



# The Coming Exaflood

By Marty Lafferty

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Investments in broadband infrastructure during the 1990s gave Internet users more capacity than they needed. But advances in rich media content delivery, particularly via peer-to-peer (P2P) technologies, along with the advent of social networks as well as user-generated content (UGC), are now challenging that status quo, and creating new levels of demand. New investments and continued innovation are both necessary to fulfill the Internet's expanded potential. And it is especially important that public policy supports these needs.

The term "exaflood," coined by the telecommunications industry's Fiber-To-The-Home (FTTH) Council, refers to the torrent of data the Internet will have to handle in the very near future as measured in "exabytes." An exabyte is one thousand petabytes – or one billion gigabytes of data. Last year, for example, American users created approximately 161 exabytes of digital information.

But by 2010, US Internet users are projected to produce and consume as much as 988 exabytes of data. When that level is achieved, it is very likely that innovative peer-to-peer (P2P) applications, including some of the most promising new P2PTV services now in beta tests and market trials, as well as P2P videogames and even more advanced interactive service offerings, will represent a significant contributing factor; in part because of their expected high popularity, and in part because interactive video is far more bandwidth-intensive than other digital content.

Currently, downloading a single half-hour television show consumes more Internet bandwidth than receiving 200 e-mails a day for a full year, and downloading a single high-definition movie consumes as much bandwidth as 35,000 web-pages.

P2P significantly alleviates the cost and bandwidth burden of less efficient traditional client-server distribution technologies, such as those employed by iTunes and YouTube, and this will greatly help expand the utility of existing Internet capacity.

In addition, advanced distributed computing technologies – which include P2P, peer-assisted, and hybrid P2P content acceleration, caching, compression, streaming, and swarming – will further enhance the productivity of today's software and available bandwidth. But even with these improvements, projected user demand will pose real challenges.

Consider this: the Library of Congress holds more than 29 million books and magazines, 2.7 million recordings, 12 million photographs, 4.8 million maps, and 57 million manuscripts. It took America two centuries to accumulate that collection. Today, Americans churn out an equivalent amount of digital information every 15 minutes, or about 100 times a day. Just last year, US Internet users created and copied *three million times* the amount of information contained in all the books ever written.

The good news is that with investment, innovation, and supportive public policy, the technology sector, ranging from the large well-established telecommunications industry to our much smaller but steadily-growing distributed computing industry, will be able to upgrade broadband networks and improve the efficiency of content distribution technologies to meet the challenge of the coming "exaflood." This, in turn,

will ensure that all users will be able to enjoy the promising new services that the Internet will offer.

Backbone providers are currently investing billions to upgrade the Internet's infrastructure from OC48 to OC192, and are already planning for OC768, which will provide ever higher capacity levels. Local Internet access providers are also investing tens of billions to upgrade the final link to end-users, enabling upgrades to 100 megabit service – fifty times faster than current broadband – and are even planning for 1 gigabit service in the foreseeable future.

DCIA Member companies, and other participants in the distributed computing industry, are doing their parts as well, with innovative new applications and related technologies that optimize the use of bandwidth, storage, and processing power for the benefit of all users in the series of discrete user-networks, from the smallest LANs to the largest and most popular open protocols, that increasingly make-up the Internet.

We respectfully urge lawmakers and other formulators of public policy to support both the telecommunications and distributed computing industries in these important endeavors. And we encourage our readers to support their elected officials and other governmental authorities along these lines. Share wisely, and take care.

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