PyPy Status Update

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PyCon Otto

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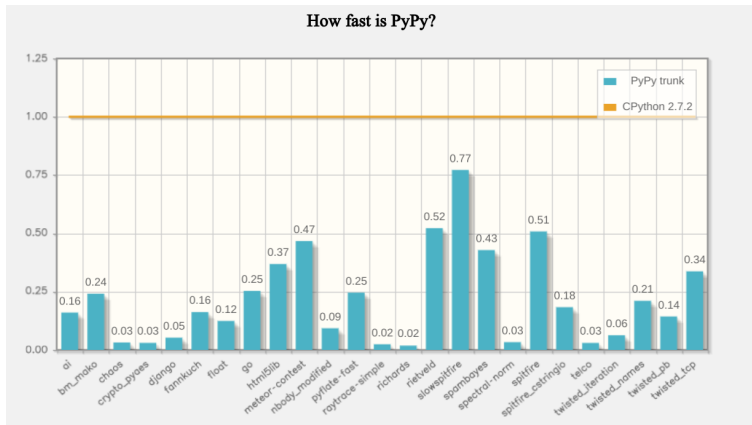
About me

- PyPy core dev
- `pdb++`, `fancycompleter`, `capnpy`, ...
- Consultant, trainer
- `http://antocuni.eu`

What is PyPy

- Alternative, fast Python implementation
- Performance: JIT compiler, advanced GC
- PyPy 5.7.1
  - x86, ARM, s390x, PPC
- http://pypy.org

Speed

How fast is PyPy?

- 7.4 times *faster* than CPython
- http://speed.pypy.org

Usual questions

- **Is it stable/mature? Can I use it in production?**
- Does package X work?
- What about Python 3?

PyPy in the real world (1)

gambitresearch

- High frequency trading platform for sports bets
  - ▸ low latency is a must
- PyPy used in production since 2012
- ~100 PyPy processes running 24/7
- up to 10x speedups
  - ▸ after careful tuning and optimizing for PyPy

PyPy in the real world (2)

MAGNE+IC™

- Real-time online advertising auctions
  - tight latency requirement (<100ms)
  - high throughput (hundreds of thousands of requests per second)
- 30% speedup

  We run PyPy basically everywhere
  Julian Berman

PyPy in the real world (3)

Crossbar.io
Networking for apps

- IoT on the cloud
- 5-10x faster

  We do not even run benchmarks on CPython
  because we just know that PyPy is way faster
  Tobias Oberstein

Usual questions

- Is it stable/mature? Can I use it in production? ✓
- **Does package X work?**
- What about Python 3?

cpyext

- Pure Python pacakges just work (TM)
- C extensions goes through **cpyext**
- Lots of progresses in the compatibility area
- Still slow
    - ▸ Crossing the Python/C border takes ages
    - ▸ lots of low hanging fruits to be taken :)
- Use CFFI if possible

demo

live demo time :)

numpy

- It just works
  - ~5 failing tests
- Better GC integration needed
- The GC does not know how much raw memory numpy objects are keeping alive
  - It **looks like** a memory leak

Other libs

- cython
  - it works
- pandas
  - ~95% of passing tests
  - most failures are because it cannot find Tkinter libs
  - We saw some segfaults
- scipy
  - ~99% of passing tests
  - Numpy memory leaks?
- matplotlib
  - Saving to disk works
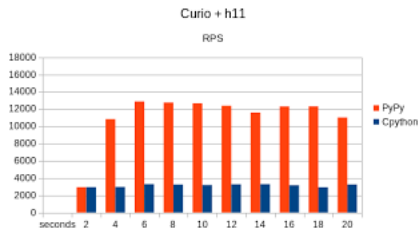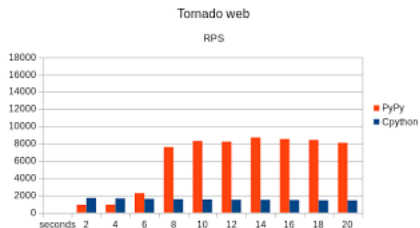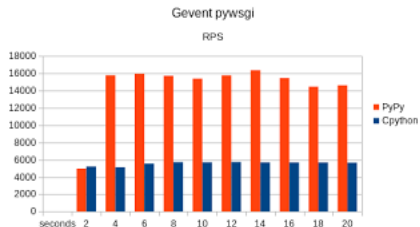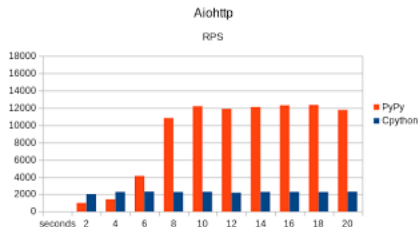 - Jupyter inline works
  - no GUI backends

Usual questions

- Is it stable/mature? Can I use it in production? ✓
- Does package X work? ✓
- **What about Python 3?**

PyPy 3.5

- PyPy 5.7.1 supports Python 3.5 (beta)
- Funded by a big grant by Mozilla (thanks!)
  - https://morepypy.blogspot.com/2016/08/
    pypy-gets-funding-from-mozilla-for.html
- Still some failing tests
- Very good results on asyncio

PyPy 3.5 asyncio

- Between 2.87 and 8.08 times faster

Usual questions

- Is it stable/mature? Can I use it in production? ✓
- Does package X work? ✓
- What about Python 3? ✓
- **Bonus topic: vmprof**

VMProf

- Statistical profiler
- Low overhead (~5%)
- For CPython and PyPy
- Distinguish between:
  - Interpreter
  - Native code
  - JIT (PyPy only)
  - GC (PyPy only)

VMProf example

```
$ python -m vmprof --web foobar.py
$ pypy -m vmprof --web foobar.py
$ pypy -m vmprof --web --jitlog
foobar.py
```