application. For instance, there are technologies available that would allow applications like BitTorrent to back off in the event of congestion. Our content delivery service, BitTorrent DNA, includes enhancements to mitigate the impact of peer networking and keeps traffic local and non-congestive. The existence of such solutions demonstrates exactly how Comcast's drastic solution is a huge overstep.

As such, it is important that we define “reasonable” first and foremost as “non-discriminatory” to any application or user. Each customer deserves his/her fair share of the capacity that he or she has been sold, and it should be up to the user (not the network) to determine which applications are important and of priority to him or her. In fact, BitTorrent would be happy to engage with Comcast to help identify a reasonable solution.

So what will happen if Comcast is victorious in blocking this class of application under the mantle of “reasonable” network management?

For starters, this action would stamp out in its infancy the most promising technology to deliver a world of near-infinite consumer choice in media; the ultimate al la carte service well beyond the thousand-channel universe we strive for today.

But just for a moment, let us consider an alternative scenario where the current demand for online media remains constant, but in the absence of P2P, now has to be fulfilled utilizing the technologies of yesteryear such as HTTP and the traditional client-server model. To quantify the task at hand, let’s first examine some estimates of total P2P traffic being delivered on the Internet today. One recent estimate comes from a Cisco

Systems report entitled the “Exabyte Era” that suggests P2P data transfers totaled one Exabyte (EB) every month in 2007.

One Exabyte per month. That statistic warrants some context. How big is an Exabyte anyway? Well, if I wanted to consume an Exabyte of online television, encoded at a modest 1Mbps, how long do you think I will be in front of my television before I’ve reached that mark? Turns out, I’ll be there a while. If I watch non-stop, 24 hours a day, 7 days a week, 365 days a year, I will be sitting there for a modest 292,000 years. Perhaps by that time, Comcast will have invested in upgrading my connection.

Now using the client server model (e.g., HTTP) to deliver that Exabyte of traffic, content owners would have to deploy and power close to 100,000 servers and keep them running 24/7. By the way, even in this scenario, Comcast would still have to invest in the network to fulfill the exact same consumer demand for online media. Clearly, the costs associated with this model are such that ONLY the richest media companies, organizations (or Comcast) could afford to deliver rich media online.

So while we made an assumption in this scenario that consumer demand would remain the same, the reality is that blocking and reducing P2P content delivery will result in far less consumer choice for online media. Many small players and emerging business models would be locked out of the market costing us countless jobs and opportunities as we cede innovation to countries with the necessary infrastructure to survive in the information age.

Which brings me to my final point: How will unreasonable network management and the policy decisions we make impact the greater information economy?

In the information age, broadband connectivity is the oxygen that breathes life into the economy, creates jobs and drives innovation. Nonetheless, this is only true if we keep the promise of open, unfettered and neutral connectivity to all applications—past, present and future.

Geo-politically, the United States may be a superpower, but when measured against the world by network capability, we are a third-world country. In 1998 when, somewhat ironically, I was building network management systems for @Home Network, the same network Comcast later took over and operates today, DOCSIS 1.0 was a new standard that offered a neighborhood of 500 households or so the opportunity to share a 5Mbps upstream channel. Ten years later, the dominant technology used by most cable operators is DOCSIS 1.1, which offers that same neighborhood a mere 10Mbps. Ten years is an eternity in Internet time, and these networks have made very little progress. Meanwhile, a single subscriber in Japan is offered a dedicated symmetric 100Mbps connection, broadband connectivity TEN times faster than the network shared by 500 Americans. Which economy do you think will be more productive in the information age?

No doubt, Asia has long ago overtaken us. It's no surprise we now see its emerging status as home to innovation and knowledge hubs, far beyond just being a region for manufacturing centers.

With that in mind, our actions to date in this regard are not working.

Aside from the network management techniques in question (which transcend any definition of "reasonable" and should cease immediately), the larger problem here, as Asia has shown us, is not a technical problem. It is a business problem, a competitive market problem and a policy problem. Who will be charged with protecting the public interest and the overall economy in this information age? Whatever the answer, it is clear that the policies we have relied on in the past are not working in the interests of our nation.

Thank you,  
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