

BEAST

The goal of BEAST (Bench-testing Environment for Automated Software Tuning) is to create a framework for exploring and optimizing the performance of computational kernels on hybrid processors that

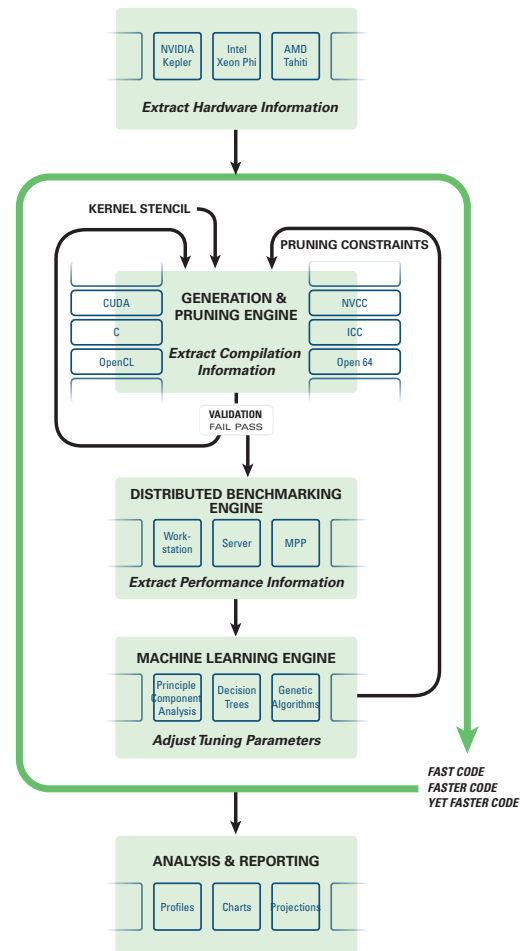
- ① applies to a diverse range of computational kernels,
- ② (semi)automatically generates better performing implementations on various hybrid processor architectures, and
- ③ increases developer insight into why given kernel/processor combinations have the performance profiles they do.

We call this form of optimization “bench-tuning” because it builds on the model used for traditional benchmarking by combining an abstract kernel specification and corresponding verification test with automated testing and data analysis tools to achieve this threefold goal.

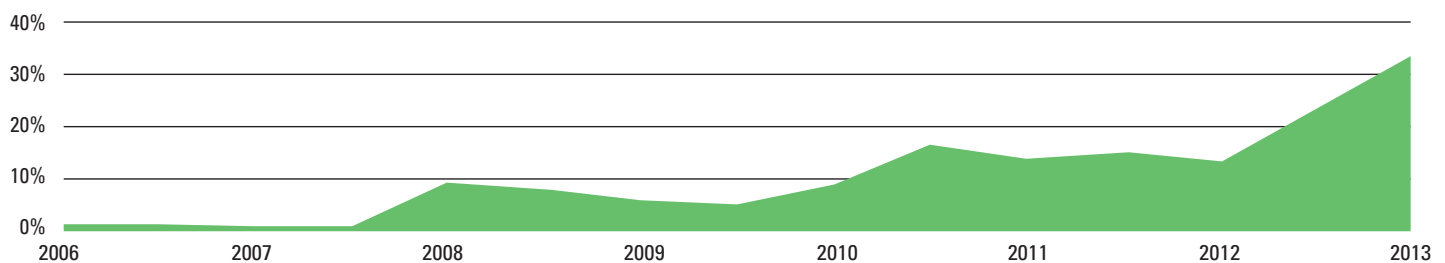
BEAST FEATURES

- ▶ Heuristic Autotuning
- ▶ Hardware Accelerators (NVIDIA, AMD, Xeon Phi)
- ▶ Scientific Kernels (dense, sparse, signal, ...)
- ▶ Large Search Space
- ▶ Powerful Pruning
- ▶ Aggressive Optimizations
- ▶ Large-scale Benchmarking
- ▶ Extensive Profiling
- ▶ “Big Data” Collection
- ▶ Machine Learning
- ▶ Powerful Feedback Loop with the User

BEAST ARCHITECTURE



TOP500 PERFORMANCE SHARE OF ACCELERATORS



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