

Continuous Performance Benchmarking Framework for ROOT

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Foundational software libraries such as ROOT are under intense pressure to avoid software regression, including performance regressions. Continuous performance benchmarking, as a part of continuous integration and other code quality testing, is an industry best-practice to understand how the performance of a software product evolves over time. We present a framework, built from industry best practices and tools, to help to understand ROOT code performance and monitor the efficiency of the code for a several processor architectures. It additionally allows historical performance measurements for ROOT I/O, vectorization and parallelization sub-systems.

We utilize the Google benchmarking library to execute micro benchmarks of selected hotspot functions in ROOT and related libraries. This provides detailed data measurements, including memory usage and CPU instruction counters. Additionally, the framework manages traditional benchmarking pitfalls via repeating unstable benchmarks and providing a stable performance environment over time. The performance data points from continuous benchmarking are fed into an InfluxDB database and provided to the developer community via a Grafana-based dashboard. This performance benchmarking framework, built on generic and flexible infrastructure, is meant to be reusable by other projects.

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