

Abstract :

Hardware task scheduling and allocation at runtime increase the chip utilization ratio and improve the system performance by exploring partially reconfigurable Field-Programmable Gate Arrays (FPGAs). Partial reconfiguration enables to change all or parts of the system hardware during the execution, in order to gain efficiency over static system. Hardware-software real-time operating systems (RTOS) are often used to develop applications for embedded systems with complex time and resource constraints. In hard real-time systems, failure to meet its time constraints may lead to disastrous consequences. However, reconfigurable systems still lack an OS foundation that covers both software and hardware tasks for hard real-time requirements. The objective of this work is to formalize an abstraction layer combining safety-critical RTOS, like SafeRTOS, μ C/OS-II or Xenomai, on the one hand. On the other hand, we give some leads on hardware tasks scheduling and allocation effective algorithms in order to manage a hard real time software-hardware configuration. This paper presents, succinctly, a preliminary work which can allow the utilization of a safety-critical RTOS for managing software tasks, while hardware tasks are relocatable and multi-shaped through GoAhead.