

Performance Regression Testing of Concurrent Classes

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Abstract: Developers of thread-safe classes struggle with two opposing goals. The class must be correct, which requires synchronizing concurrent accesses, and the class should provide reasonable performance, which is difficult to realize in the presence of unnecessary synchronization. Validating the performance of a thread-safe class is challenging because it requires diverse workloads that use the class, because existing performance analysis techniques focus on individual bottleneck methods, and because reliably measuring the performance of concurrent executions is difficult. This paper presents SpeedGun, an automatic performance regression testing technique for thread-safe classes. The key idea is to generate multi-threaded performance tests and to compare two versions of a class with each other. The analysis notifies developers when changing a thread-safe class significantly influences the performance of clients of this class. An evaluation with 113 pairs of classes from popular Java projects shows that the analysis effectively identifies 13 performance differences, including performance regressions that the respective developers were not aware of.

The full paper has been published at the International Symposium on Software Testing and Analysis (ISSTA) 2014 [PHG14].

References

- [PHG14] Michael Pradel, Markus Huggler, and Thomas R. Gross. Performance Regression Testing of Concurrent Classes. In *International Symposium on Software Testing and Analysis (ISSTA)*, pages 13–25, 2014.