Working in Unison with Mats

Optimizing Machine Code for Fun and Profit

Roberto Castañeda Lozano

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- Funded by Ericsson AB and the Swedish Research Council

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Why Unison?

```
int fac(int n) {
  int f = 1;
  while (n > 0) {
    f = f * n;
    n--;
  }
  return f;
}
```

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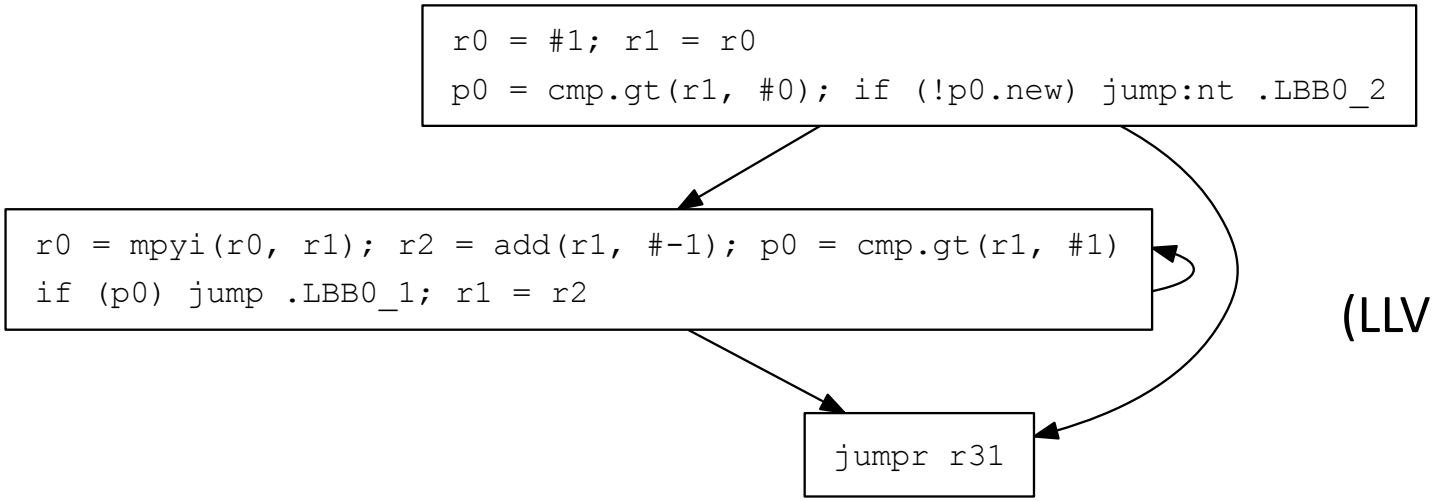

(LLVM)

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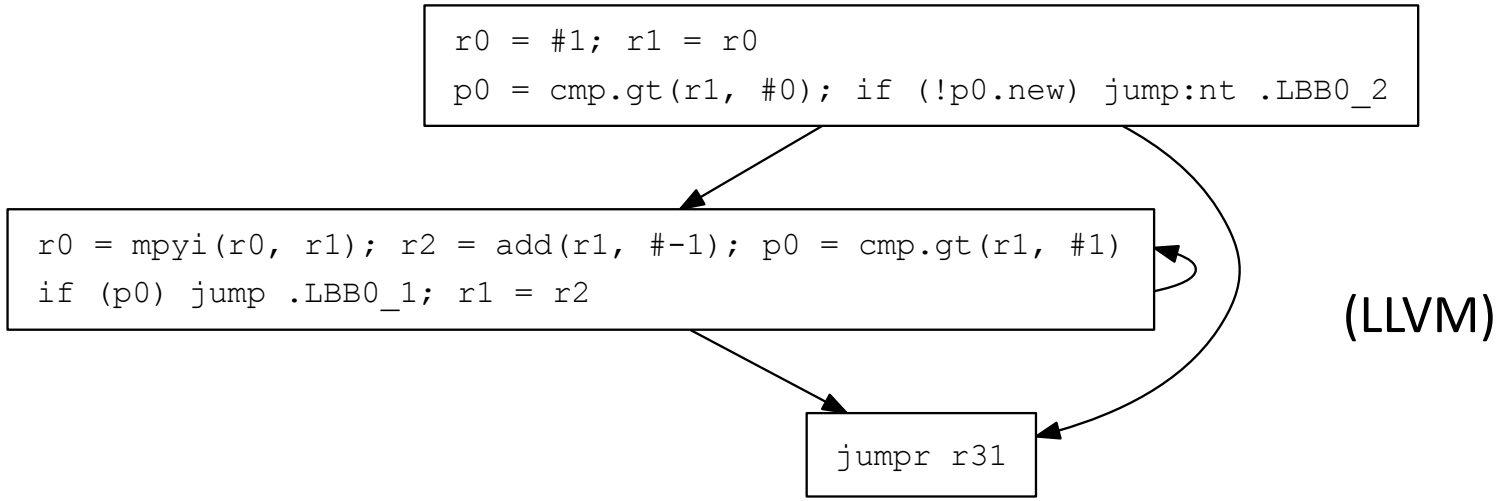

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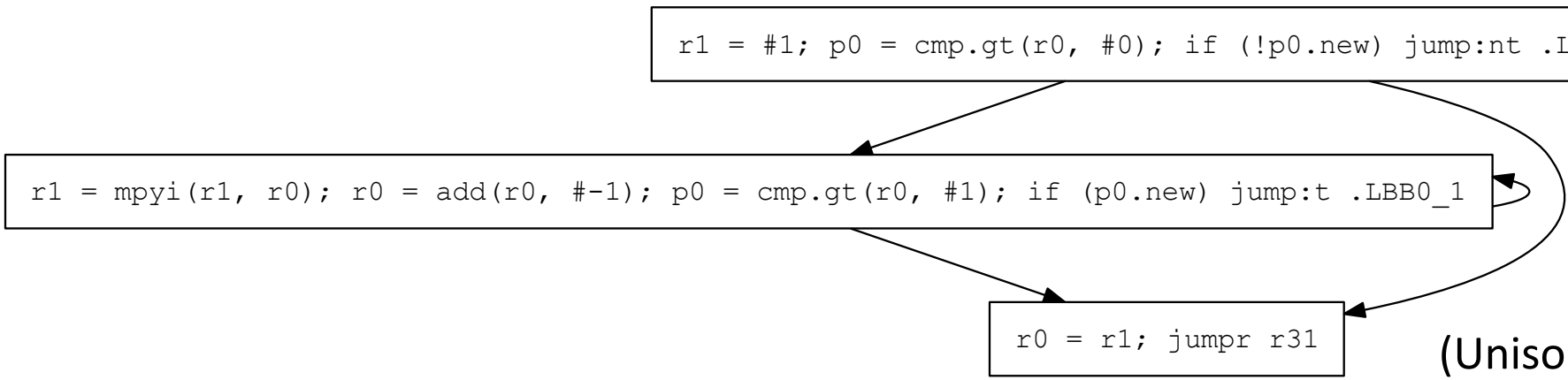

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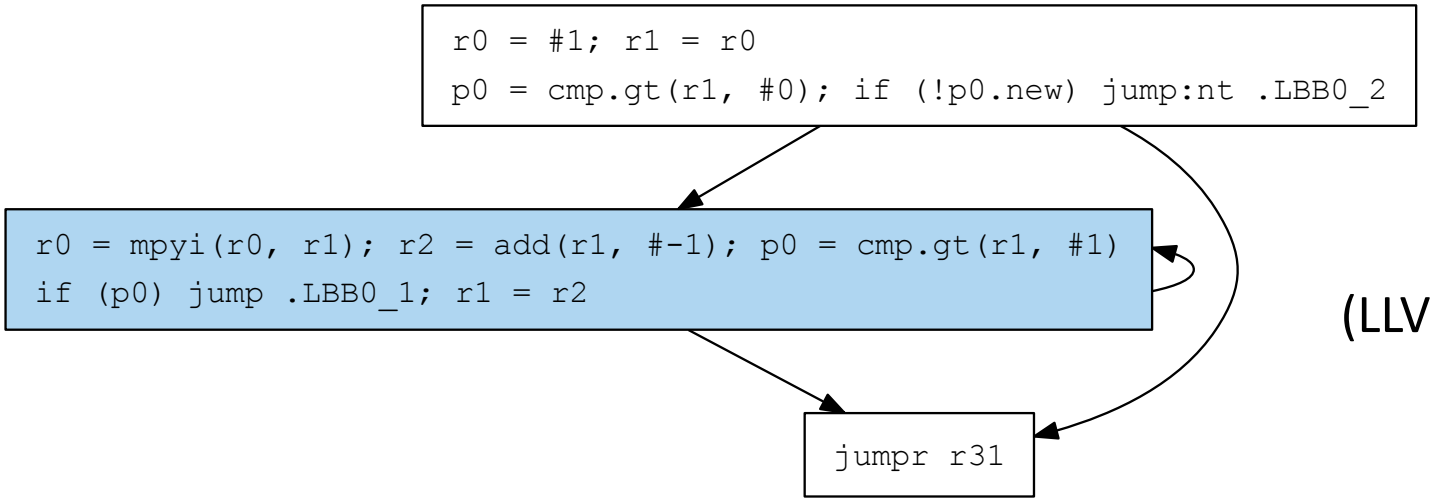
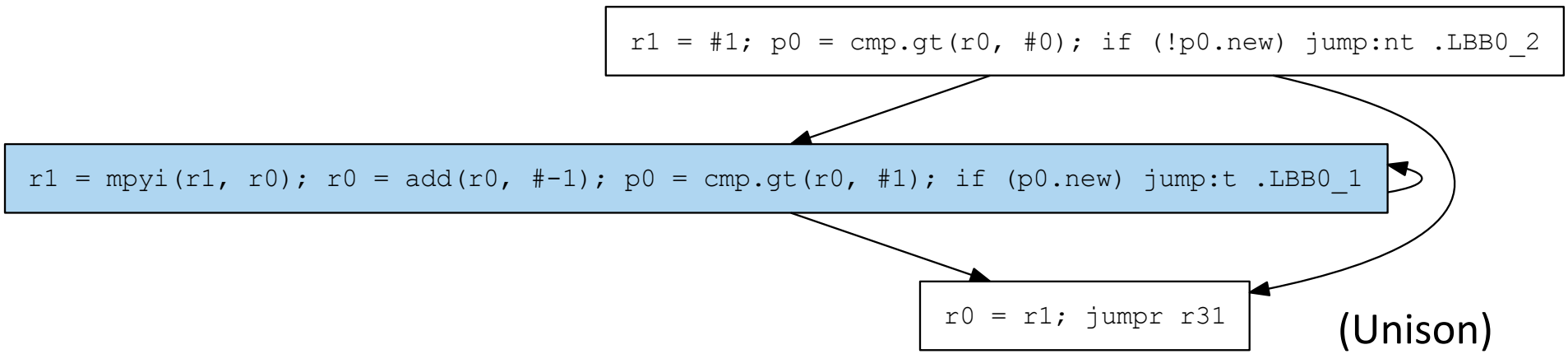


(LLVM)

Unison's loop is twice as fast: integrated scheduling and coalescing



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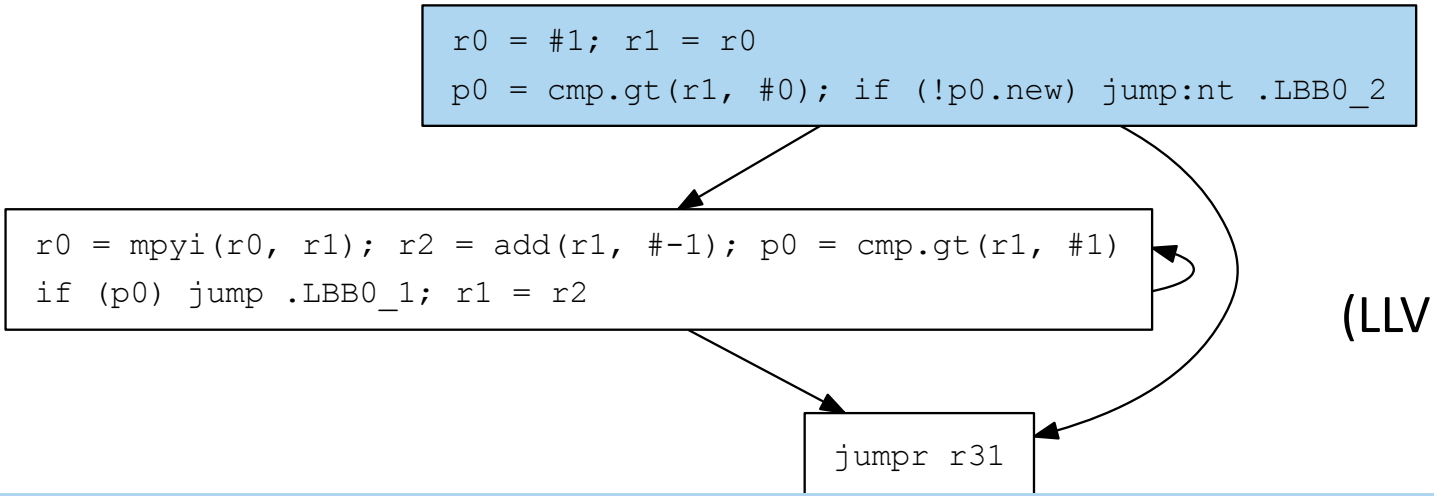
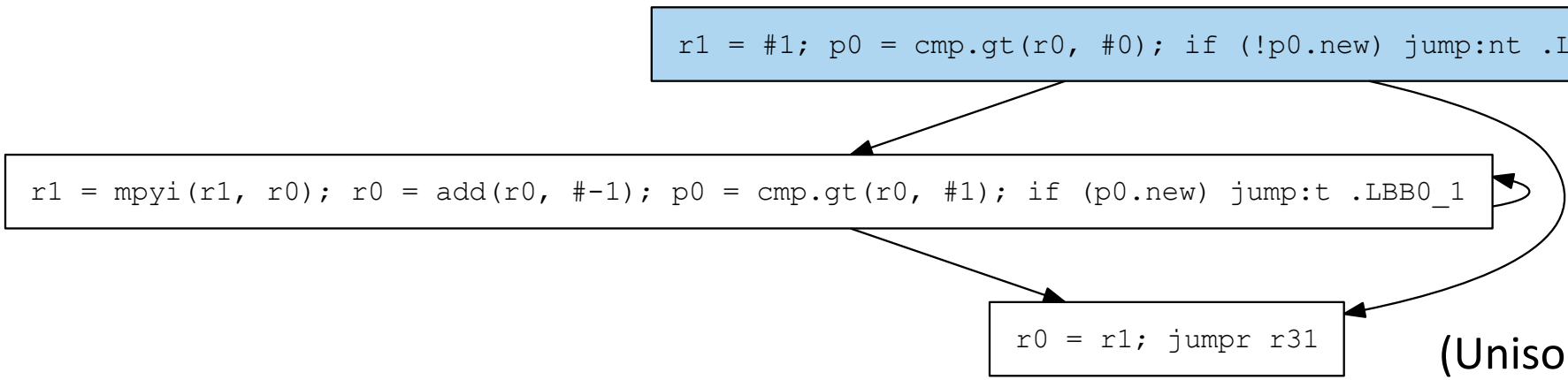


(LLVM)

Unison's initialization is one cycle faster: integrated scheduling and handling of calling conventions



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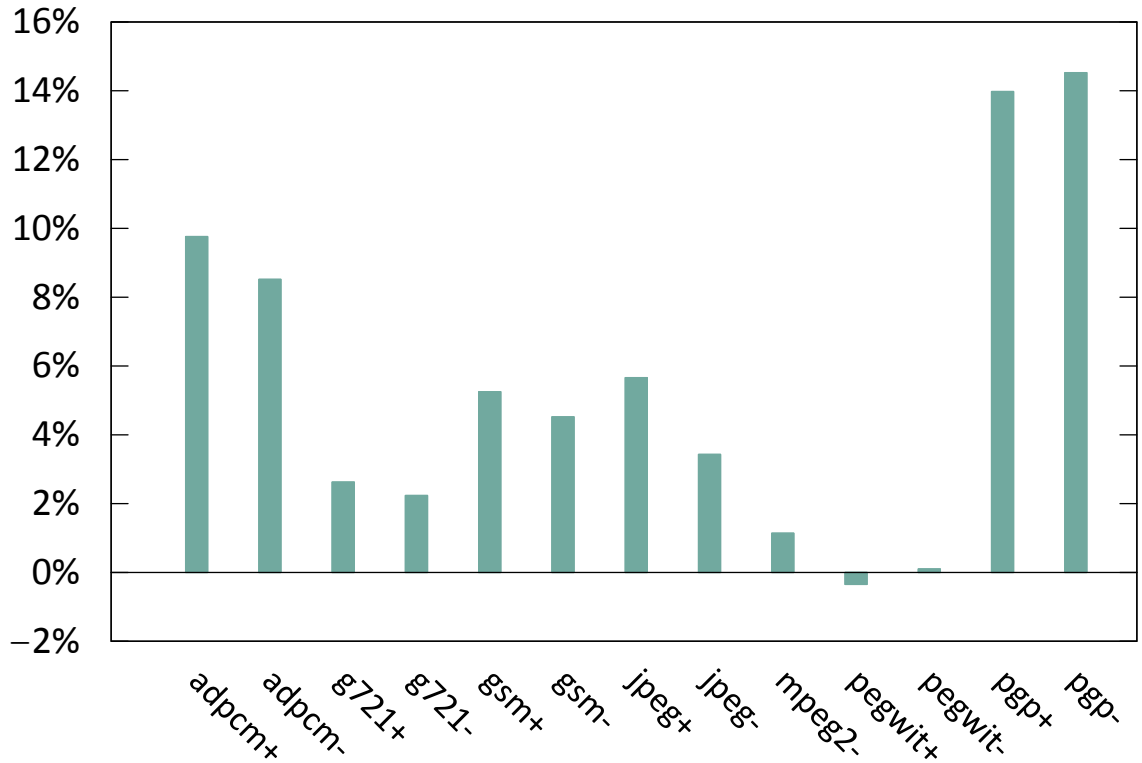
- On a larger scale: speedup over LLVM in MediaBench benchmarks (same processor)



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  - first *practical* combinatorial approach
  - industrial use: find opportunities in production compiler

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Thank you, Mats!