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Model-Based Automotive Partitioning and Mapping for Embedded Multicore Systems

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Abstract : This paper introduces novel approaches to partitioning and mapping in terms of model-based embedded multicore system engineering and further discusses benefits, industrial relevance and features in common with existing approaches. In order to assess and evaluate results, both approaches have been applied to a real industrial application as well as to various prototypical demonstrative applications, that have been developed and implemented for different purposes. Evaluations show, that such applications improve significantly according to performance, energy efficiency, meeting timing constraints and covering maintaining issues by using the AMALTHEA platform and the implemented approaches. Further- more, the model-based design provides an open, expandable, platform independent and scalable exchange format between OEMs, suppliers and developers on different levels. Our proposed mechanisms provide meaningful multicore system utilization since load balancing by means of partitioning and mapping is effectively performed with regard to the modeled systems including hardware, software, operating system, scheduling, constraints, configuration and more data.

Keywords : partitioning, mapping, distributed systems, scheduling, embedded multicore systems, model-based, system analysis
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