BitTorrent: The Internet's 800-Pound Bandwidth Gorilla

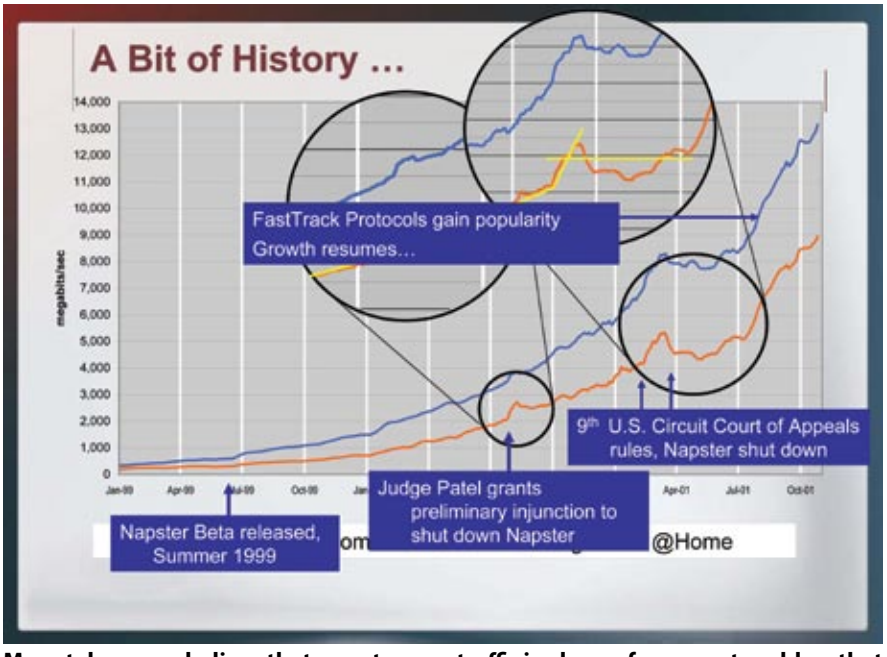
Eric Klinker, Chief Technology Officer of BitTorrent, emphasized the changing shape of Internet traffic – half of which is now peer-to-peer. Discussions with many in the audience before his keynote suggested that most believed peer-to-peer is being primarily being used for illegal music and video downloads – traffic that would dry up if strong digital rights management took hold, leaving network operators with overcapacity.

But Klinker said the traffic would always be there, and would continue to grow. "We have over 55 major studios under license – over 10,000 titles, movies, games, music," he said.

History bears him out. "Napster went beta in the summer of 1999. When the preliminary injunction to shut down happened, usage exploded as people tried to get as much as they could. When it did shut down a year later, the Internet stops growing for four months. But innovation resumes, FastTrack peer-to-peer protocols [used by Kazaa and others] come on line in 2001, and growth continues at the same rate as before."

"P2P is a technology, a means to an end, separate from the use," he said. "BitTorrent is a protocol, one that allows it to be applied to many applications. A replacement for "client-server" architectures of the 1990s, its roots go back to origins of the Internet, which was a peer-to-peer system when it was designed. Each user's server had equal status. DNS and Usenet are P2P protocols. The name servers in DNS act as clients and as servers."

Eric Klinker, CTO of BitTorrent.



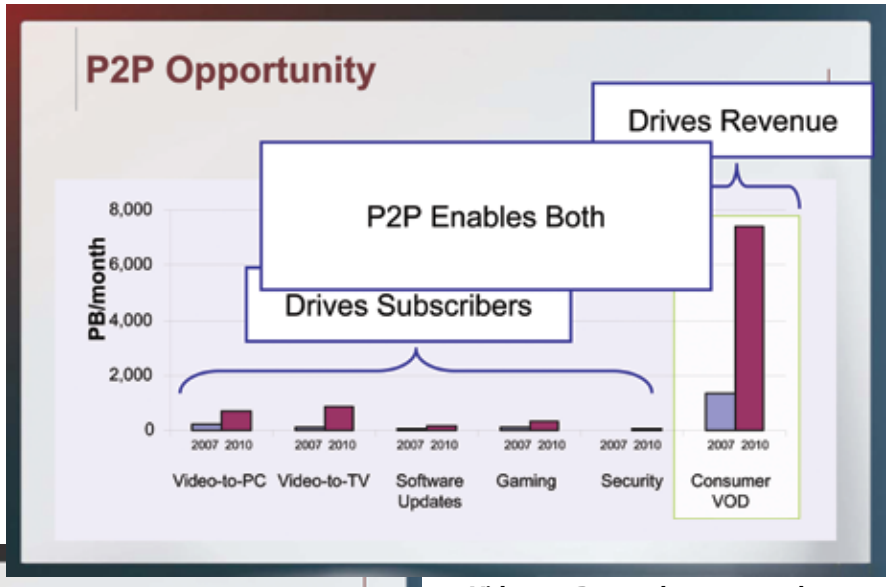
Many telco execs believe that peer-to-peer traffic is a law enforcement problem that would go away if we had stronger copyright laws; this would make network investment risky. But BitTorrent data on P2P upload (blue) and download (orange) traffic shows inexorable growth, despite legal issues. Most P2P traffic appears legal.

BitTorrent alone accounts for a third of all Internet traffic, Klinker said, some ten times as much as YouTube worldwide. "Major trends favor P2P and video growth – HDTV, timeshifting, placeshifting, connected living rooms, social networking, community," as well as Web 2.0 and IPv6, which permits new programming tools and allow an almost unlimited number of devices to be connected to the Internet, each with its own unique address.

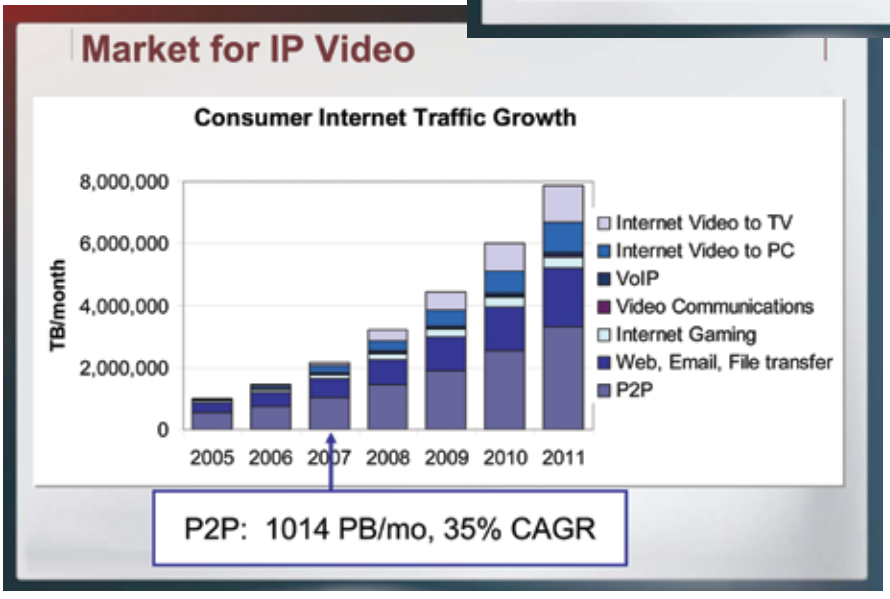
What does it all add up to? Klinker quotes Cisco to help us visualize. One exabyte is 1 trillion megabytes. It would take a bandwidth of 3507 Gbps to deliver an exabyte in one month. That would be:

- 3,507,000 months (292,000 years) of standard-definition TV at 1 Mbps

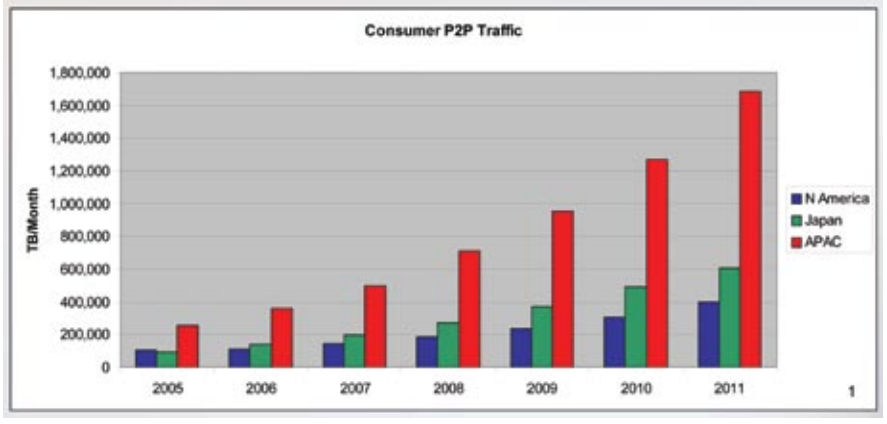
Klinker: "The Web of the 1990s was asymmetric: servers dumbly giving content. But the symmetric nature of the Asian networks is fundamental to why they are successful"



Video on Demand generates the most direct revenue, but BitTorrent warns that other services help bring customers in the first place, cutting churn and marketing costs.



Cisco data and predictions for Internet traffic. Although the looming demands for HD video get our attention, peer-to-peer traffic is larger (more than 1,000 petabytes for 2007) and growing faster (35 percent per year).



With only 127 million people, Japan has 33 percent more peer-to-peer traffic than all of North America today. The Asia-Pacific total is even higher, of course, due to traffic generated by Korea – a nation of only 46 million. Data are in terabytes per month.

- 64,944 months of Blu-Ray DVD at 54 Mbps
- 351 months for all online radio traffic in 2007
- 10 months of YouTube traffic
- 1 month of BitTorrent

(Note: YouTube accounts 3 percent of worldwide Internet as a whole – it is used mainly in the US – while BitTorrent accounts for 35 percent.)

And the future? BitTorrent is intelligent at the edge, simple at the network core. It has no way to index or search, and no anonymity. The BitTorrent software developers' kit (SDK) can be used to embed the protocol into devices other than computers. There's also a BitTorrent DNA service, which helps manage worldwide traffic flows by forward-storing data, as Akamai does.

And, Klinker says, "Web 2.0 software gets better as more people use it." Users contribute to applications as content in blogs, wikis, social networks, user-generated video, open source software, widgets, and the P2P content-delivery infrastructure itself.

"The Web of the 1990s was asymmetric: servers dumbly giving content. But the symmetric nature of the Asian networks is fundamental to why they are successful," he said.