

__builtin_expect in Rust

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Overview

- Locating Calls
- Adding Optimization
- Testing
- Benchmarks
- Future Work

Locating Calls

- InstVisitor
 - visitBranchExpr()
 - Called via ModulePass
- Identify calls by IR pattern

```
%5 = call zeroext i1 @_Z17__builtin_expect_ii(i32 %4, i32 1)
br i1 %5, label %6, label %7
```

 - Branch based on the result of a call to our function
 - Varies slightly based on the source language

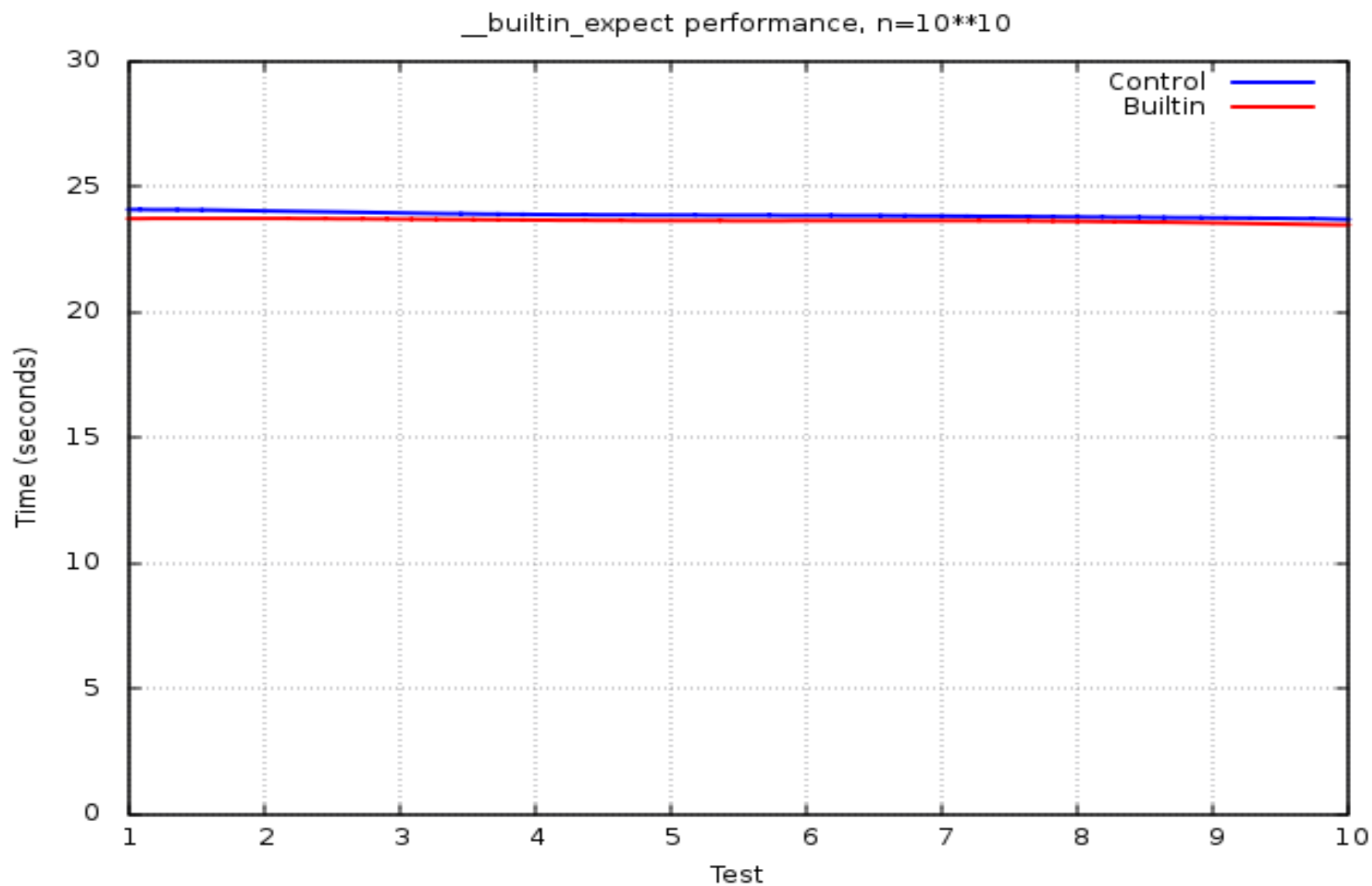
Adding Optimizations

- `MDBuilder(CallInstruction.getContext())`
- `MDBuilder.createBranchWeights(..)`
- `BranchInstruction.setMetadata(..)`

Testing

- Rust “nostd”
 - Not using Rust's testing framework
 - Have to use a float for a counter
- Compared against a duplicate function
 - Identical to `__builtin_expect` but new name
 - Has the same overall structure but lets us see the influence of the metadata only

Testing



Future Work

- Incorporating changes into the Rust core
 - Avoid requiring dummy function to piggyback
 - Can use more interesting syntax
- Adding custom weights for match statements
 - Enums that are almost always the same type
 - (e.g. Result might usually be type Ok)