Introduction to the Configware Minitrack

From glue logic synthesis to reconfigurable computing systems

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While reconfigurable computing was rather unknown several years ago, more recent projects have been established dealing with new directions of this topic. In fact, for particular application areas reconfigurable hardware has already proven to achieve a performance, which is superior to that of conventional processor solutions. Application development proceeds in moving out of its logic-design-only niche into systems development: the synthesis of high performance computing systems.

The importance of the topic can be seen by the large variety of approaches and solutions for reconfigurable computing (an overview about current projects is given in the paper by Radunovic).

Some of the papers in the minitrack deal with reconfigurable platforms and development systems to speed up problems from different application classes. These classes include stream oriented DSP algorithms, which occur e.g. in wireless communication (see paper by Swanchara/Athanas), real-time image processing hardware (paper by Drayer et al.), and the boolean satisfiability problem (see the paper by Mencer/Platzner). The number of algorithms appropriate for reconfigurable computing is still growing.

More algorithms are examined for their suitability, e.g. from multimedia applications and operating systems (see the paper by Knezevic et al.).

Another aspect of reconfigurable computing is the extension of known concepts from parallel computing. For example, mapping algorithms have been developed for a reconfigurable systolic architecture (see the paper by Plaks).

In contrast to these application specific approaches, other works employ hardware/software co-design to map general applications onto a reconfigurable hardware or a system comprising a processor and a reconfigurable accelerator. The underlying architectures range from solutions based on FPGAs with a processor (see the paper by Saul) to a complete machine paradigm based on a coarse-grained reconfigurable hardware (papers by Herz et al.).

The papers in this minitrack present promising results. These show, that a point is reached, where reconfigurable computing is a serious alternative to sequential programing of conventional processors. An increasing number of analysts and panelists predict, that in the next decade Configware will advance from a niche-technology to mainstream: From tinkertoy approach to a structural computing paradigm.