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DREAMS Architectural Style Introduced

The FP7-ICT integrated project DREAMS (Distributed REal-Time Architecture for Mixed Criticality Systems) with project start in October 2013, provides first results on the cross-domain architecture and design tools for networked complex systems where application subsystems of different criticality, executing on networked multi-core chips, are supported.

One of the main achievements is the DREAMS architectural style. It introduces the system model of the mixed-criticality architecture combined with the logical and physical system structure. Basis for development is a detailed catalogue of requirements as well as the architectural conceptualization. A waistline structure of services is established offering core services for communication, time, execution and resource management as well as non-functional aspects related specifically to safety and security aspects. More information and documentation about the DREAMS architectural style has been published at the mixed-criticality forum (http://www.mixedcriticalityforum.org/).

Main results on the software side are the development process based on model driven engineering methods and the respective platform and application models. This process allows the evaluation of platforms and applications paving the way for a cost effective development of mixed-criticality systems based on the DREAMS platform.

Mixed-critical systems of different application domains can take advantage of the new architectural style in order to develop robust and predictable systems at significantly reduced cost and fastertime-to-market.

DREAMS Intermediate Integration nearing completion

The project is currently reaching the state of intermediate integration in different areas comprising:

- the physical platform,
- the simulation of the virtual platform
- tooling and methodology.

Main building blocks for the intermediate version of the physical platform are the STNoC, XTRATUM for virtualization and gateways for on-/off-chip communicationBuilding blocks for the virtual platform allow the simulation of the STNoC combined with network extensions chip/cluster level communication. Furthermore, the firmware infrastructure is being extended with the target of deploying KVM coupled with legacy real-time operating systems and a fine-grained co-scheduling approach.

Mixed-Criticality Cluster and Review Meeting

DREAMS is part of the European Commission's Mixed-Criticality-Cluster (MCC) together with the projects PROXIMA and CONTREX. A dedicated forum website to address the mixed-criticality community is now available under http://www.mixedcriticalityforum.org/.

The second review meeting of the projects DREAMS, PROXIMA and CONTREX takes place May 19th – 21th 2015 at the Vodafone Village in Milan, Italy.

The goal of this review meeting is to assess:

- The degree of fulfilment of the project's work plans of the first 18 months.
- The continued relevance of the objectives and break through potential with respect to the state of the art
- The resources planned and utilized in relation to the achieved progress
- The management procedures and methods of the project
- The beneficiaries' contributions and integration within the project
- The expected potential impact in scientific, technological-, economic, competitive and social terms (where relevant), and the plans for the use and dissemination of result

To further support the technical collaboration within the Mixed-Criticality Cluster, an internal workshop among DREAMS, PROXIMA and CONTREX will be organized on May 20th 2015.

About

The objective of DREAMS is to develop a cross-domain architecture and design tools for networked complex systems where application subsystems of different criticality, executing on networked multi-core chips, are supported. DREAMS will deliver architectural concepts, meta-

models, virtualization technologies, model-driven development methods, tools, adaptation strategies and validation, verification and certification methods for the seamless integration of mixed-criticality to establish security, safety, real-time performance as well as data, energy and system integrity.

The ambitious goals of the project are 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, RealTime-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 DREAMS.

The four-years DREAMS project is coordinated by University of Siegen and is one of three projects funded by the European Commission in the area of mixed-criticality systems from the FP7 ICT call 10. The EC financial contribution amounts to 11 million euros.

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Project website : http://www.dreams-project.eu

Mixed Criticality Forum : http://www.mixedcriticalityforum.org/