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European Project "DREAMS" introduces architectural style for networked multicore systems in the mixed-criticality domain

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.

The project is currently reaching the state of intermediate integration in different areas comprising the physical platform, the simulation of the virtual platform as well as 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 communication. Building 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-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 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/.

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

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