

Higher and higher performance Microprocessors: Are the problems just too hard to solve?

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Abstract

There seems to be no end to the higher and higher performance expected of future generations of microprocessors. Within a year, at least one company will be producing for sale a single chip microprocessor containing more than 100 million transistors. By the year 2009 process technology promises us one billion transistors on a silicon die. Our job is to harness these transistors in behalf of higher and higher performance. But lately, as has happened from time to time in our history, there are more nay-sayers saying why it can't be done than there are folks looking at how to do it. Our job in this talk is to do three things. First, we look at the reasons the nay-sayers are offering for "why we have reached the end of our rope," and their suggestions for what we should do instead. Second we look at the real impediments to higher and higher performance microprocessors, and what we must do to get around them. Third, we offer some avenues that just may keep us on the same performance curve in the next decade that we enjoyed during the last.

Bio Sketch

Yale Patt is Professor of Electrical and Computer Engineering and the Ernest Cockrell, Jr. Centennial Chair in Engineering at the University of Texas at Austin. He enjoys equally teaching freshmen, teaching graduate students, and directing the research of eight PhD students in high performance computer implementation. He has, for more than 30 years, combined an active research program with extensive consulting and a strong commitment to teaching. He has received a number of distinguished awards for his contributions, included the IEEE/ACM Eckert-Mauchly Award in 1996, the IEEE Wallace W. McDowell Award in 1999, and the IEEE Emmanuel R. Piore Medal in 1995. For his commitment to undergraduate teaching, he has received a number of honors, including Outstanding Professor of the Year from the Michigan chapter of Eta Kappa Un and Arthur Thurnau Professorship at Michigan in 1998. He received the ACM Outstanding Lecturer Award in 1999. He is co-author (with his student, Sanjay J. Patel) of a new (correct!) introduction to Computing for serious students of computer science and computer engineering: Introduction to Computing Systems, from Bits and Gates to C and Beyond, McGraw-Hill. Patt earned his BS at Northeastern and MS and PhD at Stanford, all in electrical engineering. He is a Fellow of the IEEE. A more detailed bio is available on his web site: <http://www.ece.utexas.edu/~patt/>