Guest editorial—RTNS 2010

Sanjoy Baruah · Yves Sorel

Published online: 22 December 2011
© Springer Science+Business Media, LLC 2011

This issue of the journal Real-Time Systems contains extended versions of a selection of four papers from among those that were presented at the 18th International Conference on Real-Time and Network Systems (RTNS-2010), which was held in Toulouse on November 4 and 5, 2010. The scope of the conference covered all aspects of real-time systems and networks. A selection of the papers presented at the conference were invited to submit extended versions for this journal special issue. These papers had all been rated very favorably during the conference review process, and were selected based on their quality, relevance and significance. The extended versions were subject to an additional rigorous review process in accordance with the standards and expectations of this journal, with the authors required to satisfactorily address all concerns expressed by the reviewers before the papers were accepted for publication in this issue.

The paper entitled “Partitioned EDF Scheduling for Multiprocessors using a $C = D$ Task Splitting Scheme” is written by Alan Burns, Robert Davis, Pengyu Wang and Fengxiang Zhang. It introduces an EDF-based task-splitting scheme for scheduling multiprocessor systems. One of the advantages of this scheme is that no special run-time mechanisms are required; furthermore, run-time overheads are kept to a minimum. Evaluation is provided via a comparison with a fully partitioned scheme and by determining the theoretical maximum processor utilisation.

S. Baruah

Department of Computer Science, The University of North Carolina, 134 Brooks Computer Science Building, 201 S Columbia St. UNC-CH, Chapel Hill, NC 27599-3175, USA
e-mail: sanjoy.baruah@gmail.com

Y. Sorel (✉)

Domaine de Voluceau, Rocquencourt, INRIA, BP 105, 78153 Le Chesnay Cedex, France
e-mail: yves.sorel@inria.fr
url: www-rocq.inria.fr/~sorel/work

The paper entitled “Globally Scheduled Real-Time Multiprocessor Systems with GPUs” by Glenn Elliot and James Anderson presents two analysis methods for integrating GPUs into soft real-time multiprocessor systems. The Shared Resource method and the Container method differ in how GPU execution time is modeled and how hardware graphics hardware driver behaviors are managed. Both methods are able to schedule greater computational workloads than CPU-only systems in common cases. Schedulability experiments are presented that assess the schedulability characteristics of each method.

The paper entitled “CoMem: Collaborative Memory Management for Real-Time Operation within Reactive Sensor/Actor Networks” is written by Marcel Baunach. It introduces a novel approach, called CoMem, for cooperative memory sharing among preemptive tasks in reactive systems. With respect to task priorities and the typically limited resources of sensor nodes, it facilitates compositional software design by providing tasks with runtime information for cooperative and self-reflective memory sharing. Experiments implementing CoMem on the real-time operating system SmartOS indicate that the effective use of prioritized tasks is feasible on small embedded devices like sensor nodes.

The paper entitled “Applying Trajectory Approach with Static Priority Queuing for Improving the Use of Available AFDX Resources” is written by Henri Bauer, Jean-Luc Scharbarg and Christian Fraboul. It shows how the worst-case delay analysis of AFDX networks (which are standardized for use in avionics applications) can be improved using an optimized Trajectory approach. This approach is supplemented with a grouping technique. The paper analyzes the impact of additional low priority traffic on an industrial AFDX network and shows that this impact is bounded from above by the transmission time of the biggest lower priority packet.

We would like to thank the authors that submitted papers to RTNS-2010, and in particular to those who contributed extended versions of their RTNS submissions for inclusion in this journal special issue. We also thank the members of the RTNS-2010 program committee, as well as the reviewers of this special issue. A special thanks to the General Chair of RTNS-2010, Dr. Christine Rochange (Universite Paul Sabatier—Toulouse/IRIT, France) for her enthusiastic involvement in organizing the conference.