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Title: Stream-based concurrent computational models and programming tools

Abstract:

The emergence of multicore/manycore architectures, namely in GPUs, and the expected rapid growth in the number of cores per chip are key aspects in the next-generation of parallel systems, which will deliver a tremendous computing power. Although such architectures lead to additional opportunities, they also present new challenges for modeling and programming the systems. In this talk, we present computational models for concurrent systems supported by these new architectures, namely by adopting a stream-based approach. The Caravela project for researching and developing a stream-based concurrent programming platform is described, and the main characteristics of this platform are compared with commercial multi-core development systems (e.g. RAPIDMIND). Experimental results obtained by programming different applications show that these platforms can achieve efficient concurrent processing for telecommunications, signal and image processing, and scientific computation.

Bio: Leonel Sousa received the PhD degree in electrical and computer engineering from the Instituto Superior Tecnico (IST), Universidade Técnica de Lisboa (UTL), Lisbon, Portugal, in 1996, and he is currently an associate professor (with agregação ) of the Electrical and Computer Engineering Department at IST, and a senior researcher at the Instituto de Engenharia de Sistemas e Computadores- R&D. His research interests include computer and VLSI architectures, parallel and distributed computing, and multimedia systems. He is currently a member of HiPEAC European Network of Excellence, a senior member of IEEE and a member of ACM. He has recently been distinguished by the UTL with an honorable mention for the impact of his publications in international scientific journals in the period of 2002-2006 (award UTL/Santander Totta).