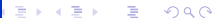# How to write cross-interpreter programs

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This talk

- most people only target CPython (or Jython or IronPython)
- sometimes, you want your program to run on each of those
- libraries are more often cross-interpreter

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- libraries are more often cross-interpreter
- hope to give you more reasons tomorrow
- won't talk about py3k

My background

- worked a lot with PyPy compatibility issues
- helped to port twisted, django and other projects to run on PyPy
- a lot of cooperation with Jython people

- extensive test suite
- good coverage

Exceptions

- TypeError vs AttributeError change often between implementations, even CPython versions
- don't rely on exception string messages (they may differ)

```
try:
  ...
except ImportError, ie:
  if str(ie) != '...':
    raise
```

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- also means - don't use doctests

Subclasses of builtin types

- in general overridden methods on subclassed builtin types are not invoked by preexisting other methods

```
class d(dict):
  def __getitem__(self, e):
    ...
```

- would `keys()` go via this getitem?
- tests are your friend

Access to 3rdy party libraries

- there is no good story here
- ctypes based access is going to be supported by all Pythons
- are there pure Python replacements/options?
- separate out dependencies/especially optional ones

Don't rely on refcounting

- example

  ```
  open('x', 'w').write('stuff')
  ```

- on refcounting, flushes file immediately
- on any other GC, it might be deferred for a while
- the single most-common problem when porting twisted to PyPy

__del__

- resurrection on CPython will call __del__ multiple times, other Pythons exactly once
- cycles with __del__s are not collected by CPython, PyPy breaks them randomly instead
- in PyPy and Jython __del__ cannot be attached to classes after creation

Use new-style classes

- 3.x ready
- much faster on PyPy, too

`sys.prefix`

XXX think about

- implementations may have different installation layouts
- open issue, at least for PyPy, has compatibility consequences with setuptools

IO bytes vs unicode

- convert/decode as soon as possible, keep text and bytes apart
- for 2.x Pythons use str for bytes and unicode for text
- the distinction is deeper in 3.x (`str` is `unicode`, `bytes` exist with slightly different interface than old `str`)

Don't concatenate strings

- use `"".join(...)`
- if you care about performance, try this and `cStringIO`

Obscure corners

- non-string keys in type dictionaries
- introspection results, implementation objects (e.g. builtin methods etc), may have different types
- exact naming of things (like list-comprehension variable)

Questions?

- http://morepypy.blogspot.com
- http://pypy.org