Power: Less is more for 2013

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Power has come of age as a defining parameter in electronic systems. Whether maximizing battery life, keeping an enclosure cool, or passing large currents more efficiently, projects now start with power in mind. In 2013 we will see the continued migration of power technologies from research to commercial availability.

Computing has been affected most notably by the move to multicore. Old news for desktops, this transition is still in its early phases for embedded systems. We are just now seeing microcontrollers, modules, and SoCs that leverage SMP architectures as standard. This year we are likely to see demonstrations of real applications using many-core processors, on the order of 64 cores or more. They have struggled for respect so far, but you will see a renewed push to prove industrial viability.

Power gating as a circuit technique will continue growth as cores and other blocks on SoCs are powered up and down on demand. But continued offloading of tasks from the processor will be required for the technique to be effective. This is particularly true for systems with sensors monitoring the environment continuously. You will see the serious evolution of sensor hub strategies, which allow sensor subsystems to operate autonomously, waking the CPU only when an event merits its attention. Gyroscopes are also notoriously power-hungry; you will see them put to sleep, to be awakened by lower-power accelerometers when needed.

One outgrowth of the power-saving capabilities of computing platforms will be the need for software to help manage power. As power control APIs materialize, applications will share in the responsibility for deciding how much system power is expended. In a historical reversal, CPUs may even be told to slow down, since “fast enough” uses less power than “as fast as possible.”

Meanwhile, energy harvesting should see the continued transition from “good ideas” to the availability of integrated transducers, battery chargers, and power management in plug-in modules. While solar and thermal harvesting dominate the field now, vibration is the next obvious source of scavengeable energy. You will also see manually-actuated devices like wall switches that derive their power from the

actuation itself.

Semiconductor technology will be key both for low and high power. Novel planar transistors and near-threshold design techniques will be important for packing more functionality into less silicon real estate. SiC and GaN transistors will continue to dominate the high-power agenda.

All in all, we have achieved sufficient speed. Except for high-current applications, 2013 will see us powering down.

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