Reality-checking the need for speed

The real-life performance gains due to incremental upticks in optical-drive read-and-write specifications, such as from 48 to 52× transfer rates for CDs, are negligible to nonexistent. What about more substantial performance boosts, however? Sony touts the 4× DVD+RW write speed of its DRU-510A; most other drives compatible with the DVD+RW format write at 2.4× or lower speeds. Similarly, Plextor points out that its Writer Premium burns CD-RW media at 32× speeds versus 24× for the competition. How much practical benefit do these higher write speeds yield? Unless you’re a media duplicator or another prolific disc creator, do you really need your CD and DVD burns to complete a few seconds or minutes faster? This question applies especially to those of you who perpetually have more work than time and can, therefore, thanks to buffer underrun, do another task while the drive happily burns away in the background.

“Your-mileage-may-vary” examples abound in the high-tech world. One of the most famous is that faster CPU core-clock rates do little to boost system performance without corresponding improvements in on-chip cache sizes and capabilities, in front-side-bus speeds, and in the performance of other PC subsystems. At least two of those subsystems, DRAM and the hard-disk drive, exhibit no shortage of specification hype of their own. Most DRAM manufacturers seem to want to talk about only their memories’ burst-transfer rates entering and leaving the chips’ sense-amp buffers. They conveniently ignore the fact that these peak speeds don’t comprehend the much slower random accesses to and from the larger DRAM array lurking behind the sense amps. As DRAM access patterns become increasingly random with improved cache hit rates, those best-case burst-transfer rates will increasingly diverge from the more sluggish sustained rates you see in real-life usage. Similarly, ATA-100, ATA-133, and SATA-150 mass-storage interfaces may incrementally accelerate reads and writes to the small on-drive RAM buffers. Without corresponding boosts in on-platter storage densities and in platter rotations per minute, though, the much slower magnetic media will remain a system boat anchor.

Even FPGAs aren’t immune to specification inflation. The vendors like to tout their chips’ Moore’s Law-driven improvements in flip-flop toggle rates, along with the peak transfer speeds through their chips’ exotic I/O buffers. However, nobody wants to take a stab at translating flip-flop speeds to meaningful design speeds, which would also comprehend the performance of slower look-up tables, multiplexers, and other logic structures along with the increasingly dominant on-chip routing delays. And nobody wants to discuss the increasing disparity between the fast I/O buffers that link the chip to the rest of the system and the much slower designs inside the chip.

The most bothersome thing about the increasing speed-above-all focus throughout the electronics industry is that it shortchanges other important selling points. Warranty times are becoming shorter. Technical support is becoming costlier, less convenient, and less competent. Quality is becoming flimsier, and bundled software is becoming more bug-prone and increasingly incomplete.

I’m curious. Both as a consumer and as a designer of chips, software, and systems, where and why do you place speed within your list of key features? If your ranking differs from that of your marketing counterparts, who wins the prioritization tug of war? Drop me a line; I look forward to your thoughts.

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