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Highly predictable execution support for critical applications with HARETICK kernel

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Author(s): Micea MV, Cretu VI

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Abstract: In this paper, the problem of providing a fully predictable execution environment for critical and hard real-time applications on embedded and DSP-based platforms is studied from the viewpoint of system architecture and operation. We introduce a set of homogenous models for time, signals and tasks, which will further serve as a basis for describing the architecture and operation of a particular hard real-time kernel-"HARETICK". The kernel provides support for concurrent operation of hard real-time tasks (the HRT execution environment), using non-preemptive scheduling algorithms, along with soft real-time tasks (the SRT environment), using classical, preemptive, priority-based scheduling algorithms. A set of applications has been developed to test the correct operation of the HARETICK kernel according to the theoretical models and to evaluate its abilities to provide high predictability of execution for critical applications. Some of the main testing results are also discussed in the paper. (C) 2005 Elsevier GmbH. All rights reserved.

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