A Flexible Approach for Compiling Scilab to Reconfigurable Multi-Core Embedded Systems

(Invited Paper)

Timo Stripf, Oliver Oey, Thomas Bruckschloegl, Ralf Koenig, Michael Huebner*, Juergen Becker
Karlsruhe Institute of Technology, Germany
{stripf, oey, bruckschloegl, ralf.koenig, huebner, becker}@kit.edu
*since April 2012 at Ruhr-University of Bochum, Germany

George Goulas, Panayiotis Alefragis, Nikolaos S. Voros
Technological Educational Institute of Mesolonghi, Greece
{ggoulas, alefrag, voros}@teimes.gr

Gerard Rauwerda, Kim Sunesen
Recore Systems, The Netherlands
{gerard.rauwerda, kim.sunesen}@recoresystems.com

Steven Derrien, Daniel Menard, Olivier Sentieys
Université de Rennes I, INRIA Research Institute, France
{steven.derrien, daniel.menard, olivier.sentieys}@irisa.fr

Nikolaos Kavvadias, Grigoris Dimitroulakos, Kostas Masselos
University of Peloponnese, Greece
{nkavv, dhmhgre, kmas}@uop.gr

Diana Goehringer†, Thomas Perschke
Fraunhofer-Institute of Optronics, System Technologies and Image Exploitation, Germany
{diana.goehringer, thomas.perschke}@iosb.fraunhofer.de
†since April 2012 at Karlsruhe Institute of Technologie, Germany

Dimitrios Kritharidis, Nikolaos Mitas
Intracom S.A. Telecom Solutions, Greece
{dkri, nmitas}@intracom.gr

***Abstract*—The mapping process of high performance embedded applications to today's reconfigurable multiprocessor System-on-Chip devices suffers from a complex toolchain and programming process. Thus, the efficient programming of such architectures in terms of achievable performance and power consumption is limited to experts only. Enabling them to non-experts requires a simplified programming process that hides the complexity of the underlying hardware – introduced by software parallelism of multiple cores and the flexibility of reconfigurable architectures – to the end user. The Architecture oriented paraLlelization for high performance embedded Multi-core systems using scilAb (ALMA) European project aims to bridge these hurdles through the introduction and exploitation of a Scilab- and architecture-description-language-based toolchain which enables the efficient mapping of applications on multiprocessor platforms from high level of abstraction. This holistic solution of the toolchain allows the complexity of both the application and the architecture to be hidden, which leads to a better acceptance, reduced development costs, and shorter time-to-market.**