The Next Operating System

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Mit News (02/24/11) Larry Hardesty

The Massachusetts Institute of Technology's project Angstrom aims to develop an energy-efficient multicore computing system, including a chip architecture, programming languages, and a new operating system. A multicore system needs to be more self-aware and have more control of the operations executed by the hardware in order to combat and fix problems that arise within the system, says Angstrom project leader Anant Agarwal. Each core in the Angstrom chip will feature a thermometer so that the system will know if any part of the chip is overheating. The Angstrom system also has a factored operating system, which will enable programmers to set performance goals for their applications. Professor Martin Rinard's research team has been studying instances in which accuracy can be traded for speed and developed a technique called loop perforation, which is an operation that skips a few steps in order to save energy when analyzing data. Meanwhile, professor Saman Amarasinghe is developing tools that enable programmers to specify different algorithms for each task a program performs, and the operating system automatically selects the one that works best under any given circumstances. In addition, professor Frans Kaashoek has developed a way to execute primitive operations using multiple cores that have access to each other's caches.