

## Accelerando: Hard Real Time Programming within the Java Memory Model

**Joshua Auerbach, IBM TJ Watson Research Center**

In the Metronome project at IBM TJ Watson Research Center we have created a Java virtual machine in which perturbations in scheduling due to garbage collection are less than a millisecond. This leaves open what can be done in the microsecond domain, and also what to do about other deficiencies of Java as a real time language. Accelerando is an effort to define subsets of Java to which portions of a larger Java program can restrict themselves in order to achieve particular aims, such as running accurately at frequencies higher than 1000hz, running as interrupt handlers, or achieving time-portability across different classes of hardware. Specifically, we have explored two restricted subsets. (1) Expedited Real Time Threads were described in a paper in PLDI 2006 (under the name "Eventrons"). They are aimed at very high frequencies and interrupt handling. (2) Exotasks are being developed jointly with Christoph Kirsch here at Salzburg. They are aimed at time-portability and determinism at moderately high frequencies, and they borrow concepts from Giotto and other languages that implement "Logical Execution Time." All accelerando subsets are validated at application initialization time and then execute safely without additional runtime checks. The talk will summarize the status of our past, present, and future work within the Accelerando subproject.

**Bio** Joshua Auerbach received a Ph.D in social psychology from Yale University in 1977, then switched his field to computer science as he realized the value that computers bring to society. He has been at the IBM TJ Watson Research Center since 1983 and has contributed to numerous IBM products. His research interests have spanned communications, distributed systems, and programming languages.

**Where** Jakob-Haringer-Straße 2, T01

**When** Thursday, 5. Oct. 2006, 16:00 h (s.t.) Host: Prof. Christoph Kirsch