



Call for Contributions Special Issue on Time-Critical Systems Design

Time-critical computing systems, designed to meet real-time deadlines, have conventionally been restricted to niche application domains such as avionics, automotive, and spacecraft. Thus mainstream computing community so far has not been sufficiently cognizant of the challenges associated with timing predictability. Indeed, decades of effort in introducing numerous architectural optimizations for enhanced performance and multiple software abstraction layers for improved performance, productivity & programmability have culminated in systems that offer high-performance at the cost of huge variability in timing. The timing unpredictability makes it onerous to deploy these systems when guaranteed deadline is a crucial objective. In parallel, the Cyber-Physical Systems and Internet of Things (IoT) revolution is rapidly ushering in myriad of new applications and devices that need to interact with the physical environment in real time but are expected to be as prevalent as smartphones. Examples of such time-critical systems range from personal smartdrones, medical devices to autonomous vehicles, robots to industrial IoT, control systems etc. All these emerging application domains have irrefutable safety concerns associated with the failure to meet timing deadlines. Thus we have slowly but surely approached a crossroad where predictable response time has become the first-class design target for diverse and everyday application scenarios rather than being relegated to only a selected few.

IEEE Design and Test seeks original manuscripts from both academia and industry for a special issue on “Time-Critical Systems Design” that will cover recent developments in architectural, software-level, and hardware-software co-designed mechanisms to design, test, and enhance timing predictability in cyber-physical and IoT systems. Contributions that articulate the innovations and challenges required for universal adoption of such mechanisms in emerging domains are particularly welcome.

Topics of Interest include but not restricted to

- Hardware-Software co-design of time critical systems
- Innovative architectural design (processor micro-architecture, multi- and many-core, interconnect, and memory) for time criticality
- Time-criticality in distributed systems
- Real-Time communications
- Software Timing analysis and optimizations for time predictability

- Runtime management for time predictability
- Mixed-Criticality systems
- Modeling, testing, verification, certification & monitoring of timing properties
- Infrastructure (tools, simulators, benchmarks, prototype) development for time-critical systems
- Existing and emerging application domains with timing constraints: Automotive including autonomous vehicles, Avionics, Robotics and SmartDrone, Industrial IoT, Medical devices etc.

Submission Guidelines

Guidelines for IEEE D&T papers are given at: <http://ieee-ceda.org/publications/d-t/paper-submission>
Please choose the special session category “Time-Critical Systems Design” while submitting the manuscript to the ScholarOne Manuscripts website <https://mc.manuscriptcentral.com/dandt>

Paper Submission and Review Schedule

Submission Deadline: 31 March 2017
Notification First Round: 12 May 2017
Submission of Revision: 9 June 2017
Final Notification: 7 July 2017
Final Papers Due: 21 July 2017

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