Distributed REal-time Architecture for Mixed-criticality Systems

Newsletter #3

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1 About DREAMS

The FP7-ICT integrated project DREAMS (Distributed REal-time Architecture for Mixed-criticality Systems) started on October 1st 2013 and aims at developing a cross-domain architecture and design tools for networked multi-core chips, where the execution of the application subsystems of different criticalities is supported.

The ambitious goals of the project are targeted and supported by 16 project partners distributed across six European countries. The project partners include major European companies encompassing large enterprises (Alstom, STMicroelectronics, Thales, TÜV Rheinland) and SMEs (FENTISS, Real-Time-at-Work, TTTech, Virtual Open Systems). Furthermore, leading universities and research institutes (FORTISS, IKERLAN, ONERA, polytechnic university of Valencia, SINTEF, technological educational institute of Crete, technical university of Kaiserslautern and university of Siegen) contribute to this four-year project.

DREAMS collaborates in the European Mixed-Criticality Cluster (MCC) with two other projects, SAFEPOWER[1] and SAFE4RAIL[2]. These three European projects work closely together in terms of identification of future challenges in the design and development of mixed-criticality multicore systems, join dissemination activities[3], and where possible exploring techniques to address those challenges.

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[1] http://safepower-project.eu/

[2] https://safe4rail.eu/

[3] http://www.mixedcriticalityforum.org/

2 Final Integration and Third Review Meeting

At the end of the second period of the project, the DREAMS partners integrated the project technologies into different physical platforms with different processor architectures. The outcomes of this integration were three domain-specific platforms that are used by avionic, wind power and healthcare demonstrators, the DREAMS virtual platform, the model-based development process and certification methods[4].

In addition to the technical achievements, a Mixed-Criticality Systems (MCS) workshop and the third DREAMS review meeting took place from 22nd to 24th of November 2016 at the Barcelona supercomputer center in Barcelona, Spain. The goal of this review meeting was to assess:

- The release of the final DREAMS architecture with the technological building blocks from the respective technology WPs.
- The integration of the DREAMS hardware platform along with a tool chain, including design space exploration and timing analysis.
- Initial work on the demonstrator applications in the areas of avionics, healthcare and wind power.
- The elaboration of an evaluation methodology including metrics for the assessment of the DREAMS architecture.
- Publishing of several publications, which concentrated on the final models, virtualization techniques, development methods and demonstrator designs.
- The continuation of training material development and preliminary exploitation plans.

The meeting was successful and the technological DREAMS results were approved. Thereby, the consortium successful moved on to the final phase of the project.

"The work that has been done is in line with the expectations of the DoW[5] and progresses according to plan. The quality of the work is high. The management is very satisfactory and there is evidence of good collaboration between the partners. The recommendations from the previous review have been carefully followed so that their effects are now visible.[6]"

3 Ongoing activities

After the successful review meeting in Barcelona, technological partners support the demonstrator partners to proceed with the validation and assessment of the provided technologies and to deploy the target platforms. The outcome of the validation are evaluations of the DREAMS objectives and the key performance indicators, also serving as a feedback for the technology providers to enhance the technologies, based upon the demonstrators' needs.

In April 2017, DREAMS partners came together in Munich to have another face-to-face meeting before the end of the project. The aim of this meeting was to discuss the current status of the project and to address the recommendations from the last review meeting in order to improve the project results. Moreover, there was a detailed discussion about the final demonstration which takes place at the final review meeting.

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[4] For more information, cf. Second DREAMS Newsletter, Nov. 2016

[5] Description of the work

[6] A quotation from the review report by the project officer

4 Upcoming Events

- DREAMS will present its technologies at the Digital Innovation Forum (DIF) 2017[7]. In addition, there will be a live demonstration of the DREAMS virtual platform which is customized for the avionics use case. This international event is the industry-driven digital innovation conference in Europe, showing R&I results and emerging challenges towards a vision on the future for the industry. DIF 2017 will take place on 10th and 11th of May 2017 in the RAI in Amsterdam, Netherlands.

- DREAMS organizes a summer-school on mixed-criticality applications and systems that will take place from 25th to 28th of September 2017 in Valencia, Spain. This summer-school is hosted by polytechnic university of Valencia and focuses on Mixed-criticality architectures and platforms. The aim is to provide the students with background and insight, which is hard to attain from the papers in the domain of mixed-criticality systems by offering a combination of lectures and practical student work.

- After an intensive work during the past three years, the DREAMS partners prepare themselves for the next review meeting taking place late 2017. This meeting is going to be the final review meeting and will take place at the end of the project (in October or November 2017). The aim of this meeting will be the reviewing of the project objectives and there will be demonstrations of the DREAMS technologies as well as the avionic, healthcare and windpower use cases.

Stay tuned

DREAMS' webpage: http://dreams-project.eu

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[7] https://dif2017.org/