PyPy Status Talk
(no no, PyPy is not dead)

Armin Rigo, Romain Guillebert
based on a PyCon Italia talk by Antonio Cuni

EuroPython

July 22, 2014

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"

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"

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

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

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

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!

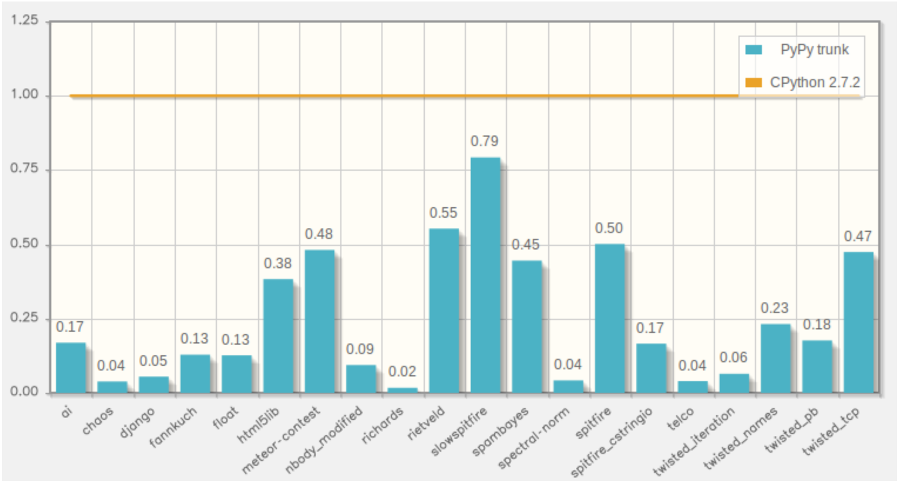
Commercial support

- 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
  - cppyy 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 :-/

py3k

- 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

cppy

- 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 precict
- 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/`
- Any question?