

Bandwidth: How much is enough?

By Jonathan Hurd
June 2008

Verizon's June announcement that it will expand availability of its 50 megabit per second (Mbps) FiOS broadband service has prompted some to ask, "How much bandwidth could a household need?" To estimate the demand, various analysts have attempted to calculate a household's future maximum peak bandwidth requirements, using an approach like this (e.g., for an IPTV triple play provider):

- **Video:** Each of 3 TVs is consuming a live high definition (HD) video stream, while 2 DVRs are recording 2 additional HD streams, with each stream at roughly 8 Mbps.
- **Broadband:** Meanwhile, the household is surfing the web—let's allocate 10Mbps downstream and 10Mbps upstream.
- **Voice:** IP voice is negligible (perhaps depressing for *Telephony* readers, but true in this rough analysis).

So, with five 8 Mbps HD streams, plus Internet surfing and voice, the analyst would estimate 50 Mbps downstream and 10 Mbps upstream. How much more could a household ever need?

The answer is *much* more, when downloading files to a portable media player is considered. Let's say you want to load your portable media player with a few HD movies (even handheld screens will look much better with HD) to watch in your car, on a friend's TV, at the beach, etc. How long are you willing to wait to download an HD movie to your portable player? 30 seconds? 5 minutes? 2 hours?

Putting aside the costs required to supply bandwidth and the prices consumers are willing to pay, I'll make the assumption that—over time—*consumers' desired time to download media is proportional to their cost to store it.* ("I've got space in my portable player—I want to fill it up.") Let's see how this plays out:

- In 2000, an affluent household with bandwidth of about 1 Mbps, could download an 8-song MP3 album (25 megabytes) in about 2 minutes, to a hard disk costing about \$10 per gigabyte.
- Today, storage costs 25 cents per gigabyte (40 times less than in 2000), so it's not surprising that download speeds of 40 Mbps are already desired by affluent households.
- By 2015, storage will cost a penny per gigabyte. (It's hard to believe, but a \$100 computer-based hard disk will hold 10 terabytes, enough for more than 3 million MP3s or 400 Blu-Ray disc-quality movies.) A 25 *gigabyte* movie will cost the same to store on a hard disk as a 25 *megabyte* 8-song album did in 2000.

By 2015, you'd want to be able to download that 25 gigabyte movie in about 2 minutes, implying bandwidth of 1 Gbps. Add live HD video streams and uploads, and the desired household bandwidth is even higher.

But even that's not the limit. As I indicated in a January *Telephony* article, there is virtually no end in sight to the video quality consumers will demand—or to the size of the video files they will want to download.

Is there an actual upper limit on desired bandwidth? Not as long as storage keeps getting cheaper, media files keep getting bigger, and consumers keep downloading.

Jonathan Hurd, Director, can be reached at jhurd@altvil.com.