

Threading in Parrot

Stefan “nine” Seifert

This talk

- Introduction
- Existing solutions
- Green Threads
- Hybrid Threads
- Implementation
- Results

Who has used threading in Perl 5?

Threading in Perl 5

- 5.005 threads
 - everything shared
 - unstable
 - unfixable problems

Threading in Perl 5

- `ithreads`
 - explicit sharing
 - easy to use
 - terrible performance

What's so difficult about threads?

Method calls:

```
$foo->bar();
```

```
$foo->bar();
```

Method call

- Fetch foo's class
- Fetch meta class
- Fetch method
- Call method

Threading in Python

- Global Interpreter Lock



Parrot

speaks your language

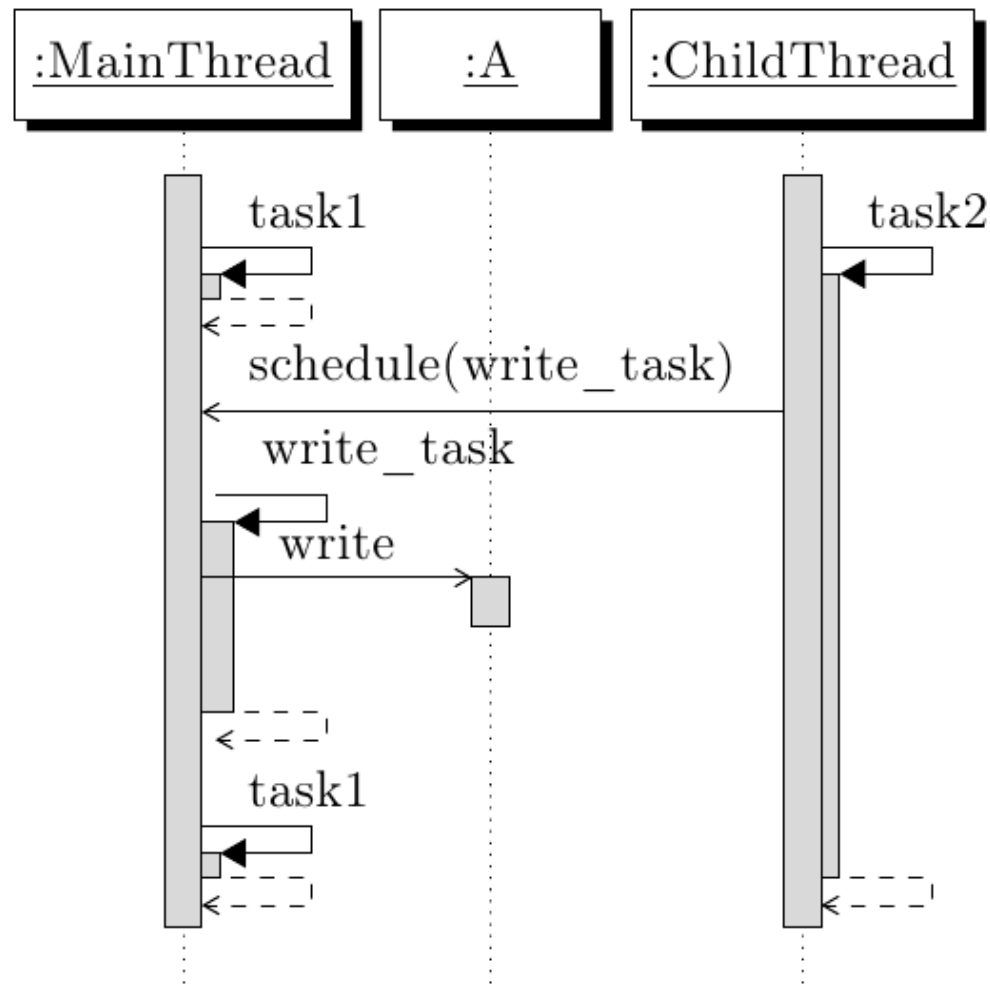
Green Threads

- Tasks
- Managed by the interpreter
- Preemption
- Use only 1 CPU core

Hybrid Threads

- Worker threads
- Variable is owned by exactly one thread
- Read by all threads
- Write by the owner thread
- Tasks as messages
- Explicit sharing

Writing to foreign variable



Example message

```
.sub write_task  
    .param pmc variable  
    variable = 1  
.end
```

Example using task

Implementation

- Scheduler
- Timer
- Proxies
- GC

Scheduler

- task queue
- outer runloop

Timer

- It's own thread
- Only really handles one alarm
- Notifies threads on expiry

Proxies

- Created for shared variables
- Pass on read calls
- Creates proxy for results
- Exception on write

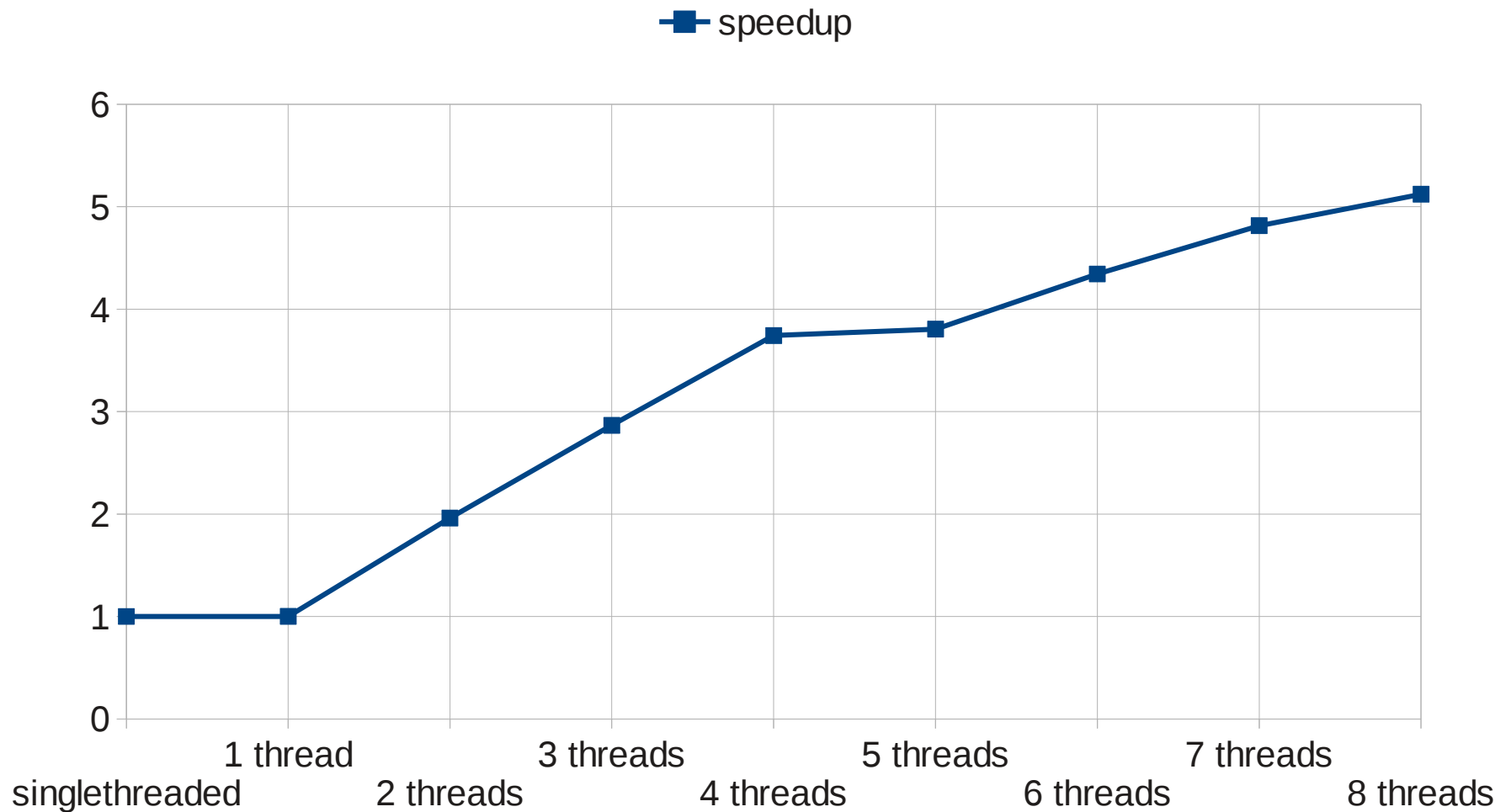
Garbage Collector

- 1 GC per thread
- More locks than anticipated

Results

- Fully implemented
- Hopefully in the next parrot release
- Performance dependent on R/W ratio

Mandelbrot calculation



Thank you very much!

<http://www.parrot.org>