Speculative Parallelization on the JVM

Ivo Anjo

ESW
INESC-ID Lisboa

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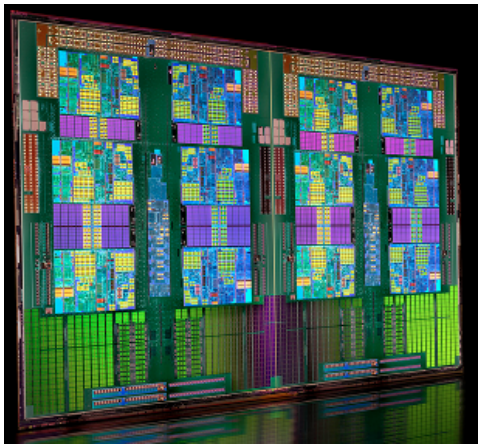
- ...even on a cheap x86 CPU:



SUNNYVALE, Calif. — 3/29/2010 AMD announces [...] the world's first 8- and **12-core** *x86 processor for the high-volume 2P and value 4P server market.*

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void method() {
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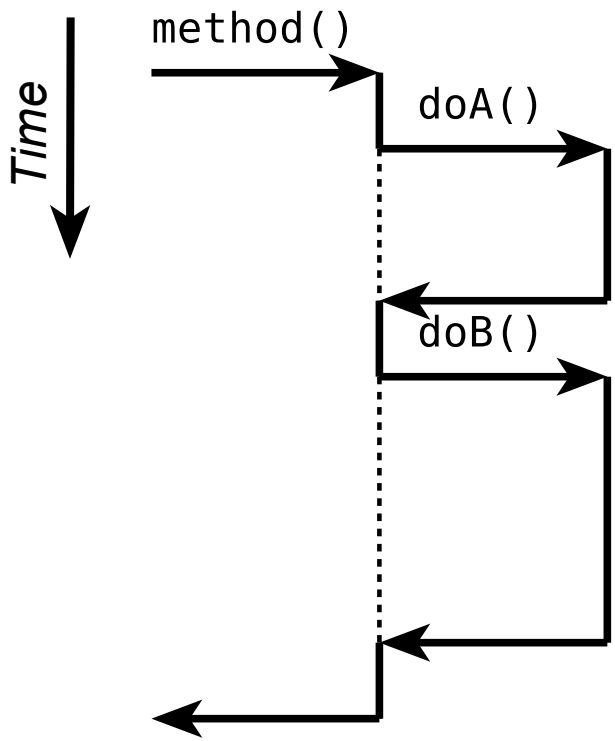
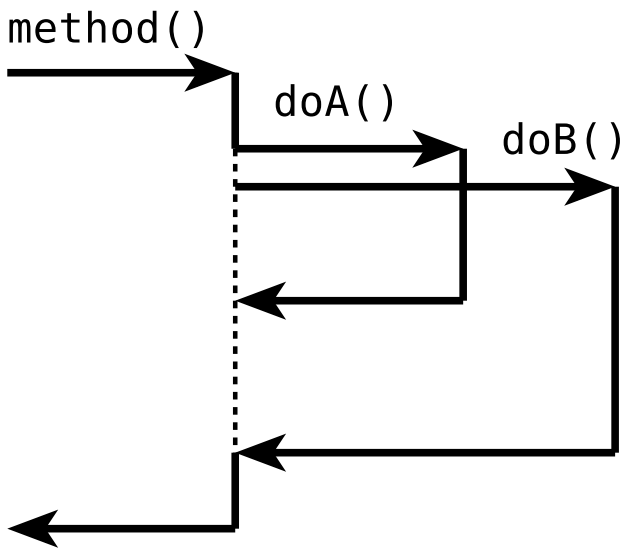


Sequential execution



Parallel execution

Problem

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  - Shared state

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Our Approach: Speculative Parallelization

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Our Approach: Speculative Parallelization

- Maybe, let's try and we'll see how it goes

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  - Hardware support just isn't there

JaSPEx

Java Speculative Parallel Executor

- Developed during my MSc

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  - Speculation

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  ➜ "Transactification"

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➜ We need to detect and handle nontransactional operations

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```
int fib(int n) {
    if (n <= 1) return n;
    return fib(n-1) + fib(n-2);
}
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  - Hard to do finer-grain stuff
- Currently, cannot reuse threads FJ style, hard to migrate call stacks

jvstm for speculation

What I need:

jvstm for speculation

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- buffer speculative writes (aka write-set)

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- versions
- read-only
- ...

What would come in handy:

- non-linear nesting :)

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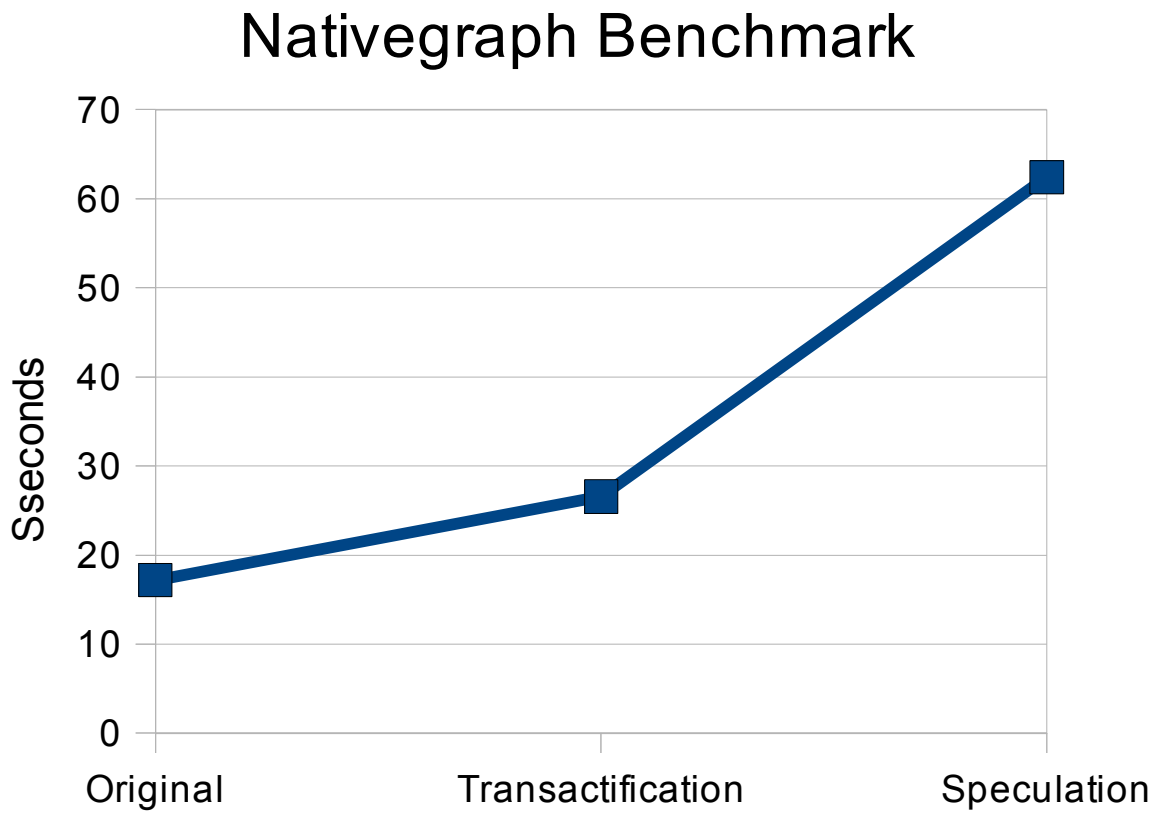
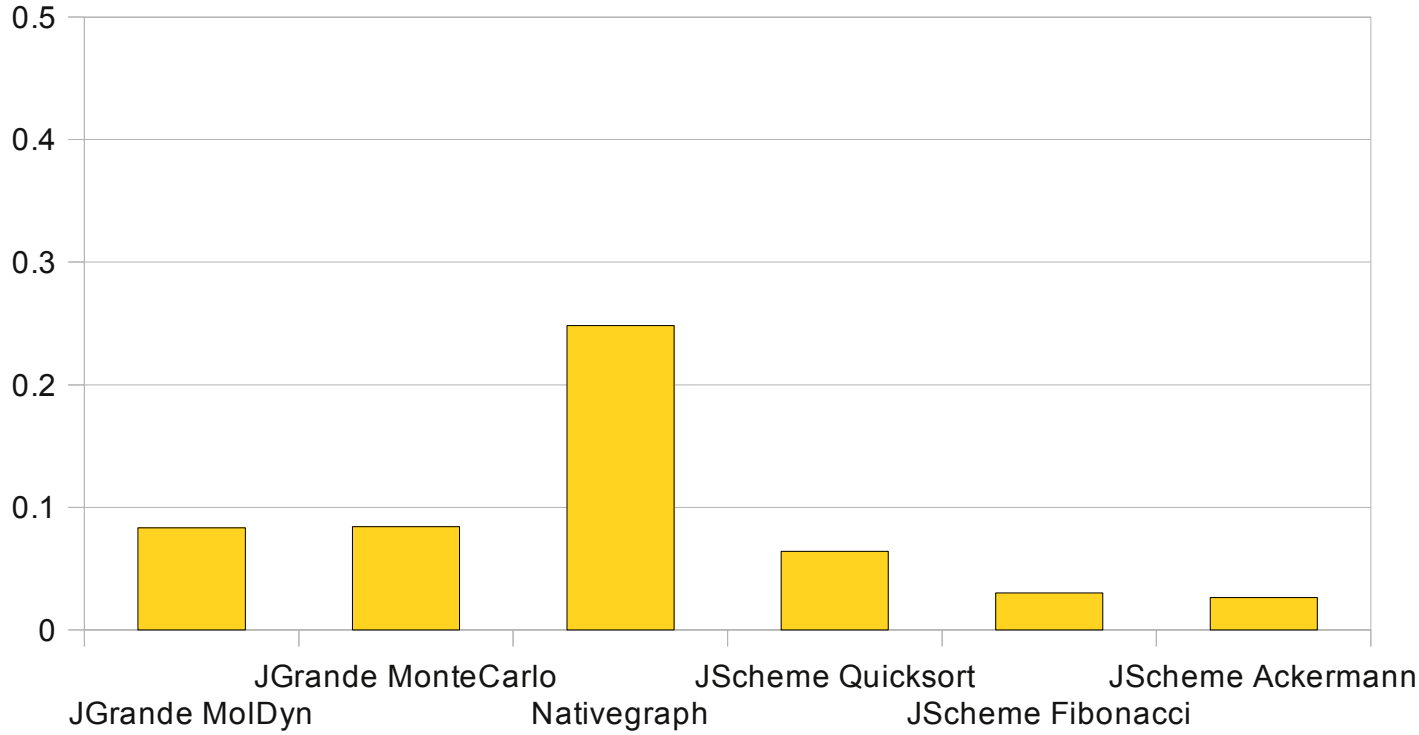
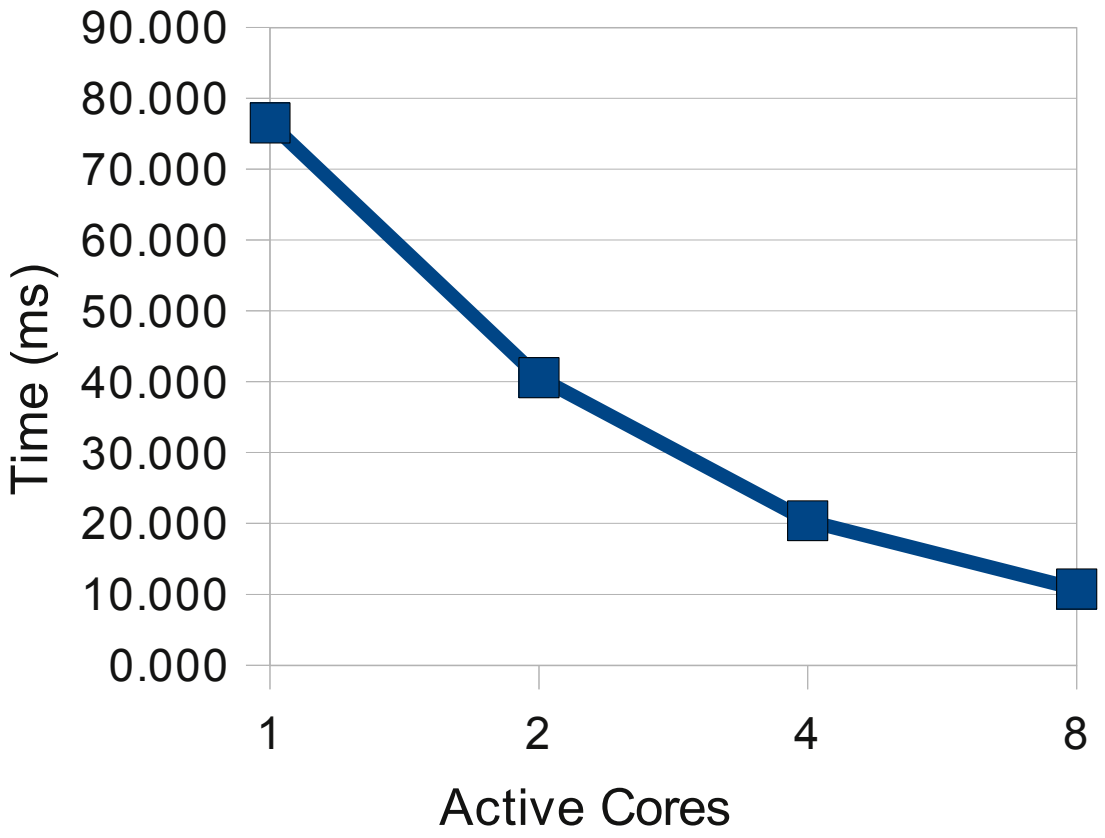
Benchmarks


Nativegraph Benchmark
Sseconds
70
60
50
40
30
20
10
0
Original
Transactification
Speculation



Relative **slowdown** for some benchmarks

➜ Should be a bit better now



Time for calculating `fib(50)` com 1..8 cores

Conclusions/Future Work

- Doing all of this using bytecode was an interesting experiment

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- We hope to solve some of these issues and obtain real results by adapting a JVM to our use-case

The end

Questions?