An evaluation of safety-critical Java on a Java processor

The safety-critical Java (SCJ) specification provides a restricted set of the Java language intended for applications that require certification. In order to test the specification, implementations are emerging and the need to evaluate those implementations in a systematic way is becoming important. In this paper we evaluate our SCJ implementation which is based on the Java Optimized Processor JOP and we measure different performance and timeliness criteria relevant to hard real-time systems. Our implementation targets Level 0 and Level1 of the specification and to test it we use a series of micro benchmarks, an application-based benchmark, and a reduced set of a SCJ technology compatibility kit. We evaluate the accuracy of periods, linear-time memory allocation, aperiodic event handling, dispatch latency for interrupts, context switch preemption latency, and synchronization.

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Embedded Systems Engineering
Contributors: Rios Rivas, J. R., Schoeberl, M.
Pages: 276-283
Publication date: 2014

Host publication information
Title of host publication: 2014 IEEE 17th International Symposium on Object/Component/Service-Oriented Real-Time Distributed Computing (ISORC)
Publisher: IEEE
Editor: O'Connor, L.
ISBN (Print): 978-1-4799-4430-9
Keywords: Computing and Processing, Benchmark testing, Embedded systems, Instruction sets, Java, Java processor, Memory management, Real-time systems, Resource management, Safety-critical Java, Safety-critical systems, Time measurement
Electronic versions:
jopscjeval.pdf
DOIs:
10.1109/ISORC.2014.41

Bibliographical note
2014 IEEE. Personal use of this material is permitted. Permission from IEEE must be obtained for all other uses, in any current or future media, including reprinting/republishing this material for advertising or promotional purposes, creating new collective works, for resale or redistribution to servers or lists, or reuse of any copyrighted component of this work in other works.
Source: FindIt
Source-ID: 271793042
Research output: Research - peer-review › Article in proceedings – Annual report year: 2014