Renaissance: Benchmarking Suite for Parallel Applications on the JVM

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Abstract: Our paper published in the proceedings of the 40th ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 2019) [Pr19a] proposes Renaissance, a modern benchmark suite whose aim is to advance compiler and virtual machine (VM) research. The publication is complemented by an accepted artifact [Pr19b]. To demonstrate that a compiler optimization, a memory management algorithm, or a synchronization technique is useful, a VM researcher needs benchmarks that demonstrate the desired behavior, and at the same time capture representative aspects of real-world applications. During the last decade, multiple new programming paradigms appeared on the Java VM (JVM), including functional programming, big-data processing, parallel and concurrent programming, message-passing, stream processing, and machine learning. The JVM has evolved as a platform too: new features, such as method-handles, variable-handles, the invokedynamic instruction, lambdas, atomic and relaxed memory operations, present new challenges for dynamic compilers and runtime environments. Existing benchmark suites do not capture the new applications, because they were made in a time when these workloads did not exist. Renaissance bridges this gap. The Renaissance suite is an ongoing, open-source effort to collect representative real-world workloads, and to advance the research and development of VMs. Renaissance is available at `https://renaissance.dev/`

Keywords: benchmarks; JIT compilation; parallelism; concurrency; JVM; object-oriented programming benchmarks; functional-programming benchmarks; big-data benchmarks

Acknowledgments: This work has been supported by Oracle (ERO project 1332) and by the Swiss National Science Foundation (project 200020_188688).

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doi:10.18420/SE2020_44

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[Pr19a] Prokopec, Aleksandar; Rosà, Andrea; Leopoldseder, David; Duboscq, Gilles; Tůma, Petr; Studener, Martin; Bulej, Lubomír; Zheng, Yudi; Villazón, Alex; Simon, Doug; Würthinger, Thomas; Binder, Walter: Renaissance: Benchmarking Suite for Parallel Applications on the JVM. Proceedings of the 40th ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI), Phoenix, AR, USA, June 22-26, 2019, 2019.

[Pr19b] Prokopec, Aleksandar; Rosà, Andrea; Leopoldseder, David; Duboscq, Gilles; Tůma, Petr; Studener, Martin; Bulej, Lubomír; Zheng, Yudi; Villazón, Alex; Simon, Doug; Würthinger, Thomas; Binder, Walter: Supplementatry material - Artifact for the paper "Renaissance: Benchmarking Suite for Parallel Applications on the JVM" published in the proceedings of the 40th ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 2019). DOI: 10.1145/3325986. 2019.