

PyPy Status Talk

(no no, PyPy is not dead)

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based on a PyCon Italia talk by Antonio Cuni



EuroPython

July 22, 2014

Who Am I

- rguillebert on twitter and irc
- GSoC student on PyPy/Cython
- PyPy contributor since 2011
- Worked on Py3k and Numpy

PyPy is not dead

- No PyPy status talk at EuroPython 2013
 - ▶ for the first time since 2004!
 - ▶ for no good reason :)
- PyPy is healthy and alive
- WARNING: This talk is boring
 - ▶ "it just works"

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What is PyPy?

- RPython toolchain
 - ▶ subset of Python
 - ▶ ideal for writing VMs
 - ▶ JIT & GC for free
- Python interpreter
 - ▶ written in RPython
 - ▶ **FAST**
- Whatever (dynamic) language you want
 - ▶ smalltalk, prolog, PHP, javascript, ...

PyPy: past two years (1)

- PyPy 2.0 (May 2013)

- ▶ beta ARM, CFFI, unicode performance
- ▶ stackless + JIT (eventlet, gevent, ...)

- PyPy 2.1 (July 2013)

- ▶ stable ARM
- ▶ py3k (3.2.3), numpy, general improvements, bugfixes

- PyPy 2.2 (November 2013)

- ▶ incremental GC, faster JSON
- ▶ more JIT, more py3k
- ▶ more numpy, numpy C API

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PyPy: past two years (2)

- PyPy 2.3 (May 2014)
- Lot of internal refactoring
- C API for embedding
 - pypy + uWSGI (thanks to Roberto De Ioris)
- the usual, boring, general improvements

More PyPy-powered languages

- RPython: general framework for dynamic languages
- Topaz: implementing Ruby
 - ▶ most of the language implemented
 - ▶ "definitely faster than MRI"
 - ▶ <https://github.com/topazproject/topaz>
- HippyVM: implementing PHP
 - ▶ ~7x faster than standard PHP
 - ▶ comparable speed as HHVM
 - ▶ <http://hippyvm.com/>

Fundraising campaign

- py3k: 52'000 \$ of 105'000 \$ (50%)
- numpy: 48'000 \$ of 60'000 \$ (80%)
- STM, 1st call: 25'000 \$
- STM, 2nd call: 3'000 \$ of 80'000 \$ (4%)
- thank to all donors!

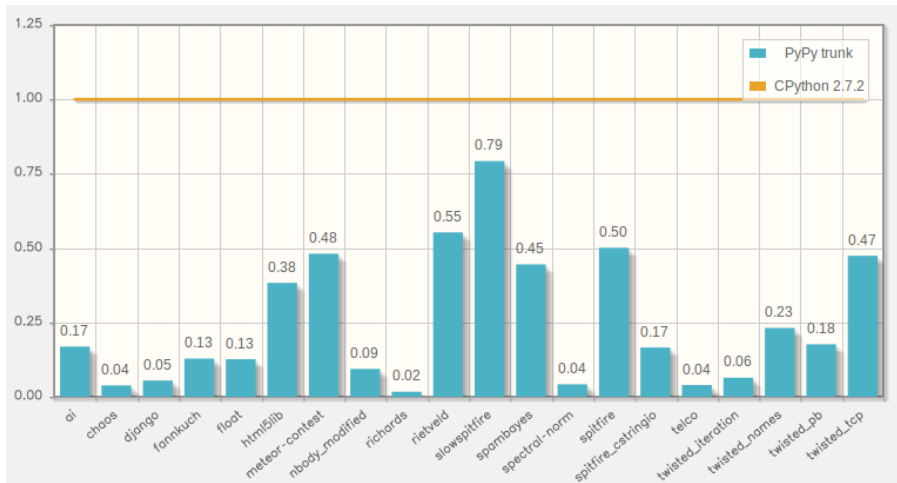
Commercial support

- We offer commercial support for PyPy
- Consultancy and training
- Performance issues for open- or closed-source programs, porting, improving support in parts of the Python or non-Python interpreters, etc.

Current status

- Python code: "it just works"
- C code: better than ever!
 - ▶ cpyext: more complete, but still slow
 - ▶ CFFI: the future
 - ▶ Native PyPy C API for embedding
 - ▶ cppy for C++
- Lots of CFFI modules around:
 - ▶ pygame_cffi, psycopg2_cffi, lxml
- numpy: in-progress (more later)

Speed: 6.5x faster than CPython



ARM

- Official support since PyPy 2.1
- "it just works"
- ~7.5x faster than CPython on ARM
- thanks to Raspberry-Pi foundation
- distributed as part of Raspbian OS

numpy

- as usual, in-progress
- ~80% of numpy implemented
 - ▶ 2336 passing tests out of 3265
 - ▶ <http://buildbot.pypy.org/numpy-status/latest.html>
- just try it
- no scipy :-/

- 3.2: stable
- 3.3: branch started, in-progress
- some missing optimizations
 - ▶ getting better

CFFI

- Python <-> C interfacing done right
 - ▶ existing shared libraries
 - ▶ custom C code
- Inspired by LuaJIT's FFI
- Alternative to C-API, ctypes, Cython, etc.
- Fast on CPython, super-fast on PyPy

- Interface to C++
- Based on reflection, no need to write wrappers
- PyPy-only, similar to PyCintex for CPython
- Main use case: ROOT
 - ▶ `http://root.cern.ch`
 - ▶ "a set of OO frameworks with all the functionality needed to handle and analyze large amounts of data in a very efficient way"
- 3x faster than CPython

The future: STM

- Software Transactional Memory
- Strategy to solve race conditions
- "Finger crossed", rollback in case of conflicts
- On-going research project
 - ▶ by Armin Rigo and Remi Meier

Current status for STM

- Preliminary versions of pypy-jit-stm available
- The overhead is still a bit too high and hard to predict
- Lots of polishing needed
- More fundamentally, how to best use it is still unknown
- See talk tomorrow

Contacts, Q&A

- `http://pypy.org`
- `http://morepypy.blogspot.com/`
- `#pypy@freenode.net`
- Any question?