Heard at Hot Chips: business lessons from the masters of microprocessors

Ron Wilson - August 26, 2008

Yesterday evening’s Hot Chips panel, Ready, Fire, Aim: 20 years of hits and misses at Hot Chips, managed to include some sage business advice along with its architectural observations. After all, many of the panelists had been in pioneering CPU projects or start-up companies themselves.

One useful insight offered by several of the panelists was to not waste someone else’s money—or, in any case, your own—by basing a product position on a technology other than CMOS. Howard Sachs, who has a long history of experimenting with CPUs in arcane technologies, gave an obituary page full of great ideas that relied on ECL, CML, or GaAs for their performance edge. Invariably, he pointed out, design delays, yield problems, and issues with enormous heat generation delayed production of the design just long enough for a new generation of CMOS to erase the performance lead. Sachs pointed out, for instance, that both MIPS and SPARC RISC architectures had at one time been implemented in bipolar ECL, and that both projects had failed.

Dave Ditzel offered another golden guideline: don’t let your chip design get ahead of the industry infrastructure necessary to support it. John Mashey emphasized this point in respect to software in particular, pointing out that creating the operating software, compilers and programming tools for a new instruction set is a crushingly large job, full of risks, and with a maturity curve all its own. The real production of a new CPU may be measured from the date when the software is finally mature, not from the date when the silicon is shipped.

Nathan Brookwood offered two points that in the context of the panel might have sounded humorous, but had solid cores to them. First, he warned that stealth ventures rarely work out well, citing the significant craters left by Micro Unity and Transmeta as examples. Admitting that he might be motivated in part by an analyst’s frustration at not getting a briefing from such start-ups, he suggested that the function of peer review really was vital to the engineering process, and that stealth, by shielding the engineering effort from peer view, shielded the engineers from vital feedback and correction.

Brookwood’s second point was more controversial still. “The return on investment from hiring lawyers is much better than from hiring marketing managers,” he said. To support this, he cited again Micro Unity and Transmeta, but also Intergraph and Rambus, all of which have made substantially greater profits from patent threats and litigation than from selling products. In fact, he argued, these products failed in the market. But they succeeded in court.

Perhaps a last take-away from the panel was a certain sense of wistfulness for the Hot Chips of 20 years ago, a more innocent, and more technologically vital, time. Ditzel pointed out that at the 1989 Hot Chips conference, there were papers on 11 different CPU architectures, and in some categories there were several papers on different chips implementing the same architecture. Intel alone
presented three different architectures, and there were 8 papers on different SPARC chips. But out of those 11 architectures, only three—x86, MIPS, and SPARC—are represented in this year’s conference.

In his opening remarks Nick Tredennick quoted a paper given by long-time architect Keith Diefendorff at the 1997 Hot Chips, in which he argued that instruction set architecture simply didn’t matter any more. Since that time many instruction sets have come and gone, and gradually the reviled x86 architecture has conquered it’s rivals, now being used by even Sun and Apple. Today, perhaps, we should rephrase that thought to say that it doesn’t matter any more, as long as you are binary-compatible with x86. Hot Chips is still a vital conference, but we seem to care a great deal more about the heat than about the microarchitecture that is generating it.