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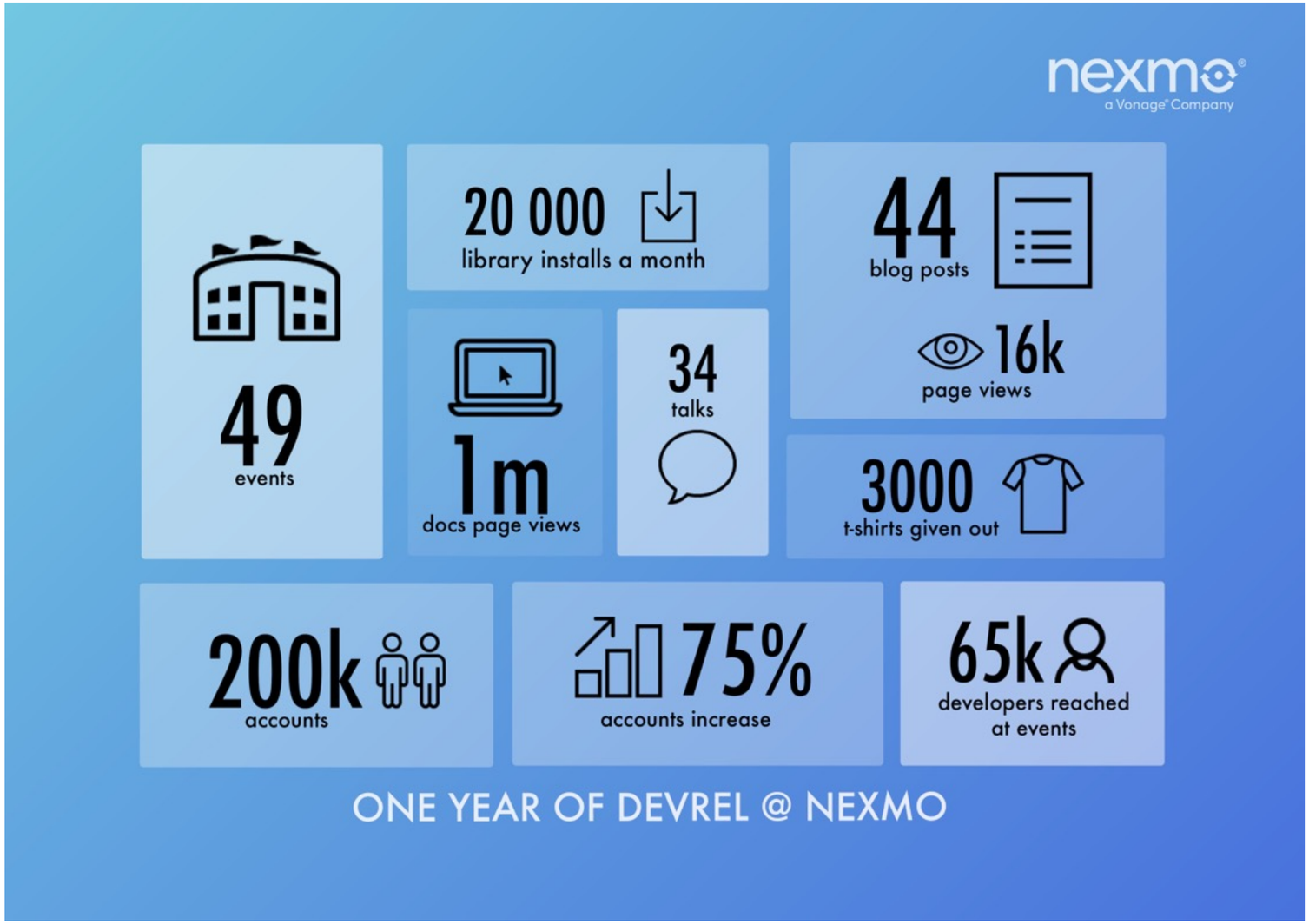
Pythonic Refactoring

& protecting your users from change

Mark Smith

- Developer Advocate @ Nexmo
- Python Edinburgh
- @judy2k
- Stupid Python
- Not a Viking


nexmo
a Vonage Company
49
events
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library installs a month
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44
blog posts
16k
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t-shirts given out
200k
accounts
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accounts increase
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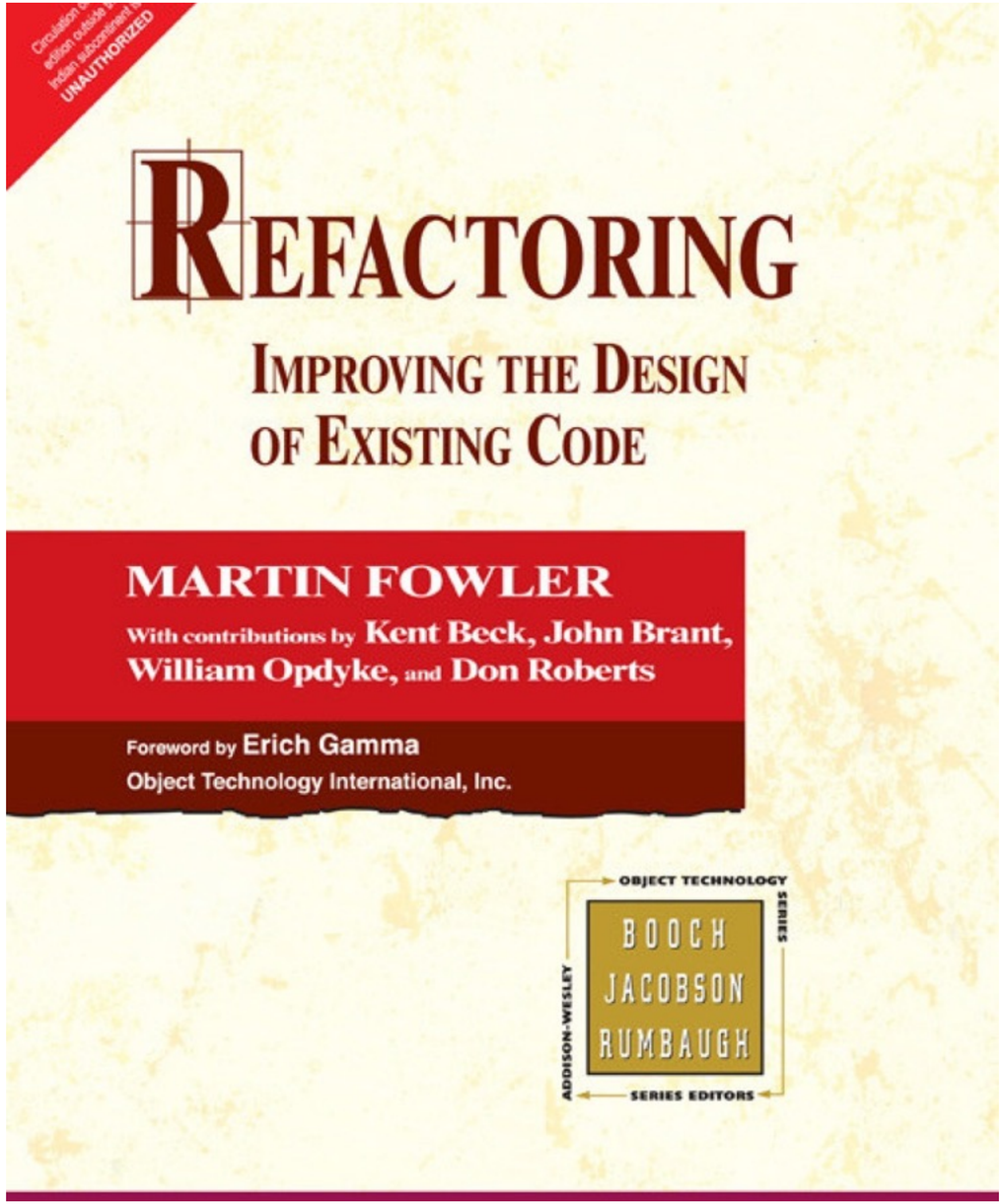
developers reached
at events
ONE YEAR OF DEVREL @ NEXMO

Me & Nexmo ❤️

This is **not** actually a talk about refactoring



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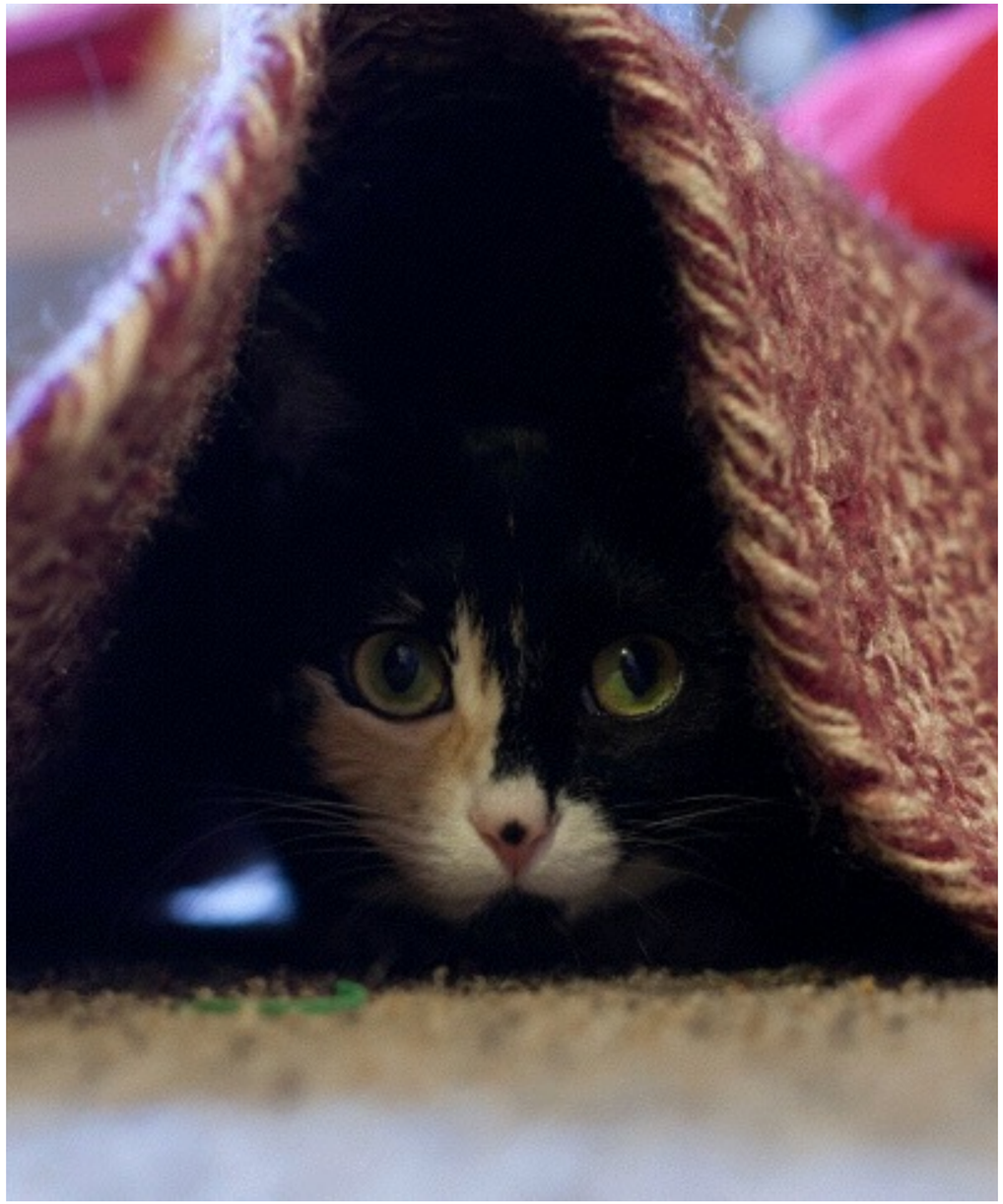
This is a talk about **change**

… and about **hiding change** from your users



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Ensure Your Interface is Stable

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What *is* your Interface?

Exceptions

Structure

Global Variables

Modules

Bytecode

Parameters

Classes

Functions
& Methods

Interfaces should be
as **strict** as possible

Things that are like this

- REST *(2000)*
- J2EE *(1999)*
- SOAP *(1998)*
- CORBA *(1991)*

Python is not like this

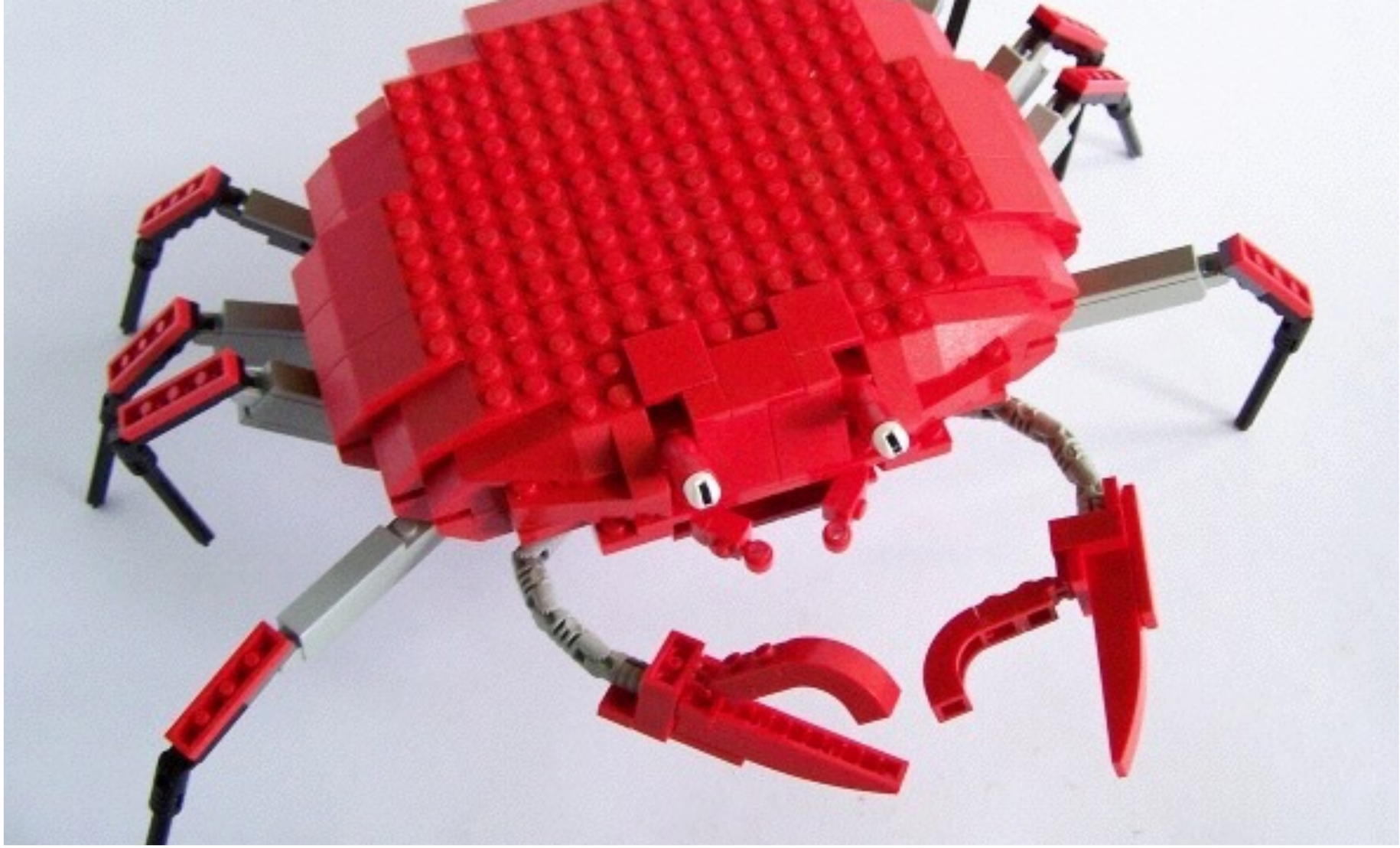
```
>>> import requests
>>> dir(requests)
['ConnectTimeout', 'ConnectionError', 'DependencyWarning',
'FileModeWarning', 'HTTPError', 'NullHandler', 'PreparedRequest',
'ReadTimeout', 'Request', 'RequestException', 'Response', 'Session',
'Timeout', 'TooManyRedirects', 'URLRequired', '__author__', '__build__',
'__builtins__', '__cached__', '__copyright__', '__doc__', '__file__',
'__license__', '__loader__', '__name__', '__package__', '__path__',
'__spec__', '__title__', '__version__', '_internal_utils', 'adapters',
'api', 'auth', 'certs', 'codes', 'compat', 'cookies', 'delete',
'exceptions', 'get', 'head', 'hooks', 'logging', 'models', 'options',
'packages', 'patch', 'post', 'put', 'request', 'session', 'sessions',
'status_codes', 'structures', 'utils', 'warnings']
```

```
import requests

def stupid_request(*args, **kwargs):
    print("Don't be stupid!")

requests.get = stupid_request
```

```
import requests
requests.get("https://www.reallycoolsite.com/")

# Don't be stupid!
```

What we would like

Python



Pythonic

Making your interface knowable

Underscore Prefix

```
class HammerTime(object):
    def _dont_touch_this(self):
        print("Stop!")


mc = HammerTime()
mc._dont_touch_this()
# Stop!
```

Double-Underscores

```
class HammerTime(object):
    def __cant_touch_this(self):
        print("Stop!")


mc = HammerTime()
mc._HammerTime__cant_touch_this()
# Stop!
```

Structure

Hide your private code in submodules

Documentation

The Python ecosystem has **excellent** documentation

Your users will use the interface

that you document

If you **don't** write documention…

…users will **read your code**

If you **don't** write documention…

…users will **guess** the interface

… and they'll get it **wrong**

Use **Sphinx** or **Mkdocs**

Don’t auto-generate your docs!

Should you use **type hints**?

Q: What is your interface?

A: Code that is documented

Testing

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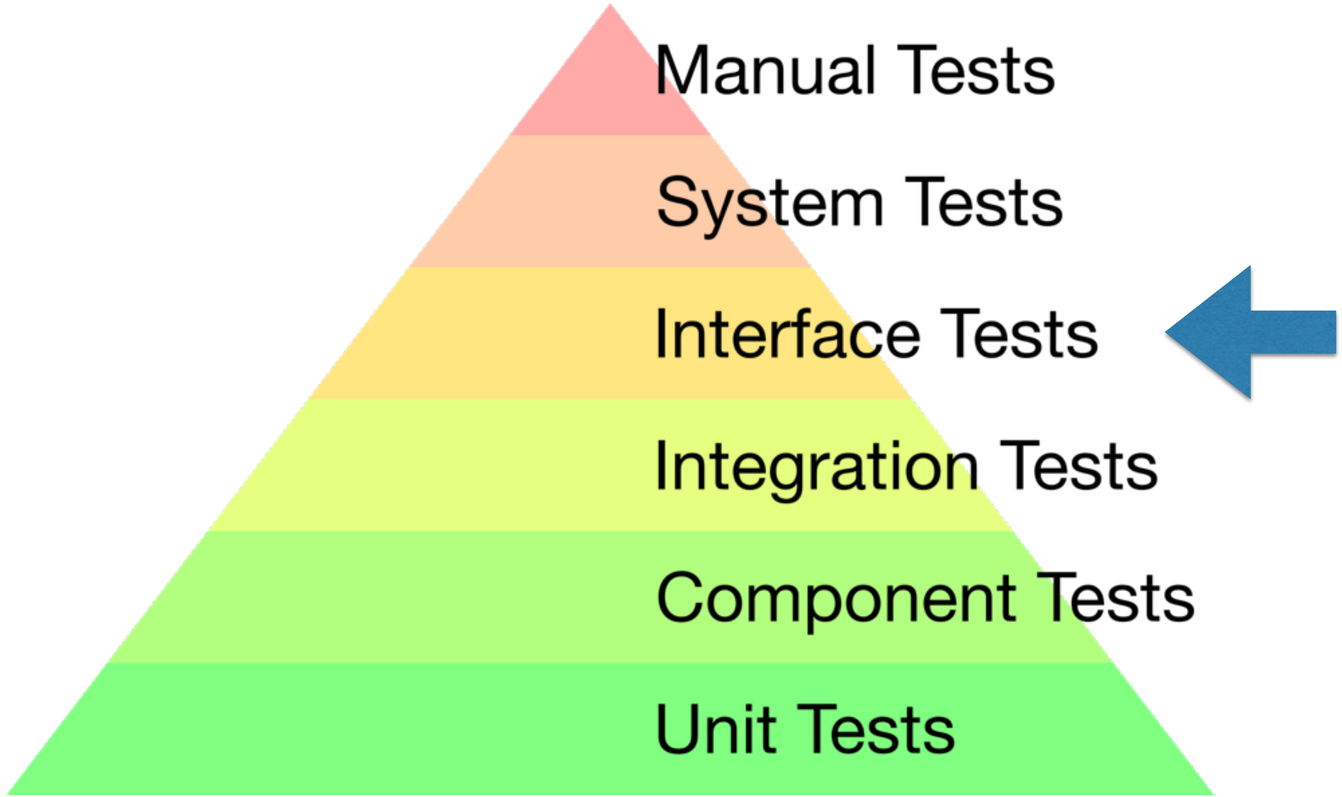
"Code without tests
is broken by design."

— Jacob Kaplan-Moss

Test Types


Manual Tests
System Tests
Interface Tests
Integration Tests
Component Tests
Unit Tests

Versioning

Semantic Versioning

Major.Minor.Patch

- **Patch** - No interface change
- **Minor** - Additions, backwards-compatible changes
- **Major** - Modifications of existing interface. Incompatible

Release Notes

- Added
- **Changed**
- Deprecated
- **Removed**
- Fixed
- Security

keepachangelog.com

It *is* okay to break compatibility

OCCASIONALLY!

Add & **Deprecate**

… instead of modifying

Good Engineering Practices

protect your users from change

Technical Solutions

Finally, some *Python*!

Object Attribute to Property

@property

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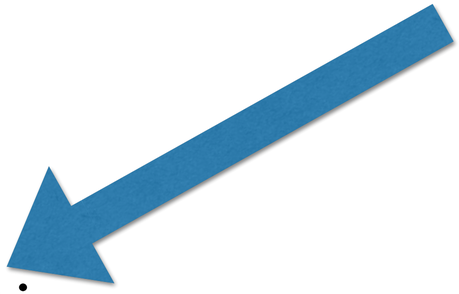
Singletons & factories

Implement **__new__**

Functions to Methods

Default Instance Refactoring

Default Instance: Example



```
class App(object):
    def do_the_thing(self):
        pass

default = App()
do_the_thing = default.do_the_thing
```

Module to Object

Module Object: Example

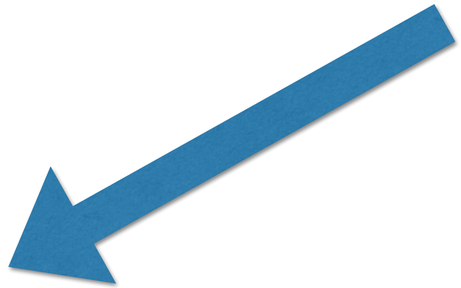
```
# important.py

salt = 4
```

Module Object: Mechanics

1. Create a class
2. Make each of your dynamic variables a **property**
3. Create an instance of your class
4. Replace the just-imported module with the instance

Module Object: Example



```
# fake.py
import sys

class FakeModule(object):
    @property
    def salt(self):
        return time.time()

sys.modules[__name__] = ImportantFakeModule()
```

Further Techniques

- Class creation/initialisation (__init__, __new__)
- Objects that behave like iterators (__iter__, __next__)
- Making method calls look like attribute access (__get__)
- Classes that act like functions (__call__)
- Manually extract params from args & kwargs

http://www.diveintopython3.net/special-method-names.html for more

Dangers

All clever tricks have
risks attached

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Exceptions

Type Assumptions

Monkey Patching

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There is no **silver bullet**

… you *will* break client code

Strong & Stable

- Know your interface
- Document your interface
- Test your interface
- Have a deprecation plan
- Know some tricks for switching code

Thank You!

http://bit.ly/ep2017-refactoring

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Talk to me about Nexmo!