

Anatomy of a large Django site

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Vancouver

Credit: <http://www.flickr.com/photos/43096515@N00/5322219049/>

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**Python
Zope and Plone
...now at Mozilla**



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Using Django

<http://www.djangoproject.com>



1. About the site
2. Performance
3. Localisation
4. Reuse

1. About the site

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ADD-ONS

2,326,721,130 add-ons downloaded

Categories

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Discover great add-ons for everyone



Echofon for Twitter

Echofon (formerly TwitterFox) notifies you of your friends' tweets on Twitter. ...

[Continue to Download →](#)
Featured

ColorfulTabs

The most beautiful yet the simplest add-on that makes a strong colorful appeal. ...

[+ Add to Firefox](#)
Featured

Flagfox

Displays a country flag depicting the location of the current website's server ...

[+ Add to Firefox](#)
Featured

Like these? Find more add-ons in the [Rock Your Firefox - September 2010](#) collection.

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Browse Add-ons

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Amplify

by Clipmarks

[+ Add to Firefox](#)
Featured

Not available for Firefox 4.0b11

Use Amplify to clip, share & spark conversation about excerpts

Collections

Collections are groups of related add-ons that anyone can create and share.



All code is open:
<https://github.com/jbalogh/zamboni>

All* bugs are open:
<https://bugzilla.mozilla.org>

**Convert from
CakePHP (remora)
to Django (zamboni)**



Changing one URL at a time from CakePHP to Django

General trend to move
away from PHP and do
more Python and Django

How large?

250k+ addons

120 mn views month

500 mn API hits day

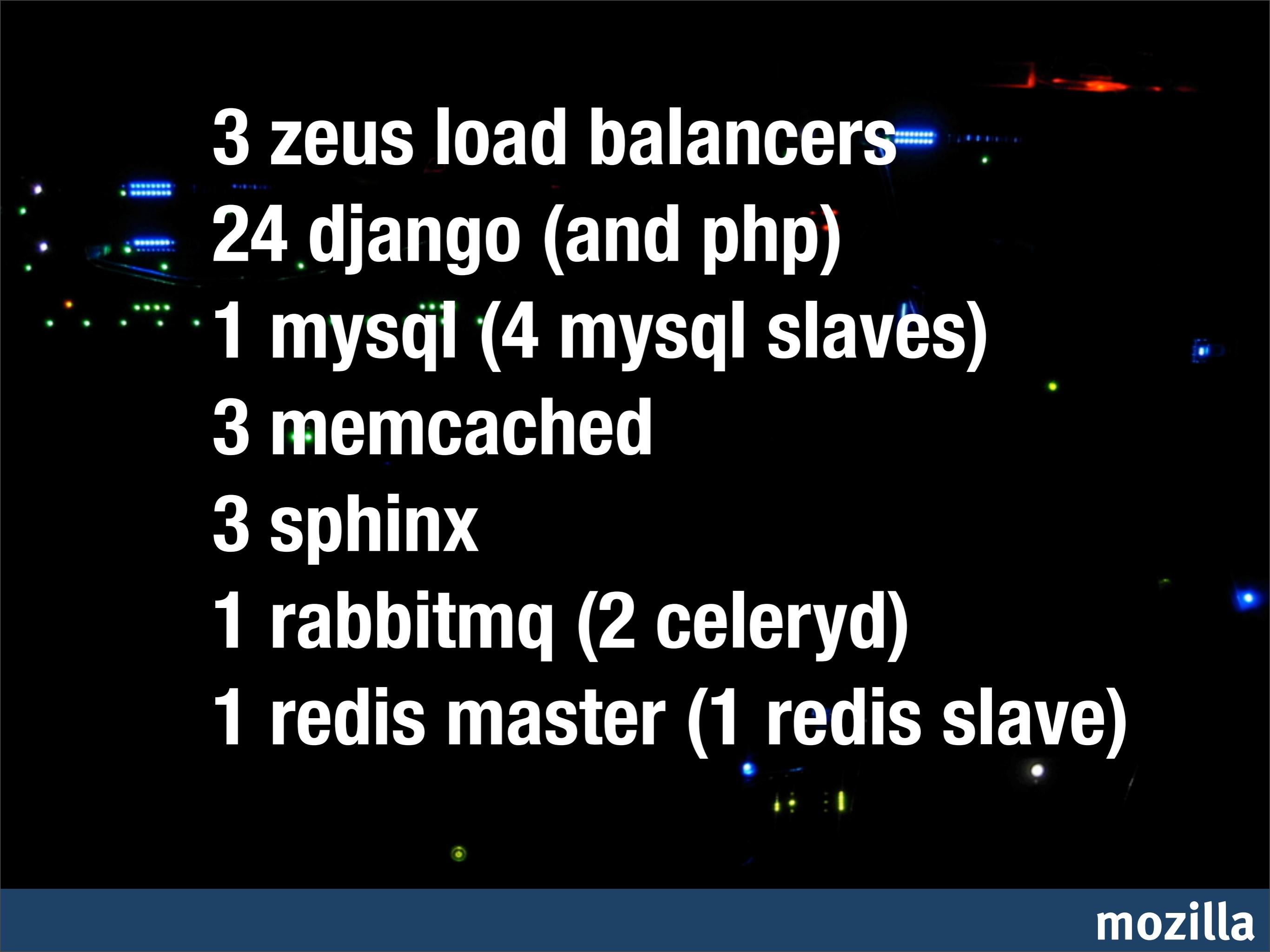
Lines of code

PHP 40k

Python 18k

Unit tests 15k

No pages go out until
they are faster



3 zeus load balancers

24 django (and php)

1 mysql (4 mysql slaves)

3 memcached

3 sphinx

1 rabbitmq (2 celeryd)

1 redis master (1 redis slave)

2. Performance

Using memcached 3 memcached servers



0 0 1 2 3 4 5 6

Cache machine

<http://bit.ly/cache-machine>

```
from django.db import models
import caching.base

class Addon(caching.base.CachingMixin,
            models.Model):
    ...
    status = models.IntegerField()
    objects = caching.base.CachingManager()
```



```
>>> Addon.objects.filter(status=public)
>>> len(connection.queries)
13
```

```
>>> Addon.objects.filter(status=public)
>>> len(connection.queries)
13
```

```
>>> Addon.objects.filter(status=public)
>>> len(connection.queries)
13
```

Invalidation

add-on 3615

md5('select... a')

***includes locale**

mozilla

add-on 3615

md5('select... a')

md5('select... b')

***includes locale**

mozilla

Memcached
get invalidation records
alter invalidation records
set invalidation records

Redis

add invalidation record

**Home page
20+ addons
400+ sql queries**

add-on

version 1

file 1

standard answer in
django is select-related

file 2

version 2

file 1

Transformer

<http://bit.ly/queryset-transform>

```
@staticmethod
def transformer(addons):
    addon_dict = dict((a.id, a) for a in addons)
    vs = filter(None, (a.current_version_id for a in addons))
    versions = list(Version.objects.filter(id__in=vs))
    for version in versions:
        addon_dict[version.addon_id].current_version = version
```

slightly outdated
example

big SQL statements... :(

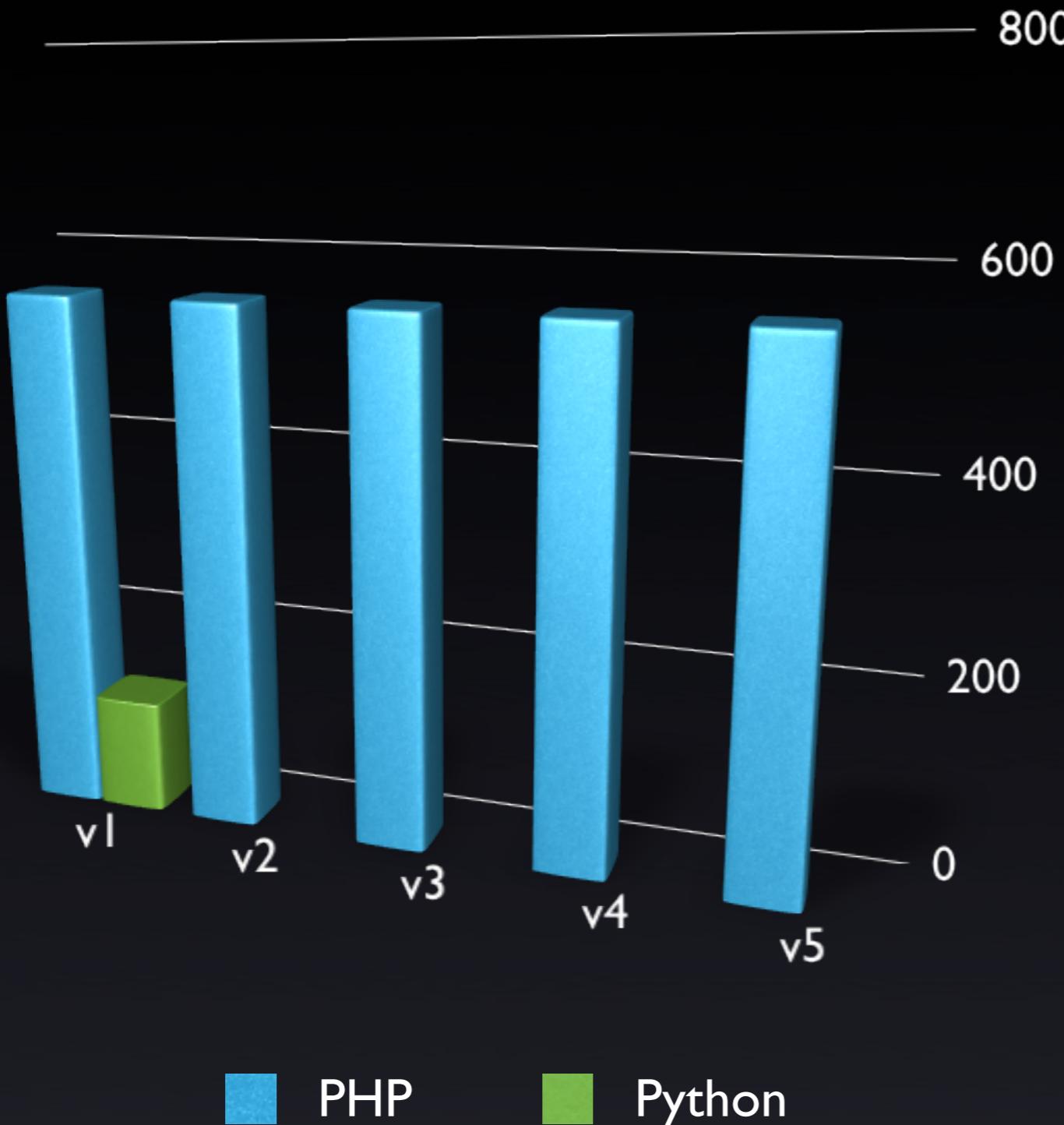
14313 character

Home page
20+ addons
~14 sql queries

**Update
Called on startup
`about:config - extensions.update.url`**

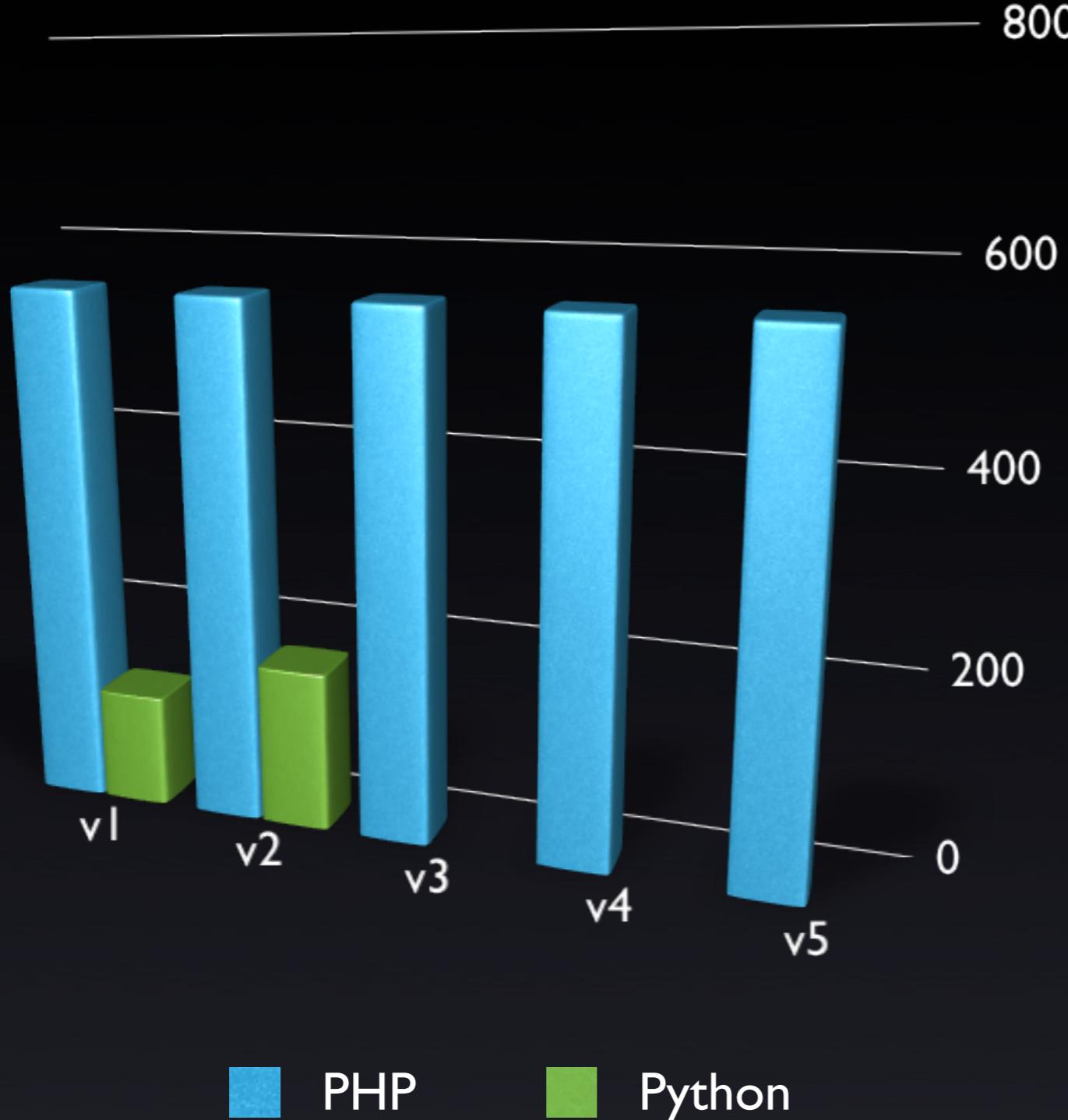
Incoming 8,000 req/sec
Uncached 1,600 req/sec
PHP 550 req/sec

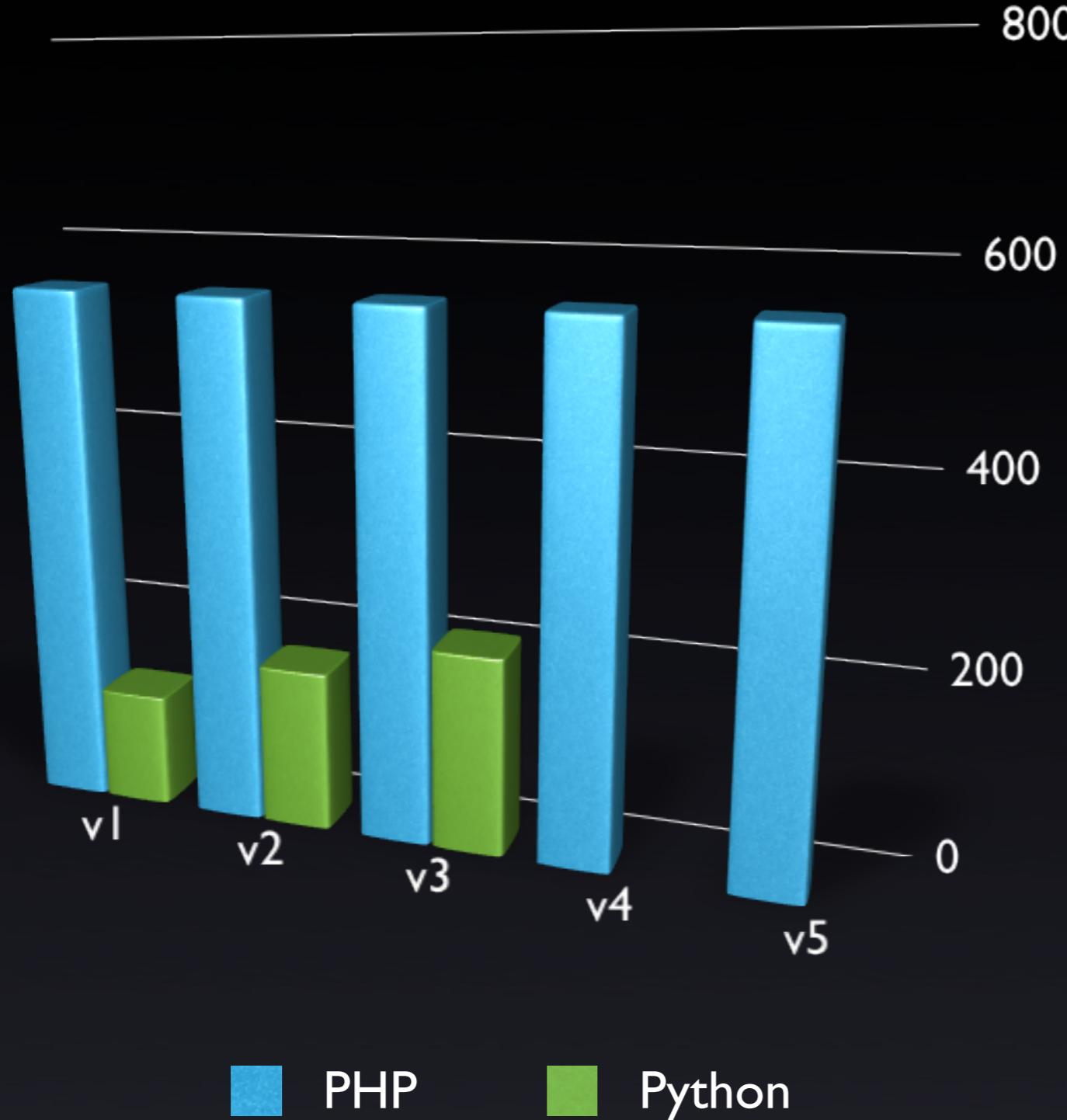
Im used to Plone in the
bad old days



v1
Plain
Django

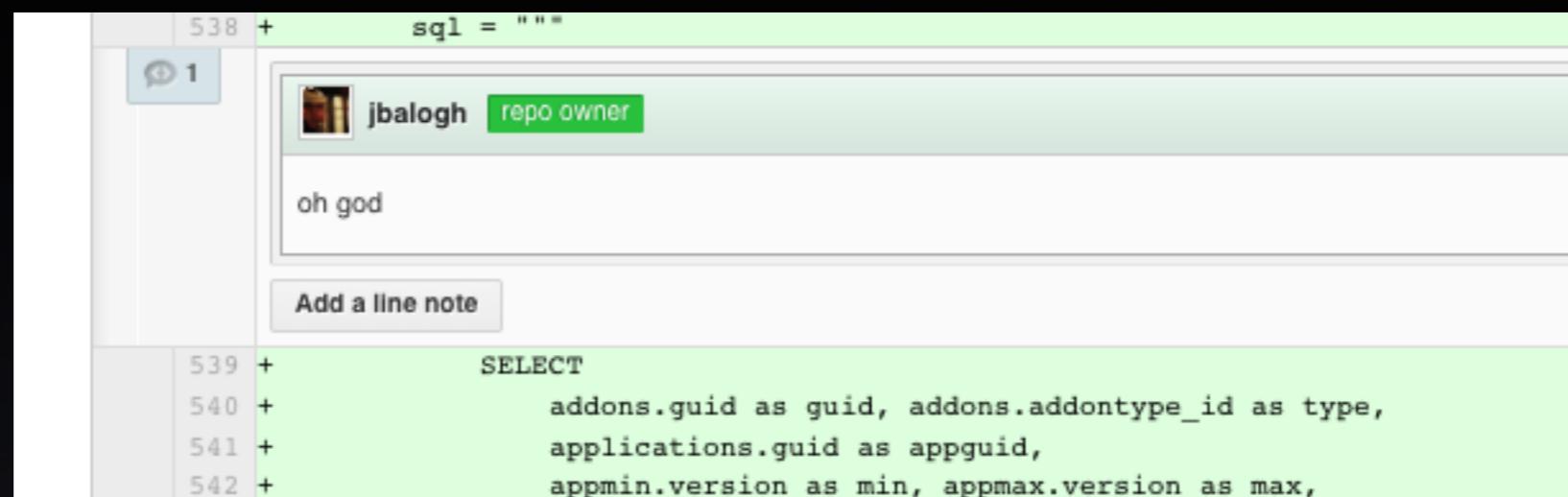
v2 Min. SQL queries





v3 Django and raw SQL

max-requests 200,
actually we hit 210

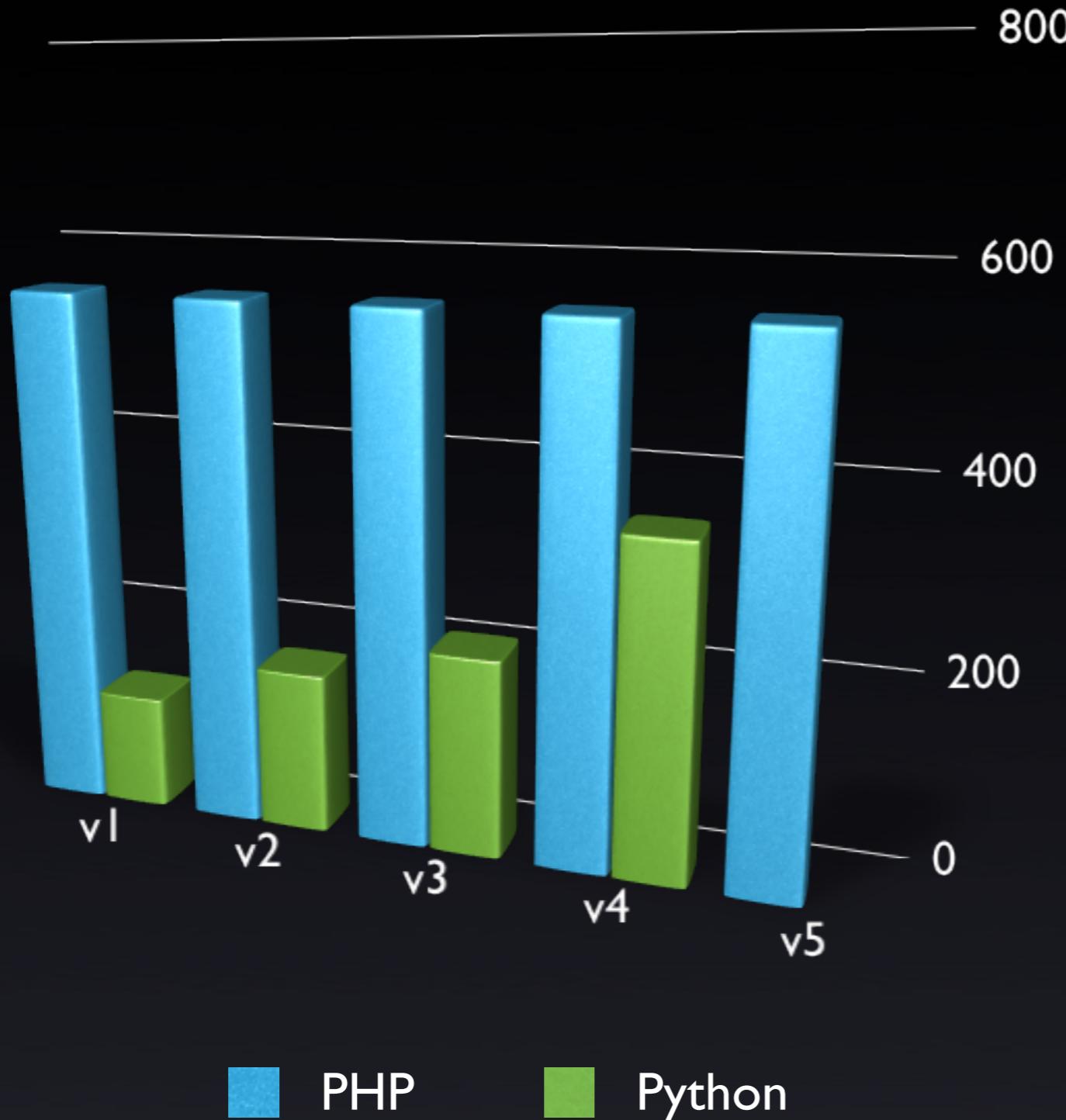


A screenshot of a GitHub pull request interface. At the top, line 538 shows the assignment of a variable `sql` to an empty string. Below this, a note from a user named `jbalogh` (repo owner) is displayed, containing the text "oh god". A button labeled "Add a line note" is visible. The bottom part of the screenshot shows code starting at line 539, which includes a `SELECT` statement with several columns from tables like `addons`, `applications`, and `appmin`.

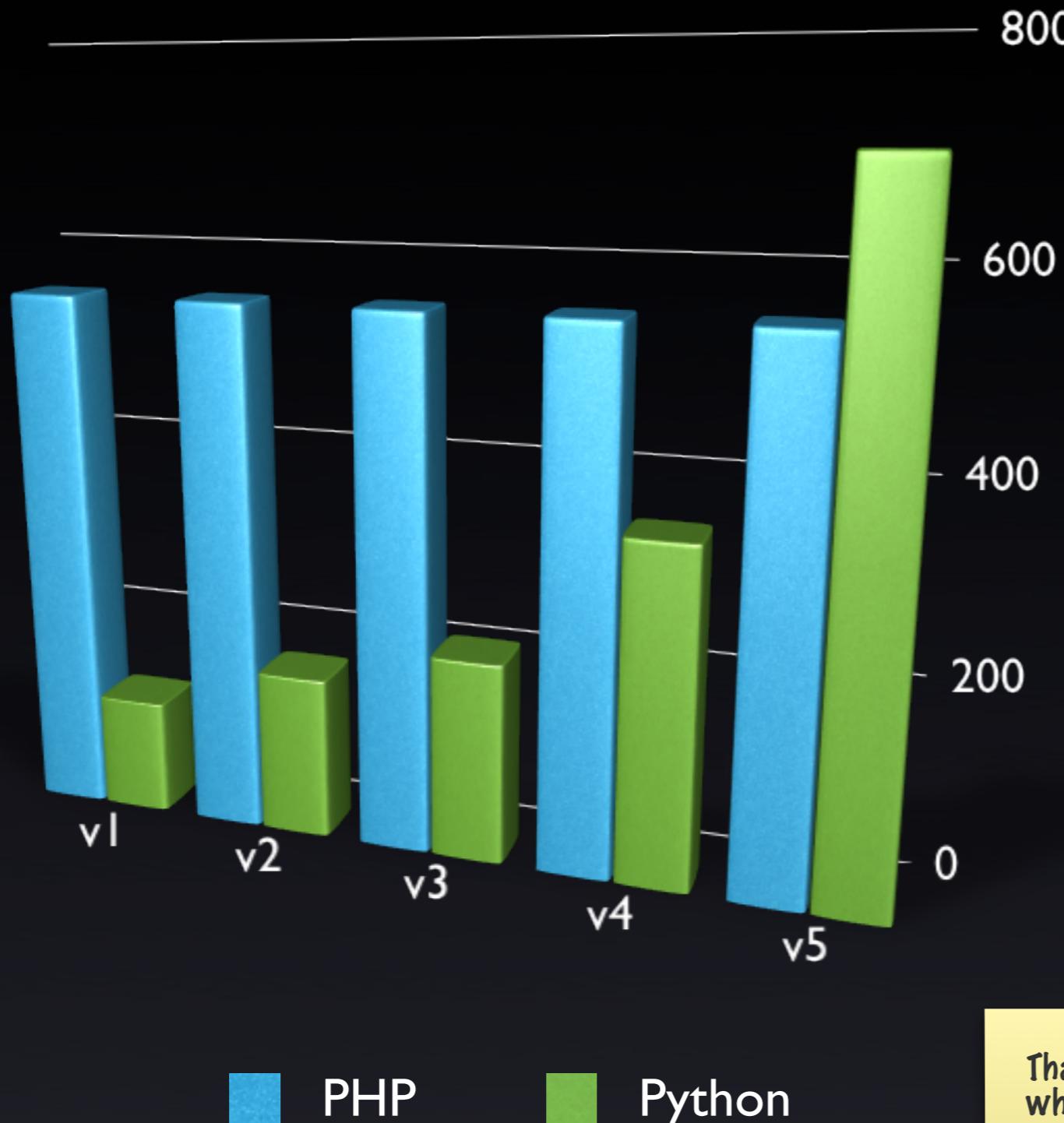
```
538 +     sql = ""  
1  
jbalogh repo owner  
oh god  
Add a line note  
539 +     SELECT  
540 +         addons.guid as guid, addons.addontype_id as type,  
541 +         applications.guid as appguid,  
542 +         appmin.version as min, appmax.version as max,
```

oh god

v4
Python
no Django



v5 Pooling, optimised queries



That's 700 req/sec
which translates into
over 600 million
requests a day

Reducing the SQL queries...
doesn't always help

mySQL query cache is fast

A close-up photograph of fresh green celery stalks and leaves. The stalks are long, thin, and ribbed, with bright green leaves at the top featuring distinct serrated edges.

Celery

<http://celeryproject.org>

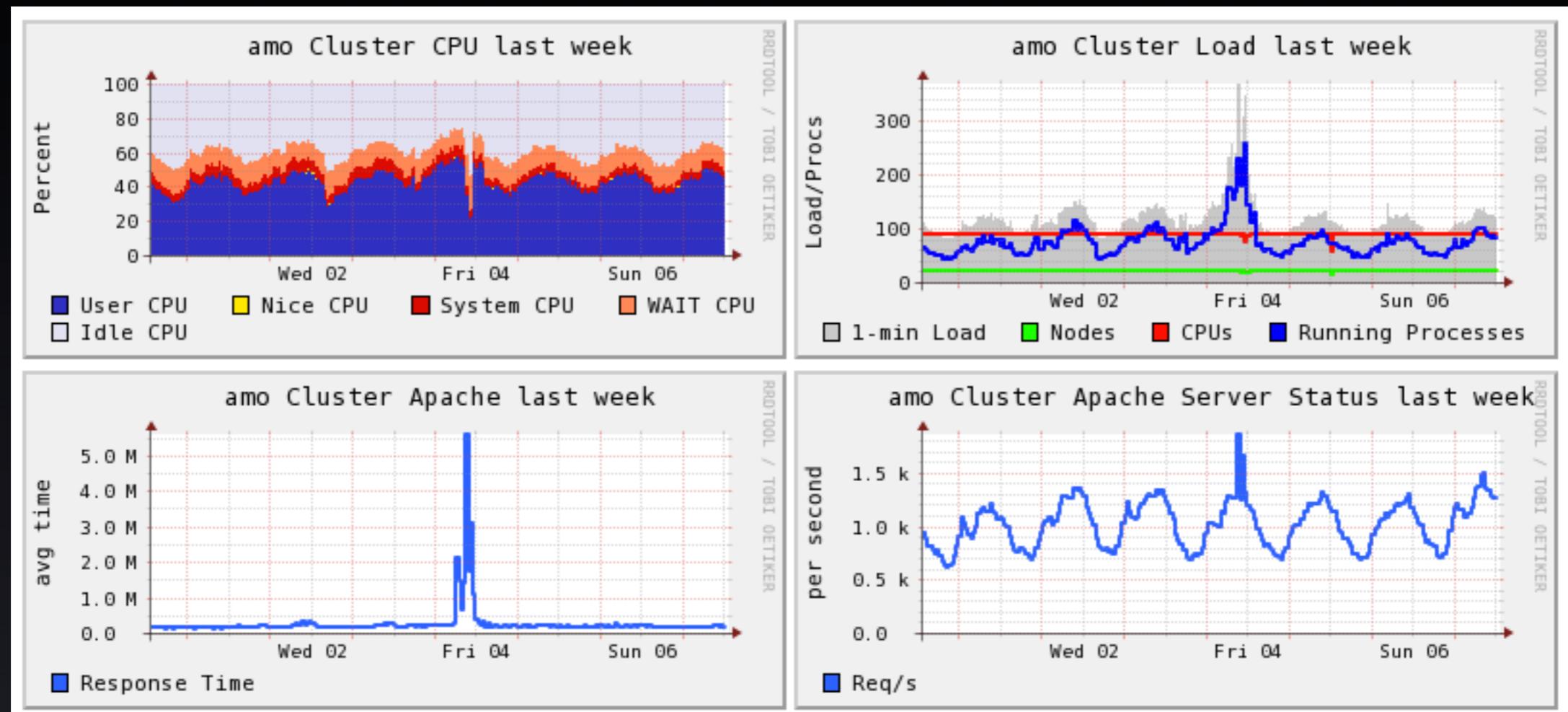
Push things async
email
image processing
addon-validation
cronjobs

specifically fixing data
changes between php
and python

```
from celeryutils import task  
  
@task  
def update_tag(tag, **kw):  
    tag.update_stat()
```

```
from tasks import update_tag  
update_tag.delay(tag)
```

Measurement

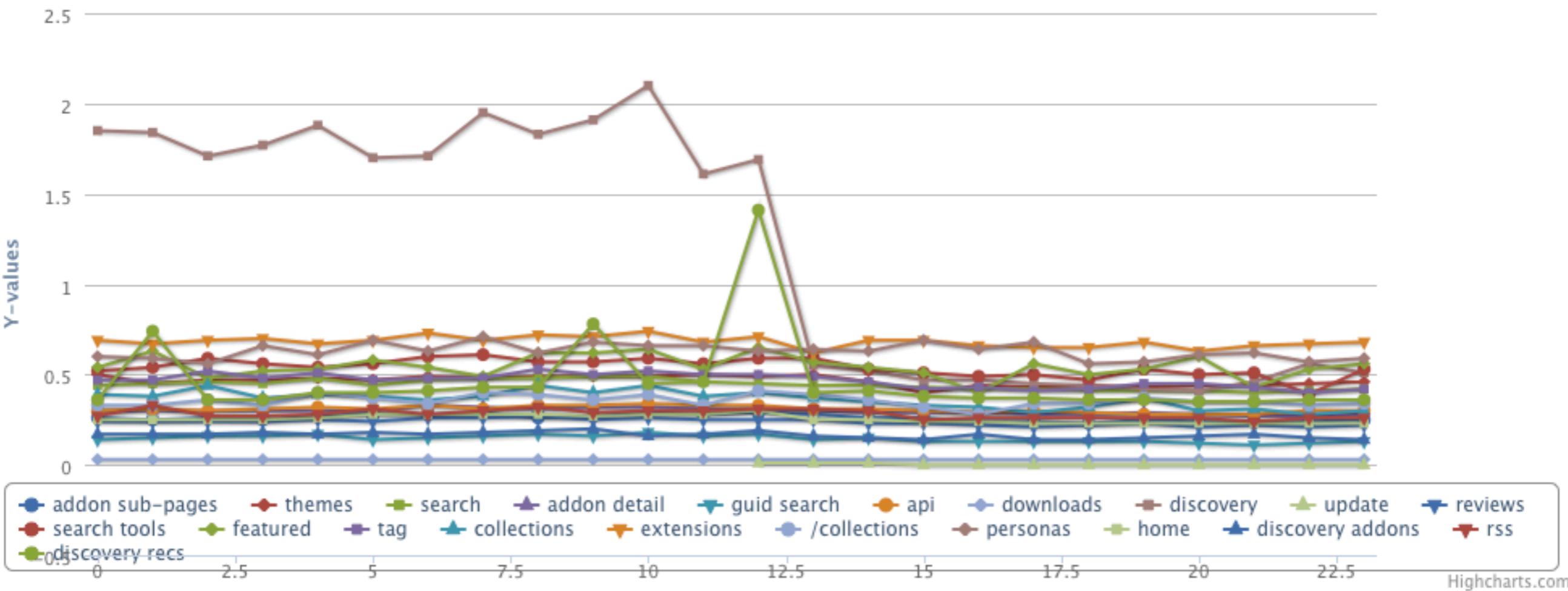


A black and white photograph showing a stack of US dollar bills. The bills are slightly crumpled and overlapping, with visible numbers like '100' and '50'.

Timing Middleware

<https://github.com/>

Page performance for 02-25



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3. Localization

Database strings

```
class Addon(caching.base.CachingMixin,  
models.Model):  
    ...  
    name = models.ForeignKey(Translation)
```

Localize for: English (US) ▾

Basic Information

Name

English (US)

A9

Add-on URL ?[http://addons.mozilla.local:8000/.../ 4594](http://addons.mozilla.local:8000/.../)**Summary** ?

English (US)

Amazon's A9 search engine

225 characters left.

Categories ?

Select up to 2 Firefox categories for this add-on:

 Bookmarks News & Blogs Business Photos & Images Dictionaries & Encyclopedias Shopping & E-Commerce

Localize for: Español (de España) ▾

Basic Information

Name

Español (de España)

A9

Add-on URL

<http://addons.mozilla.local:8000/> / 4594

Summary

Español (de España)

Amazon's A9 search engine

225 characters left.

Categories

Select up to 2 Firefox categories for this add-on:

- Bookmarks
- Business

- News & Blogs
- Photos & Images

Templates

Django

{% blocktrans with app=request.APP %}

Add-ons for {{ app }}

{% end blocktrans %}

Jinja2

<http://jinja.pocoo.org/>

```
{{ _('Add-ons for {0}') } | if(request.APP) }}
```

Python Unicode hell

UnicodeDecodeError: 'ascii' codec can't
decode byte 0xd0 in position 16: ordinal
not in range(128)

Still not fun

4. Reuse

Bleach

<http://pypi.python.org/pypi/>



```
>>> bleach.clean('an  
<script>evil()</script>  
example')  
  
'an &lt;script&gt;evil()&lt;/  
script&gt; example'
```

```
>>> bleach.linkify('an http://  
ex.com url')
```

```
'an <a href="http://ex.com"  
rel="nofollow">http://ex.com</  
a> url'
```

Javascript tests


```
test('Buttons: Test backup button', function() {
  $('.backup-button').showBackupButton();

  var attr = 'data-version-supported',
    current = $('#buttons .install').first();
  current_wrapper = $('#buttons .install-shell').first();
  backup = $('#buttons .backup-button .install').first();
  backup_wrapper = $('#buttons .backup-button').first();

  equals(backup_wrapper.hasClass('hidden'), false);
  equals(current_wrapper.hasClass('hidden'), true);
})
```

Use ~~Hudson~~Jenkins



Flake8

<http://bit.ly/flake8>

Pyflakes, pep8 and MacCabe





Playdoh

<http://bit.ly/mozilla-playdoh>

fred wenzel

Basis for new projects

Celery support
Jinja2 support
Simple migrations

By default:
SHA-512 password hashing
X-Frame-Options: DENY
secure and httponly flags on cookies

fred wenzel

zilla

**Take inspiration from...
but not the best for you**

for example jinja2 which
makes integration with
lots of django addons
possible, but a bit harder

Questions?

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andym on irc.freenode.net, irc.mozilla.org