



MWARE – SOFTWARE TECHNOLOGIES FOR THE MULTICORE FUTURE

Challenge

Multicore processors combine a steadily rising number of independent compute units, called cores, on one chip allowing them to do multiple calculations simultaneously. With this approach chip manufacturers are trying to unlock new performance potentials while at the same time reducing the energy consumption of the whole chip. Individual cores will no longer get faster, there will only be more of them on one processor.

As a consequence this means that software has to be adapted to exploit the full potential of the new parallel processors. The parallelization requires solutions on multiple levels of a system ranging from the operating system, to middleware

libraries and APIs (application programming interfaces) for implementing and running parallel software as well as to algorithms and process models for designing parallel solutions.

In the light of these challenges Fraunhofer IAO has joined forces with the Fraunhofer Institutes for Algorithms and Scientific Computing (SCAI), for Industrial Mathematics (ITWM) and for Experimental Software Engineering (IESE) in a cooperative project: The MWare project assists IT businesses in the upcoming transition to the parallel paradigm by offering suitable methods and tools for a successful start into the multicore future. With extensive experience in the field of software and process engineering Fraunhofer IAO helps businesses with the selection and rollout of suitable tools for multicore software development.

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Range of services

IAO experts assist businesses in the early design and implementation stages of multicore software development projects. We bring in our cross-industry experience, use the latest research insight and have access to the combined expert knowledge of the participating Fraunhofer institutes as needed.

Multicore-Check

Fraunhofer IAO is compiling a checklist that helps your business decide on supporting multicore processors in your product portfolio. The check list reveals benefits and challenges of parallelizing your software. This minimizes risks in the early development stages.

Multicore Guide

Fraunhofer IAO is preparing a guide and a process model for porting legacy software to multicore as well as developing software that is ready for multicore from the start. Furthermore the guide provides answers to the questions if and how a given software should be parallelized and what the implications are for the existing software development process.

Market Study

Fraunhofer IAO is conducting a market study that presents an overview of current software tools for the development of multicore software with a neutral view on products and vendors. The focuses of the study are software products for the different challenges of multicore software development, namely analysis, implementation, debugging and tuning. The study describes these challenges in detail and presents tools that help deal with them. An independent survey assembles a comprehensive overview of each product's features with regard to these challenges.

Fraunhofer IAO is accompanied by experts from the partner institutes SCAI, ITWM and IESE. These institutes have extensive knowledge in the field of developing parallel algorithms and applications. Our range of services is completed with tools from our partner institutes that facilitate the development of powerful parallel software, among them an efficient runtime for parallel applications (GPI), a library for parallelizing graph-based problems (GraPA) and a library for the computation of algebraic multi-grids (SAMG).

With the combined experience of our experts we can guide you on your way to multicore and help you make the transition as easy and as efficient as possible.