AmigaMCCC News
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New Transistor Technology

Intel announced two major breakthroughs in computer processor technology on Jan. 27, with multiple University [of Illinois] alumni to thank for their contributions to the project.

Mark Bohr, a senior fellow at Intel and University alumnus, led the team of process engineers that created the new 45 nanometer transistor processor. Bohr said the new transistors will reduce leakage, meaning battery leakage, related to the length of battery life.

"(The transistors) provide for performance but in a much more energy efficient manner," Bohr said.

These 45 nanometer chips are the first to have the gate insulator and the gate electrode made without silicon, which had been used for the past 40 years. Intel developed a new material with a "high-k" property for the gate insulator, and a combination of metals for the gate electrode. But the make-up of "high-k" and the precise combination of metals are being kept secret by Intel so they can have a leg up on the competition. Most of the details regarding the project have been kept secret until now.

From the changes made to the gate insulator, gate electrode and the elimination of silicon, Bohr said Intel's announcement was key in progressing transistor technology.

"Those three components remained unchanged in the past 40 years." Bohr said. "So our announcement in January was a big change where we converted the gate insulator from silicon to hafnium."

Not only is Intel's new transistor technology energy efficient, but it is also extremely small and solves the problem of Moore's Law, at least temporarily.

Gordon Moore, inventor of Moore's law and co-founder of Intel, said that the number of transistors should double on a processor every 18-24 months, eventually leading to a limit. This limit was approaching, Bohr said, but this new technology may have delayed the end of Moore's law.

"Over the last five, six years experts have admitted that we are running into fundamental limits." Bohr said. "We have made transistors as small as possible. If we make them smaller they won't have good performance."

According to Intel, with the new technology approximately 400 of Intel's 45 nanometer transistors could fit on the surface of a single human red blood cell.

Michael Hattendorf, University alumnus and process engineer who has worked on the new Intel chip, said that it was a great feeling when Intel made the announcement because he had been working on the project for so long. Hattendorf said that the University got him interested in computer engineering, and he worked a lot with transistor technology as an undergraduate.

While at the University, Hattendorf said, "I had some opportunities to do some hands on work, making devices and doing measurements, learning about the way these kinds of devices work."

…by Kristen Sackley

FCC Broadband Fudge Factor

The FCC has just released its report, High-Speed Services for Internet Access: Status as of June 30, 2006. All the usual problems with FCC data are built in (the wimpy definition of broadband as over 200 kbit/s, the use of zip codes as the unit of analysis, the inclusion of satellite-only zip codes as having broadband service, the counting of competitors as if a 250 line ISP is equal to a grownup Bell, et cetera).

The big shock is this: U.S. terrestrial broadband Internet connectivity only grew 27% between June 05 and June 06! The FCC report claims it is 54%, but that's just wrong.

The FCC would have us believe that U.S. Broadband connectivity grew 54% between June 05 and June 06 (from 42 to 65 million lines) because, in a giant data-fudge, the FCC is lumping 11 million cellular data (mobile broadband) accounts with its other broadband Internet access methods. Mobile broadband is entirely different than terrestrial forms of Internet access. It is

(a) extremely non-neutral; many Internet applications are forbidden or blocked,
(b) the largest providers impose covert throughput limits,
(c) it violates the FCC's own guidelines, because end-users are NOT free to access content, run applications, or attach devices of their own choosing(!!) — see (a) above,
(d) it does not provide a rich environment for innovation or end-user generated content equivalent to landline broadband Internet access, and
(e) most U.S. citizens with mobile broadband probably already have terrestrial broadband Internet connectivity, so it is likely that including mobile Internet access is a form of double counting.

The OECD numbers show that the annual growth of U.S. broadband Internet penetration was 53% in 2001–2002. This slowed over successive years to 40%, 33% and 30% for 02–03, 03–04 and 04–05. Without the FCC's bogus inclusion of mobile broadband, the growth rate of 27% is right in line.

How does 27% growth stack up to the rest of the world? I do not have the 05–06 figures, but in 2004, OECD countries Greece, Turkey, the Czech Republic, the Slovak Republic, Mexico and Ireland all had growth rates above 100%. These, without exception, reflect the law of small numbers.

Looking at the second tier, OECD countries with growth between 27% and 100% in 2004–2005, we find Australia, Hungary, New Zealand, Germany, Luxembourg, United Kingdom, Finland, Norway, Italy, Iceland, France, Spain, Portugal, Sweden, Austria, Netherlands, Switzerland, and Denmark. The law of small numbers no longer applies; six of these have higher overall broadband Internet access penetration than the U.S. — AND they are growing faster.

At 27%, the U.S. has approximately the 26th fastest growing number of broadband Internet access lines. Even including mobile data access, like the FCC report does, 54% growth rate is only the world's 10th fastest growth. In other words, even counting mobile data, the U.S. is tied with Luxembourg's 2004–2005 growth rate.

…by Harold Feld

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April Calendar

April — Amiga By-The-Loop Chapter
7:00 pm — Grand Prairie Public Library
901 Conover Drive, Grand Prairie

NO APRIL MEETINGS

April — MCCC Board of Director's Meeting
Approx. 9:15 pm — Location TBD

April 28 — Newsletter Deadline — 7:00 am