Coverage-directed codebase reduction for the procedural generation of lit tests

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Motivation

Current workflow

Large real-world build

Crash/miscompile found

Reduce to create test case

File bug report upstream

Desired workflow

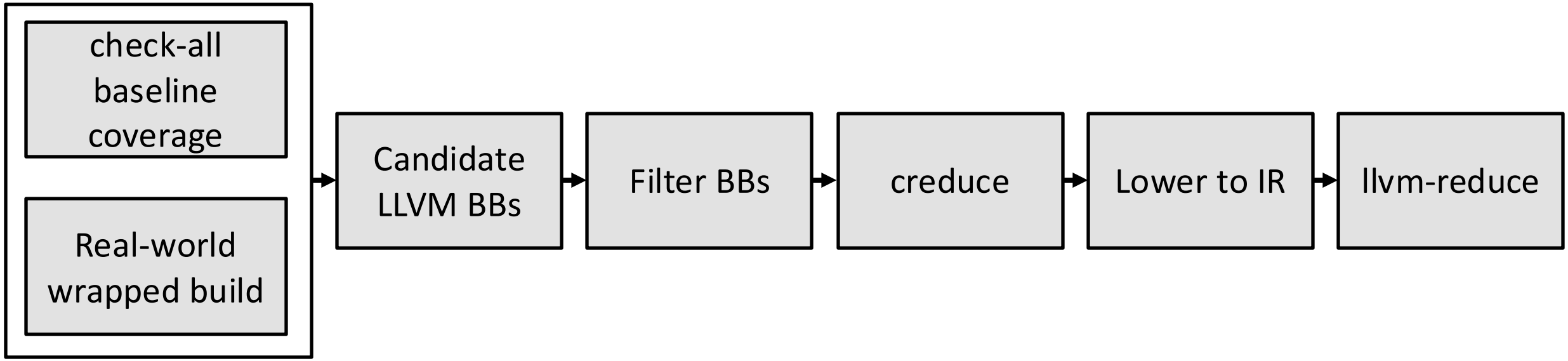
Large real-world build

New LLVM coverage found

Reduce to candidate test

Upstream before any failures

Alecto pipeline



Interestingness test

```
#!/bin/bash -e

TARGET="0x0aa1d14d5e6a4f6c 17
DAGCombiner.cpp:_ZN12_GLOBAL__N_111DAGCombiner28reduceBuildVecTruncToBitCastEPN4llvm6SDNodeE"

LLVM_PROFILE_FILE=prof.profraw clang++ -c test.cpp –O3

llvm-profdata merge prof.profraw -o prof.profdata

llvm-alookup prof.profdata $TARGET
```

Where automation gets hard

Automated well

Coverage delta detection

Testcase reduction

Convert to lit test

Still manual

Identifying genuinely useful tests

Open question