Zero and Shark

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What is Zero?

- Interpreter-only port of HotSpot
- Uses (almost) no assembler
- Can trivially be built on any (Linux) system
- Known to work on
  - Alpha
  - ARM
  - IA-64
  - MIPS
  - PowerPC
  - x86-64
  - zSeries

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How does it work?

- Template interpreter:
  - Bytecodes implemented in assembly language
- C++ interpreter:
  - Bytecodes implemented in C++
  - Thin assembly layer

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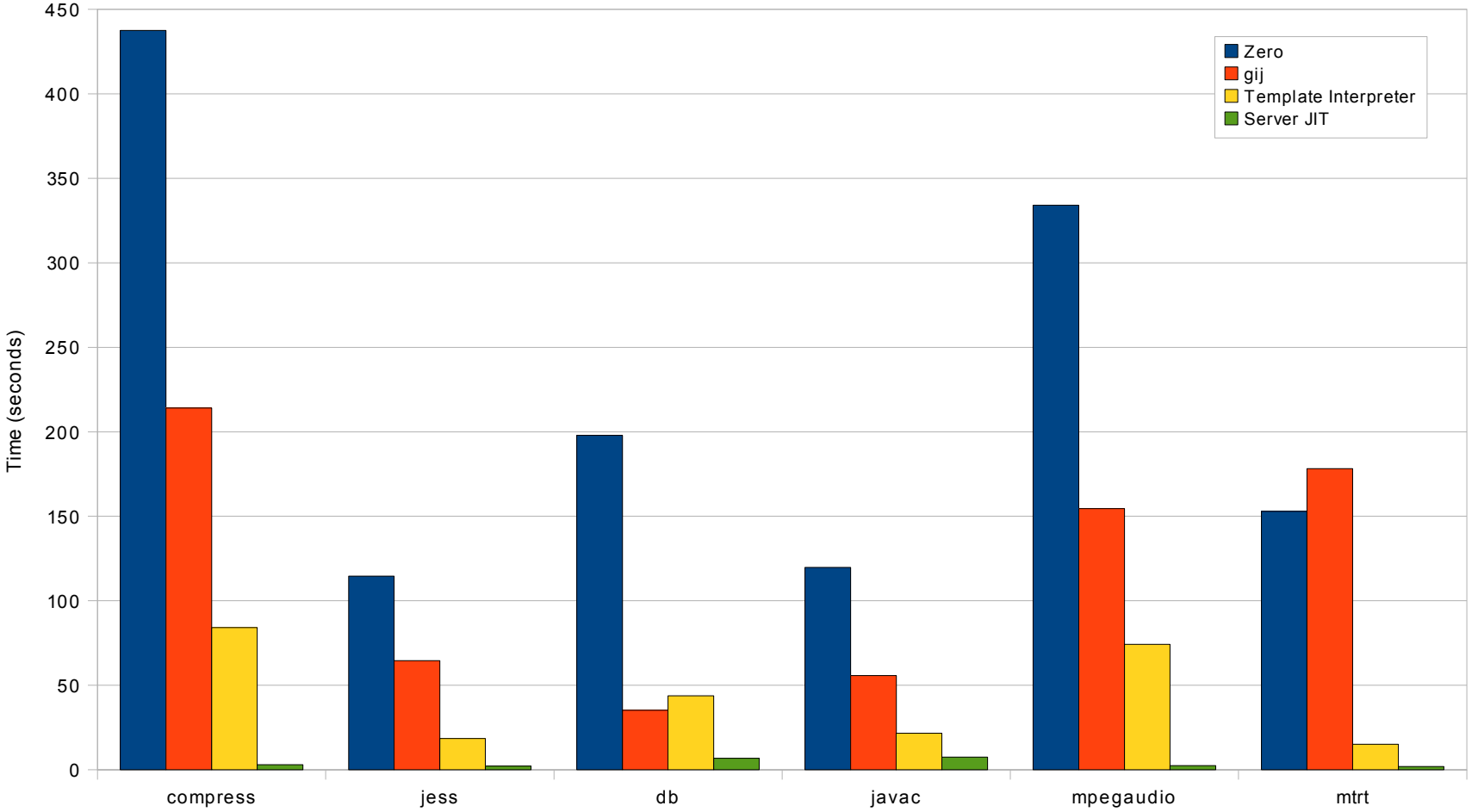
How to remove assembly?

- Atomic operations and memory access ordering
  - Use GCC atomic intrinsics
- Native function calls (for JNI)
  - Use `libffi`
- Interfacing with stack
  - Manage our own

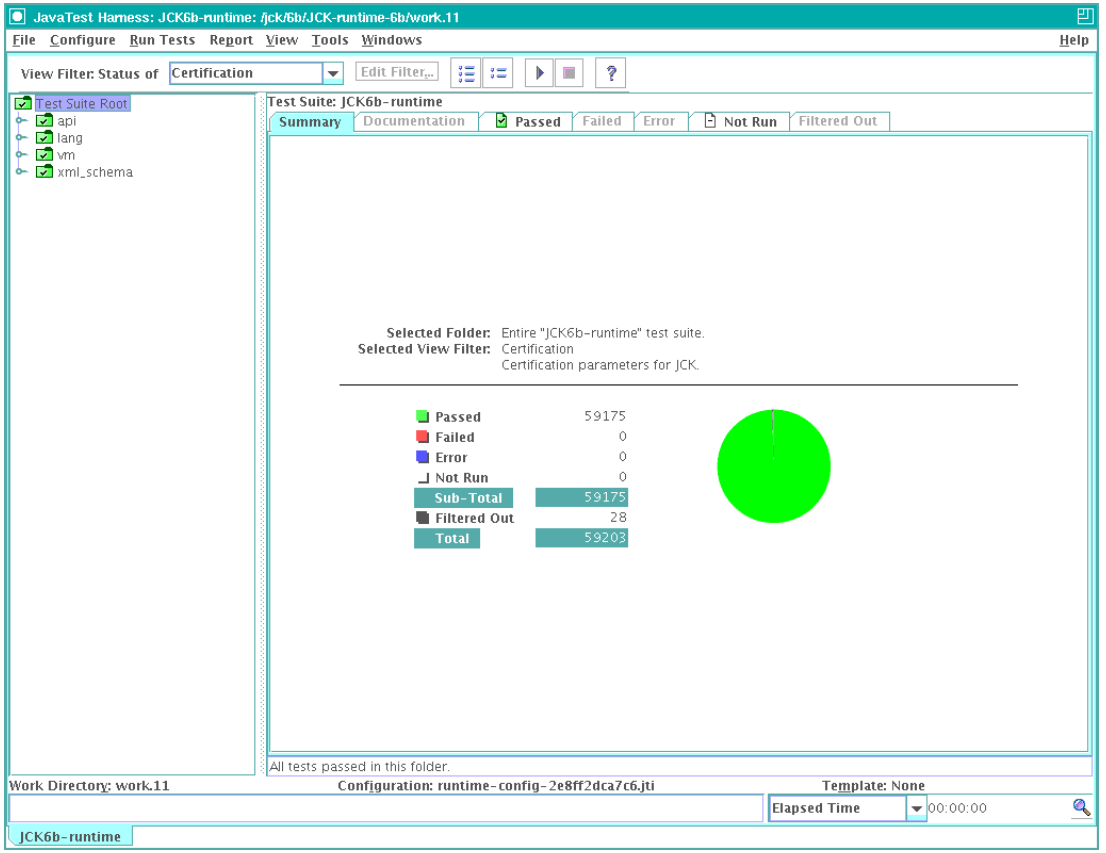
Performance



These times were generated using the SPECjvm98 benchmark, but they were not produced in compliance with the SPECjvm98 run rules and therefore are not comparable with a SPECjvm98 metric.

Compatibility

The latest OpenJDK packages included in Fedora 10 for 32- and 64-bit PowerPC have passed the Java SE 6 TCK and are compatible with the Java SE 6 platform.



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What is Shark?

- Shark is a just-in-time (JIT) compiler for Zero
- Uses LLVM compiler infrastructure
- Available on Zero architectures with an LLVM JIT:
  - Alpha
  - ARM
  - PowerPC
  - x86-64

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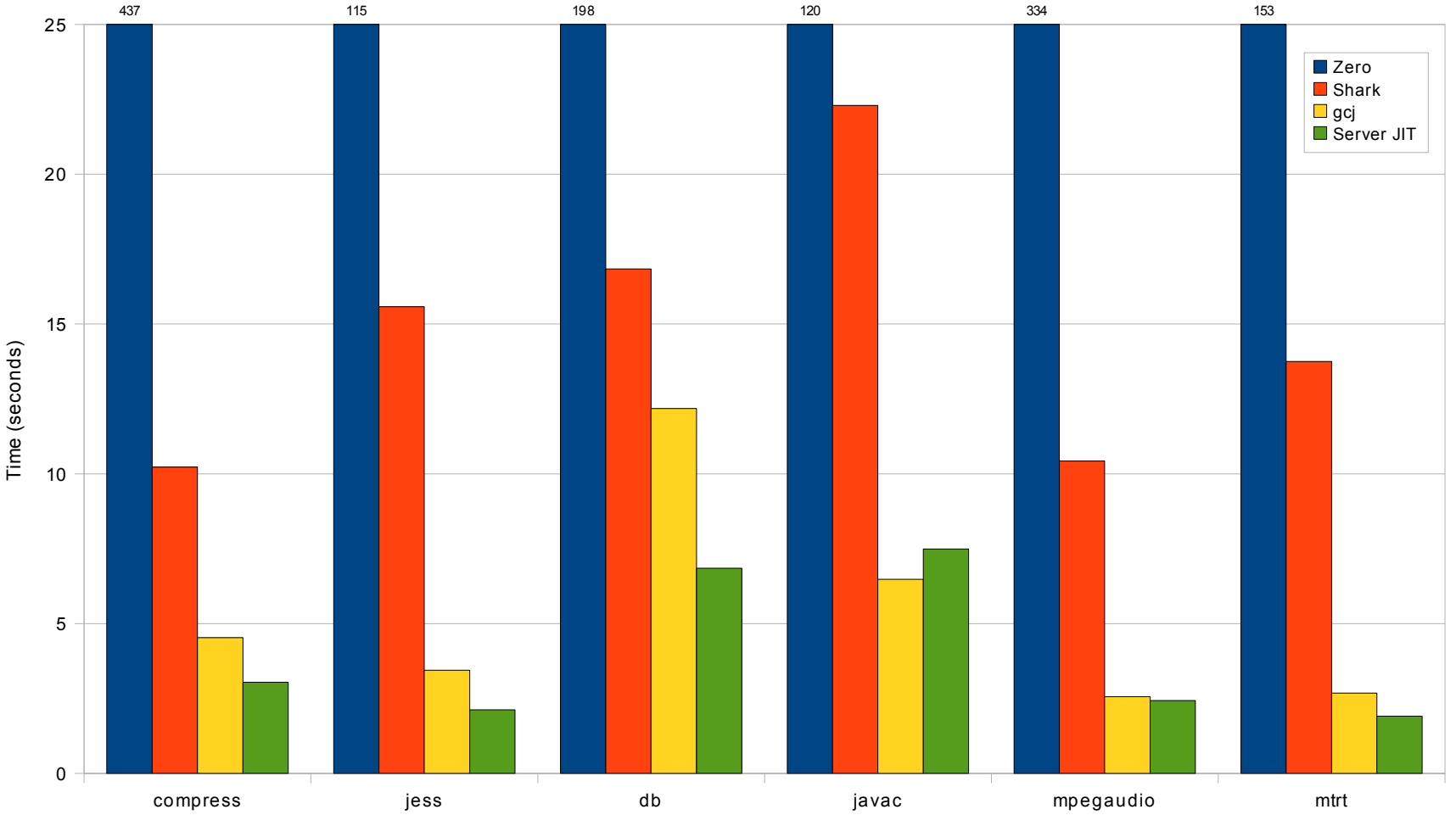
How does it work?

- Uses the same interface as HotSpot's client and server compilers
  - Same options: `-Xcomp`, `-Xmixed`, `-XX:CompileThreshold`...
  - Tiered compilation should be possible
- Three passes:
  - Server compiler's typeflow pass produces annotated bytecode
  - Shark converts annotated bytecode to LLVM IR
  - LLVM converts LLVM IR into native code

Performance



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Future work

- Stabilization
- Optimization
  - Profiling
  - Method and field lookups
  - LLVM's optimizers
  - Warmup

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Questions

- *http://openjdk.java.net/projects/zero/*
- *http://icedtea.classpath.org/wiki/ZeroSharkFaq*
- *http://gbenson.net/*

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