# Development, Testing, Deploying, Hosting, Monitoring of your Python Web App.

Lakshman Prasad (@becomingGuru)

September 18, 2011

# Development is but, one part of the Application ”Growth” Cycle

## Common non-Development Tasks

- Distributed log storage and analysis
- Backups and Snapshots
- Graphing, Instrumentation and Monitoring
- HTTP Caching, Memory Caching
- Failover, Node addition/removal
- Auto-scaling for cloud resources
- Data Retention/Archival,
- Data Model Changes, Database sharding
- CDN Management
- API Metering, Rate Limiting
- Handling Multiple Environments, Multiple Versions, Rollbacks

# The Application "Growth" Cycle

- Develop
- Test
- Design Production Environment
- Deploy
- Monitor
- Tune

Introduction

Development

Testing

Deploying

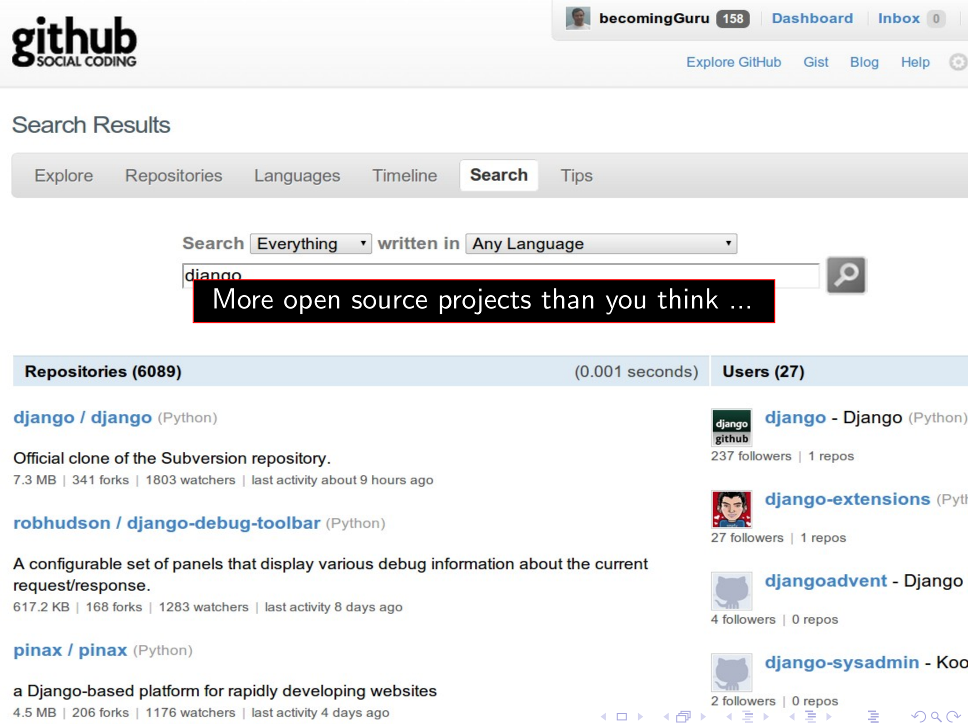
Scaling and Performance

Cloud Hosting Providers

Monitoring

Beta Invites

17444 Pypi packages



Search Results

Search Everything written in Any Language

django

More open source projects than you think ...

**Repositories (6089)** (0.001 seconds)

**django / django** (Python)

Official clone of the Subversion repository.

7.3 MB | 341 forks | 1803 watchers | last activity about 9 hours ago

**robhudson / django-debug-toolbar** (Python)

A configurable set of panels that display various debug information about the current request/response.

617.2 KB | 168 forks | 1283 watchers | last activity 8 days ago

**pinax / pinax** (Python)

a Django-based platform for rapidly developing websites

4.5 MB | 206 forks | 1176 watchers | last activity 4 days ago

**Users (27)**

**django** - Django (Python)

237 followers | 1 repos

**django-extensions** (Pyth

27 followers | 1 repos

**djangoadvent** - Django

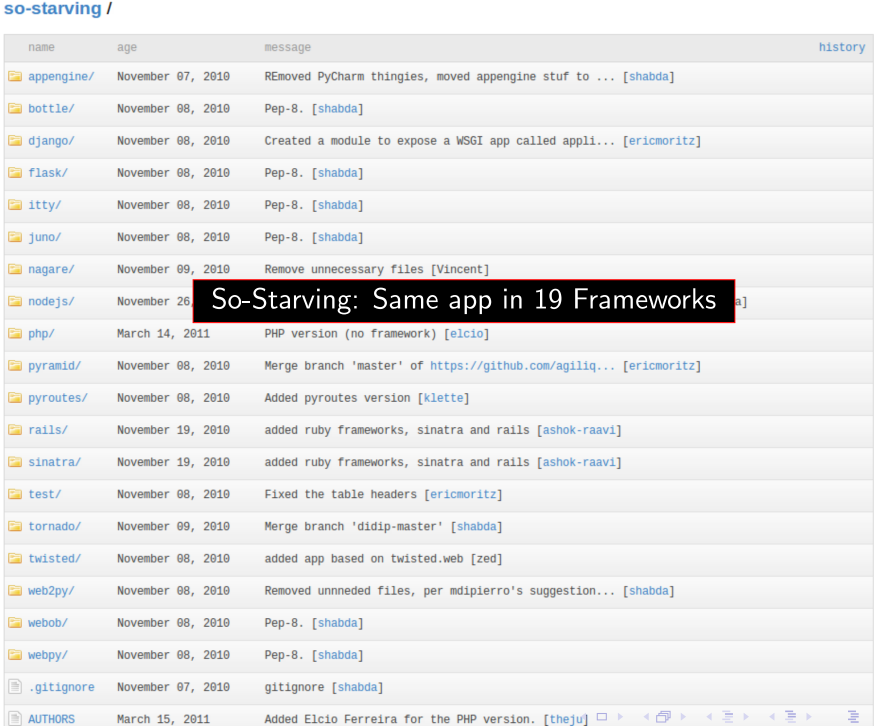
4 followers | 0 repos

**django-sysadmin** - Koo

2 followers | 0 repos

… one for every size and style

# So-Starving: Same app in 19 Frameworks



so-starving /

| name | age | message | history |
|---|---|---|---|
| appengine/ | November 07, 2010 | REmoved PyCharm thingies, moved appengine stuf to ... [shabda] | |
| bottle/ | November 08, 2010 | Pep-8. [shabda] | |
| django/ | November 08, 2010 | Created a module to expose a WSGI app called appli... [ericmoritz] | |
| flask/ | November 08, 2010 | Pep-8. [shabda] | |
| itty/ | November 08, 2010 | Pep-8. [shabda] | |
| juno/ | November 08, 2010 | Pep-8. [shabda] | |
| nagare/ | November 09, 2010 | Remove unnecessary files [Vincent] | |
| nodejs/ | November 26, | a] | |
| php/ | March 14, 2011 | PHP version (no framework) [elcio] | |
| pyramid/ | November 08, 2010 | Merge branch 'master' of https://github.com/agiliq... [ericmoritz] | |
| pyroutes/ | November 08, 2010 | Added pyroutes version [klette] | |
| rails/ | November 19, 2010 | added ruby frameworks, sinatra and rails [ashok-raavi] | |
| sinatra/ | November 19, 2010 | added ruby frameworks, sinatra and rails [ashok-raavi] | |
| test/ | November 08, 2010 | Fixed the table headers [ericmoritz] | |
| tornado/ | November 09, 2010 | Merge branch 'didip-master' [shabda] | |
| twisted/ | November 08, 2010 | added app based on twisted.web [zed] | |
| web2py/ | November 08, 2010 | Removed unnneded files, per mdipierro's suggestion... [shabda] | |
| webob/ | November 08, 2010 | Pep-8. [shabda] | |
| webpy/ | November 08, 2010 | Pep-8. [shabda] | |
| .gitignore | November 07, 2010 | gitignore [shabda] | |
| AUTHORS | March 15, 2011 | Added Elcio Ferreira for the PHP version. [theju] | |

So you wrote a web app.

# Jacob on Testing

*"Code without tests is broken by design"*

# Unit Testing

```
from django.utils import unittest
from myapp.models import Animal

class AnimalTestCase(unittest.TestCase):
    def setUp(self):
        self.lion = Animal.objects.create(name="lion",
                                          sound="roar")
        self.cat = Animal.objects.create(name="cat",
                                         sound="meow")

    def testSpeaking(self):
        self.assertEqual(self.lion.speak(),
                         'The␣lion␣says␣"roar"')
        self.assertEqual(self.cat.speak(),
                         'The␣cat␣says␣"meow"')
```

# Titus Brown on TDD and BDD

*"I don't do test-driven development; I do stupidity-driven testing. When I do something stupid, I write a test to make sure I don't do it again."*

# Feature Testing

```
>>> from django.test.client import Client
>>> c = Client()
>>> response = c.post('/login/',
                      {'username': 'john',
                       'password': 'smith'})
>>> response.status_code
200
>>> response = c.get('/customer/details/')
>>> response.content
'<!DOCTYPE␣html...'
```

# In Browser Testing

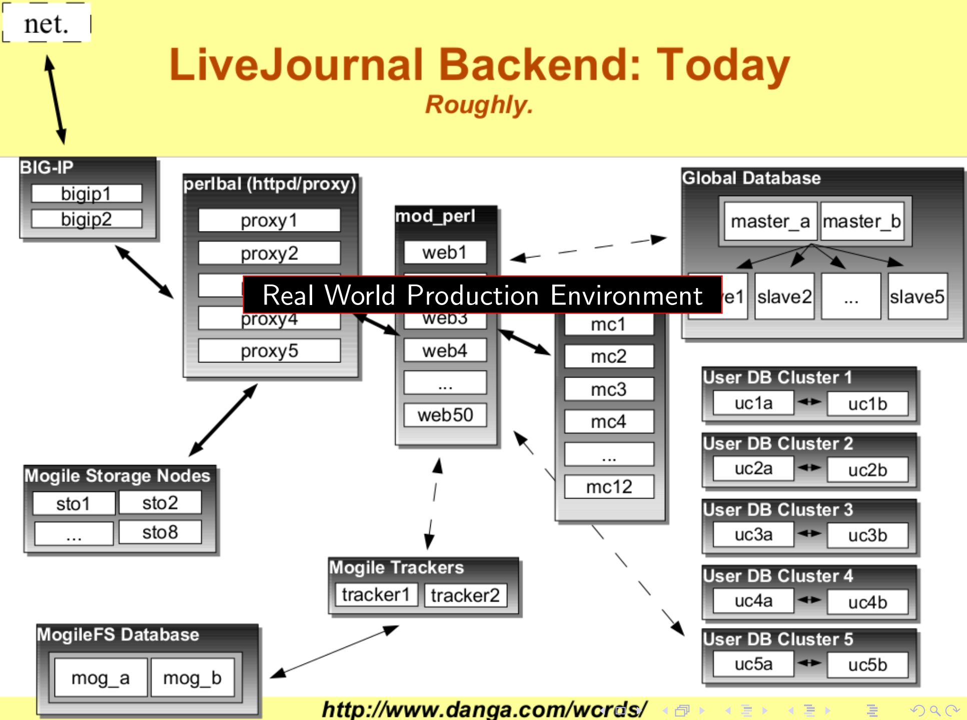
- Selenium
- Twill

# An idempotent deployment

- Automated - Fabric, Puppet, Capistrano, Buildout
- Isolated - virtualenv, Buildout
- Repeatable - pip, easyinstall
- Dependency Management - Yum, Deb, pip

# LiveJournal Backend: Today

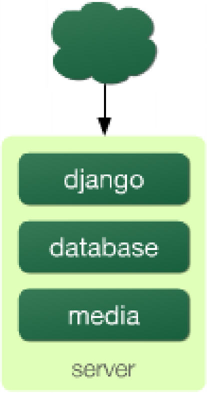
*Roughly.*



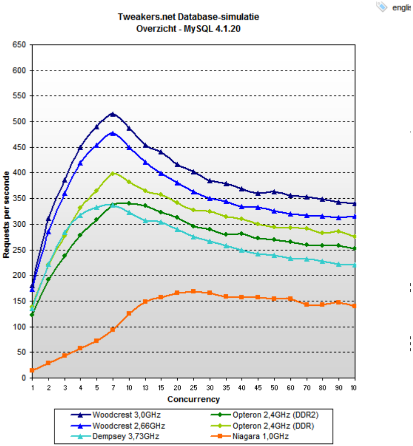
Real World Production Environment

*http://www.danga.com/words/*

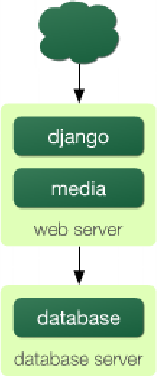
# To start with



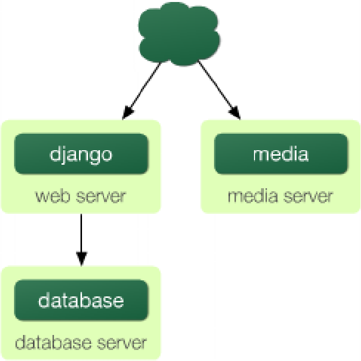
# DB Prop


englis
Tweakers.net Database-simulatie
Overzicht - MySQL 4.1.20
Requests per seconde
650
600
550
500
450
400
350
300
250
200
150
100
50
0
1
2
3
4
5
7
10
13
15
20
25
30
35
40
45
50
60
70
80
90
10
Concurrency
Woodcrest 3,0GHz
Woodcrest 2,66GHz
Dempsey 3,73GHz
Opteron 2,4GHz (DDR2)
Opteron 2,4GHz (DDR)
Niagara 1,0GHz

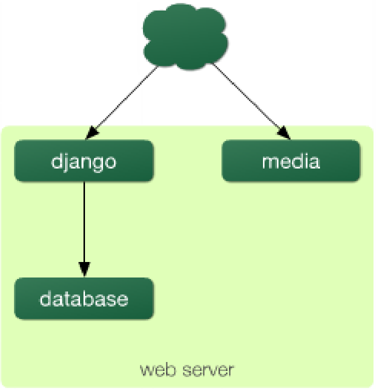
# Seperate DB machine (with pooling)



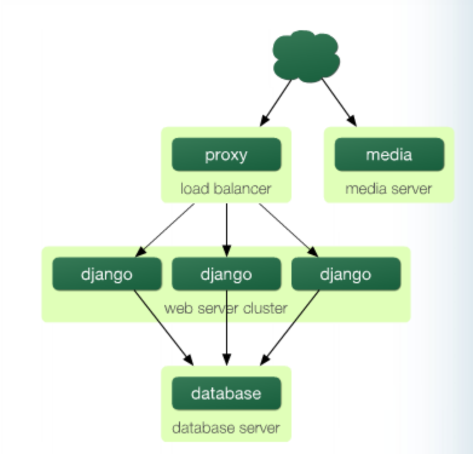
# Seperate static server



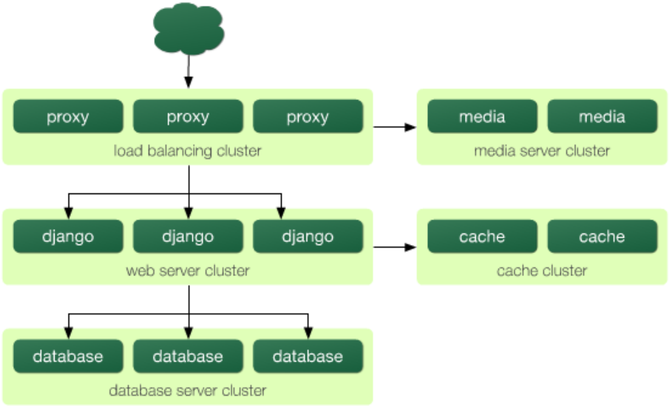
# Together called a web server



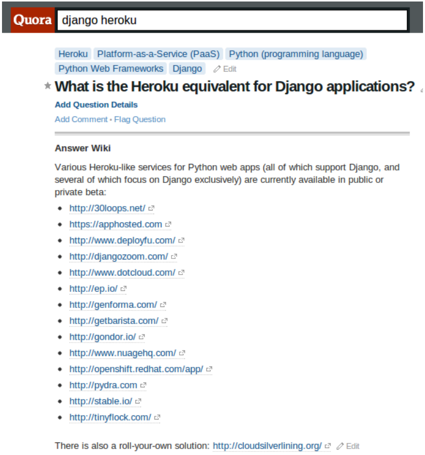
# Then, a LB and all set to Scale



# Then, scale into clusters



# Many click-hosting providers



Heroku · Platform-as-a-Service (PaaS) · Python (programming language) · Python Web Frameworks · Django · Edit

**What is the Heroku equivalent for Django applications?**

Add Question Details

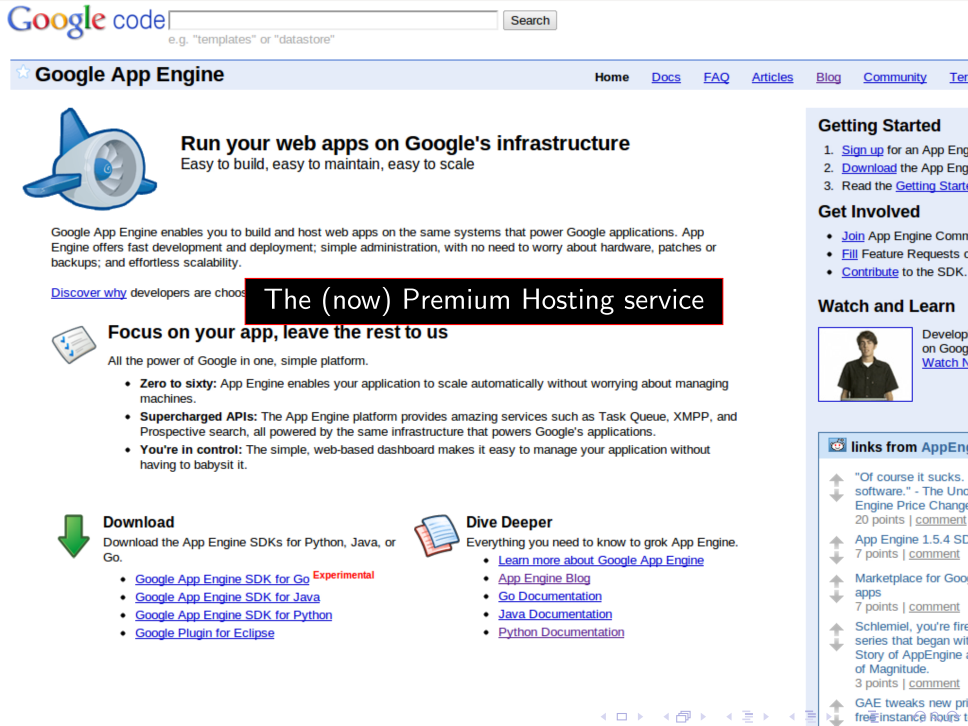
Add Comment • Flag Question

**Answer Wiki**

Various Heroku-like services for Python web apps (all of which support Django, and several of which focus on Django exclusively) are currently available in public or private beta:

- http://30loops.net/
- https://apphosted.com
- http://www.deployfu.com/
- http://djangozoom.com/
- http://www.dotcloud.com/
- http://ep.io/
- http://genforma.com/
- http://getbarista.com/
- http://gondor.io/
- http://www.nuagehq.com/
- http://openshift.redhat.com/app/
- http://pydra.com
- http://stable.io/
- http://tinyflock.com/

There is also a roll-your-own solution: http://cloudsilverlining.org/ Edit



The (now) Premium Hosting service

e.g. "templates" or "datastore"

## Google App Engine

Home Docs FAQ Articles Blog Community Ter

## Run your web apps on Google's infrastructure

Easy to build, easy to maintain, easy to scale

Google App Engine enables you to build and host web apps on the same systems that power Google applications. App Engine offers fast development and deployment; simple administration, with no need to worry about hardware, patches or backups; and effortless scalability.

Discover why developers are choos

### Focus on your app, leave the rest to us

All the power of Google in one, simple platform.

- **Zero to sixty:** App Engine enables your application to scale automatically without worrying about managing machines.
- **Supercharged APIs:** The App Engine platform provides amazing services such as Task Queue, XMPP, and Prospective search, all powered by the same infrastructure that powers Google's applications.
- **You're in control:** The simple, web-based dashboard makes it easy to manage your application without having to babysit it.

### Download

Download the App Engine SDKs for Python, Java, or Go.

- Google App Engine SDK for Go Experimental
- Google App Engine SDK for Java
- Google App Engine SDK for Python
- Google Plugin for Eclipse

### Dive Deeper

Everything you need to know to grok App Engine.

- Learn more about Google App Engine
- App Engine Blog
- Go Documentation
- Java Documentation
- Python Documentation

### Getting Started

1. Sign up for an App Eng
2. Download the App Eng
3. Read the Getting Starte

### Get Involved

- Join App Engine Comm
- Fill Feature Requests c
- Contribute to the SDK.

### Watch and Learn

Develop
on Goog
Watch N

### links from AppEn

"Of course it sucks.
software." - The Und
Engine Price Change
20 points | comment

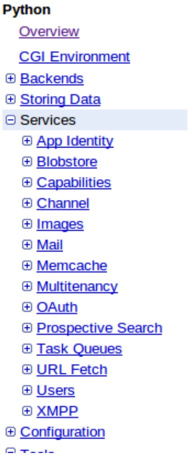
App Engine 1.5.4 SD
7 points | comment

Marketplace for Goo
apps
7 points | comment

Schlemiel, you're fire
series that began wit
Story of AppEngine a
of Magnitude.
3 points | comment

GAE tweaks new pri
free instance hours t

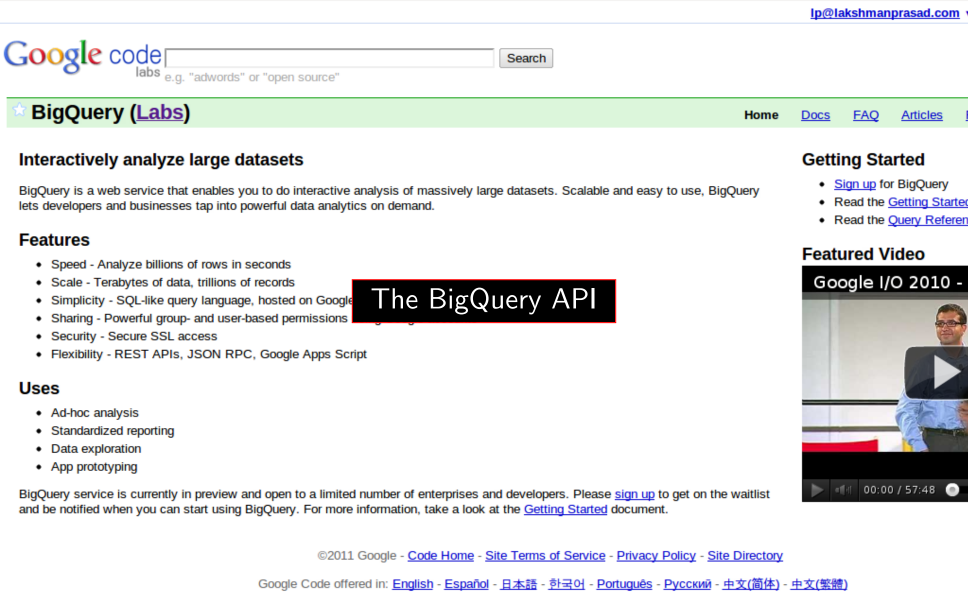
# Custom APIs



**Python**

- Overview
- CGI Environment
- ⊞ Backends
- ⊞ Storing Data
- ⊟ Services
  - ⊞ App Identity
  - ⊞ Blobstore
  - ⊞ Capabilities
  - ⊞ Channel
  - ⊞ Images
  - ⊞ Mail
  - ⊞ Memcache
  - ⊞ Multitenancy
  - ⊞ OAuth
  - ⊞ Prospective Search
  - ⊞ Task Queues
  - ⊞ URL Fetch
  - ⊞ Users
  - ⊞ XMPP
- ⊞ Configuration
- Tools

# The BigQuery API



## BigQuery (Labs)

### Interactively analyze large datasets

BigQuery is a web service that enables you to do interactive analysis of massively large datasets. Scalable and easy to use, BigQuery lets developers and businesses tap into powerful data analytics on demand.

### Features

- Speed - Analyze billions of rows in seconds
- Scale - Terabytes of data, trillions of records
- Simplicity - SQL-like query language, hosted on Google
- Sharing - Powerful group- and user-based permissions
- Security - Secure SSL access
- Flexibility - REST APIs, JSON RPC, Google Apps Script

### Uses

- Ad-hoc analysis
- Standardized reporting
- Data exploration
- App prototyping

BigQuery service is currently in preview and open to a limited number of enterprises and developers. Please sign up to get on the waitlist and be notified when you can start using BigQuery. For more information, take a look at the Getting Started document.

### Getting Started

- Sign up for BigQuery
- Read the Getting Started
- Read the Query Referen

### Featured Video

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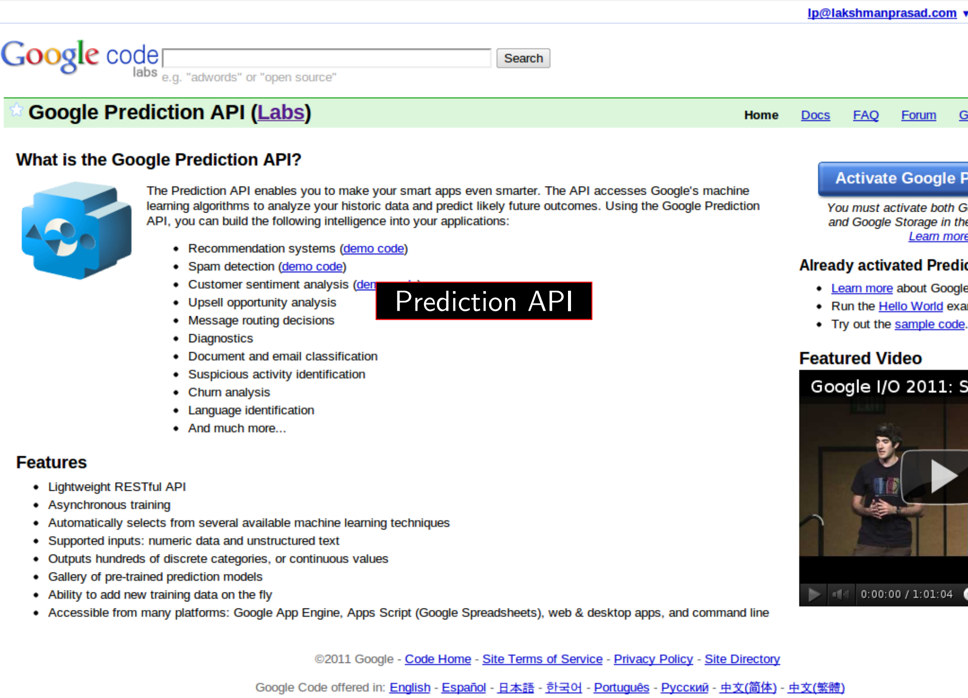
# Prediction API



lp@lakshmanprasad.com ▾

Google code labs

Search

e.g. "adwords" or "open source"

## Google Prediction API (Labs)

Home Docs FAQ Forum G

### What is the Google Prediction API?

The Prediction API enables you to make your smart apps even smarter. The API accesses Google's machine learning algorithms to analyze your historic data and predict likely future outcomes. Using the Google Prediction API, you can build the following intelligence into your applications:

- Recommendation systems (demo code)
- Spam detection (demo code)
- Customer sentiment analysis (dem
- Upsell opportunity analysis
- Message routing decisions
- Diagnostics
- Document and email classification
- Suspicious activity identification
- Churn analysis
- Language identification
- And much more...

### Features

- Lightweight RESTful API
- Asynchronous training
- Automatically selects from several available machine learning techniques
- Supported inputs: numeric data and unstructured text
- Outputs hundreds of discrete categories, or continuous values
- Gallery of pre-trained prediction models
- Ability to add new training data on the fly
- Accessible from many platforms: Google App Engine, Apps Script (Google Spreadsheets), web & desktop apps, and command line

Activate Google P

*You must activate both G and Google Storage in the* *Learn more*

### Already activated Predic

- Learn more about Google
- Run the Hello World exa
- Try out the sample code.

### Featured Video

Google I/O 2011: S

0:00:00 / 1:01:04

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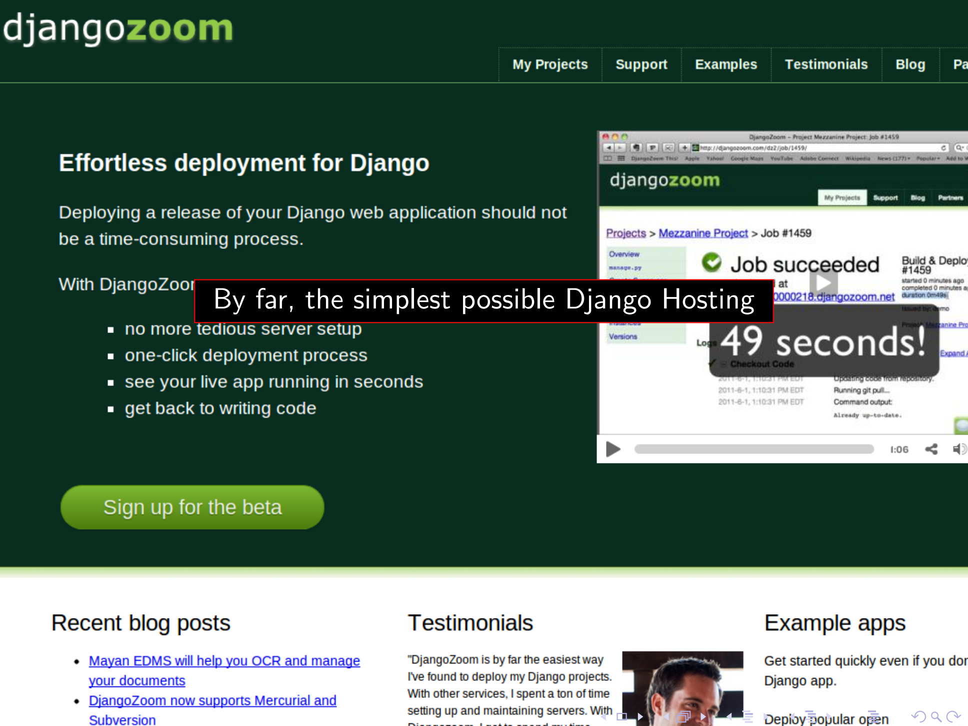


By far, the simplest possible Django Hosting

## Effortless deployment for Django

Deploying a release of your Django web application should not be a time-consuming process.

With DjangoZoo

- no more tedious server setup
- one-click deployment process
- see your live app running in seconds
- get back to writing code

```
2011-6-1, 1:10:31 PM EDT    Updating code from repository.
2011-6-1, 1:10:31 PM EDT    Running git pull...
2011-6-1, 1:10:31 PM EDT    Command output:
                            Already up-to-date.
```

## Recent blog posts

- Mayan EDMS will help you OCR and manage your documents
- DjangoZoom now supports Mercurial and Subversion

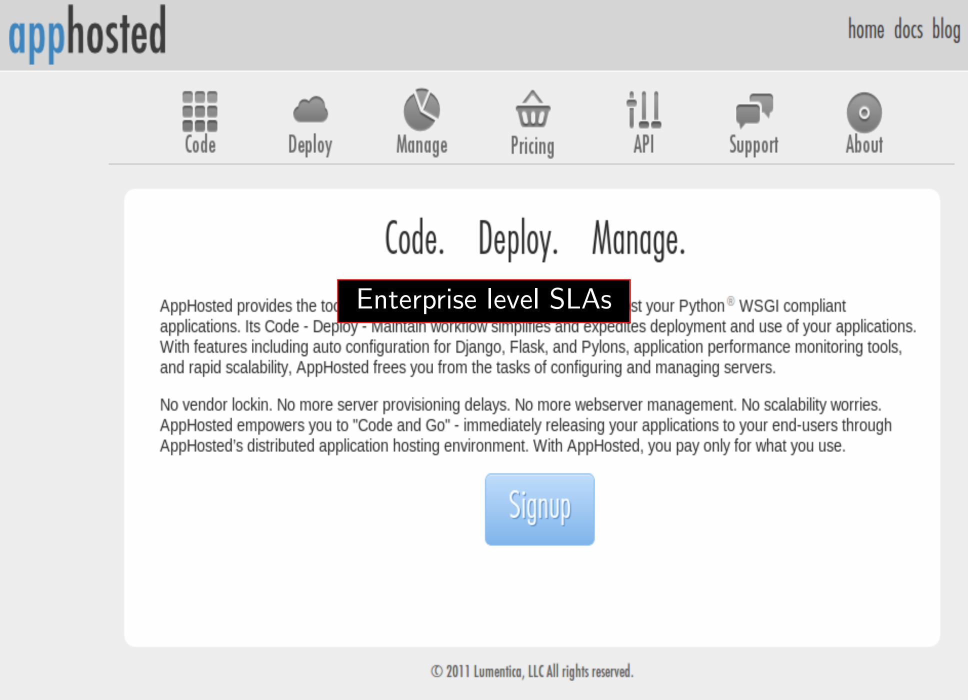
## Testimonials

"DjangoZoom is by far the easiest way I've found to deploy my Django projects. With other services, I spent a ton of time setting up and maintaining servers. With

## Example apps

Get started quickly even if you dor Django app.

Deploy popular open

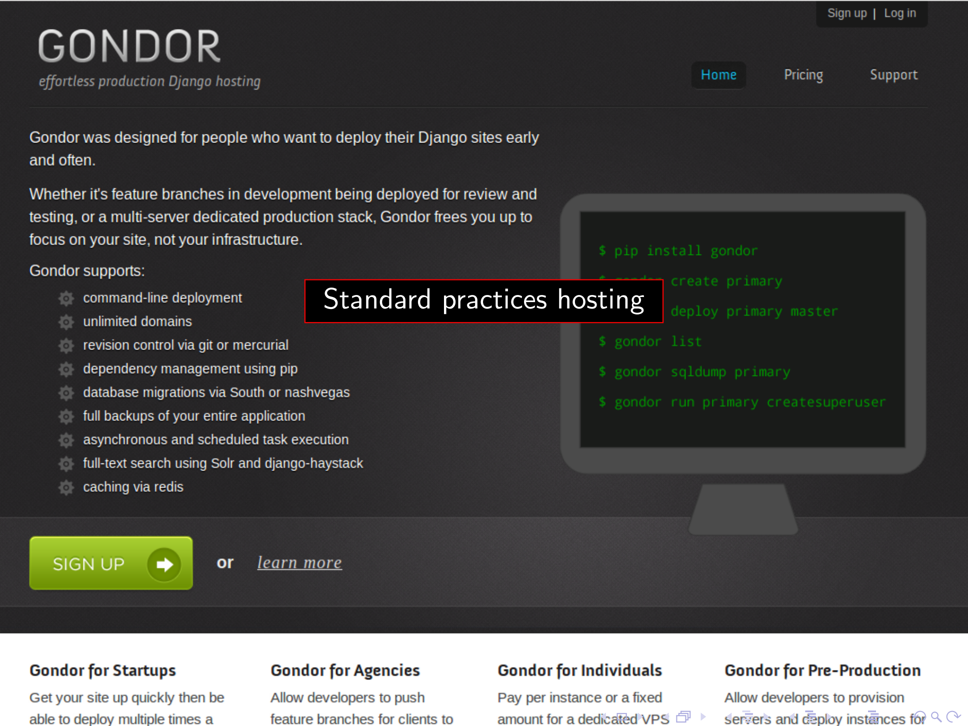


Enterprise level SLAs

# Code. Deploy. Manage.

AppHosted provides the too st your Python® WSGI compliant applications. Its Code - Deploy - Maintain workflow simplifies and expedites deployment and use of your applications. With features including auto configuration for Django, Flask, and Pylons, application performance monitoring tools, and rapid scalability, AppHosted frees you from the tasks of configuring and managing servers.

No vendor lockin. No more server provisioning delays. No more webserver management. No scalability worries. AppHosted empowers you to "Code and Go" - immediately releasing your applications to your end-users through AppHosted's distributed application hosting environment. With AppHosted, you pay only for what you use.



Standard practices hosting

Sign up | Log in

GONDOR

*effortless production Django hosting*

Home Pricing Support

Gondor was designed for people who want to deploy their Django sites early and often.

Whether it's feature branches in development being deployed for review and testing, or a multi-server dedicated production stack, Gondor frees you up to focus on your site, not your infrastructure.

Gondor supports:

- command-line deployment
- unlimited domains
- revision control via git or mercurial
- dependency management using pip
- database migrations via South or nashvegas
- full backups of your entire application
- asynchronous and scheduled task execution
- full-text search using Solr and django-haystack
- caching via redis

```
$ pip install gondor
$ gondor create primary
         deploy primary master
$ gondor list
$ gondor sqldump primary
$ gondor run primary createsuperuser
```

SIGN UP or *learn more*

**Gondor for Startups**

Get your site up quickly then be able to deploy multiple times a

**Gondor for Agencies**

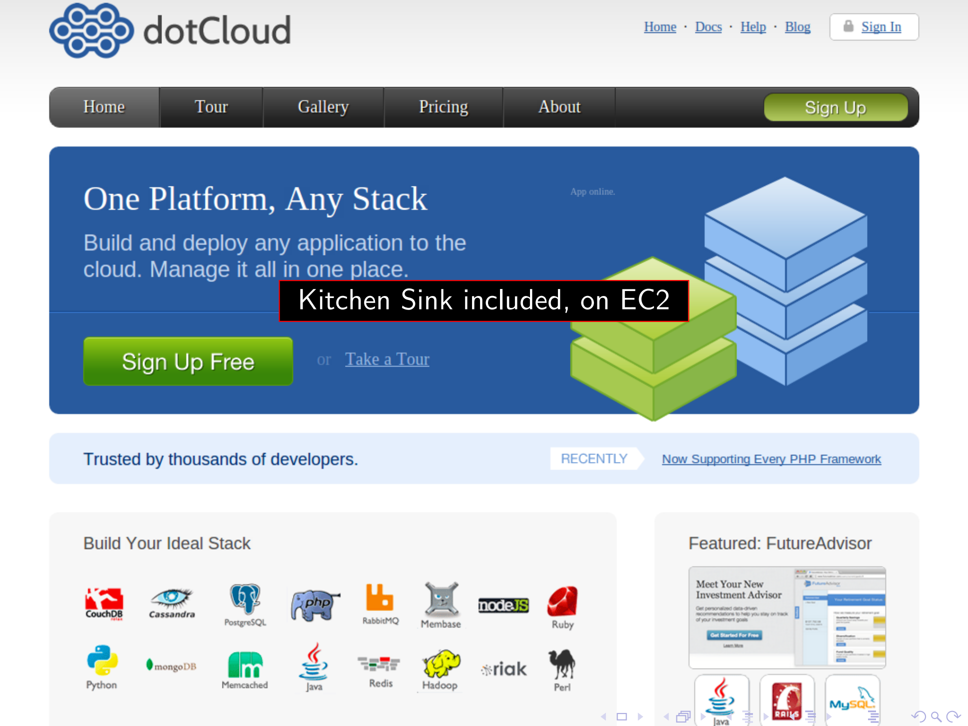
Allow developers to push feature branches for clients to

**Gondor for Individuals**

Pay per instance or a fixed amount for a dedicated VPS

**Gondor for Pre-Production**

Allow developers to provision servers and deploy instances for



## One Platform, Any Stack

Build and deploy any application to the cloud. Manage it all in one place.

Kitchen Sink included, on EC2

Trusted by thousands of developers.

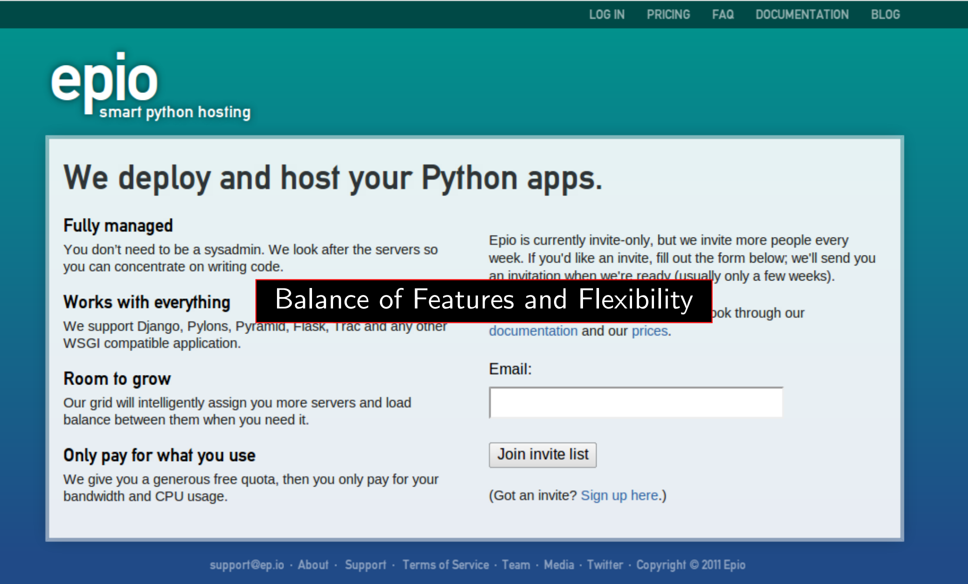
RECENTLY Now Supporting Every PHP Framework

### Build Your Ideal Stack

### Featured: FutureAdvisor

Meet Your New Investment Advisor

# Balance of Features and Flexibility



We deploy and host your Python apps.

**Fully managed**

You don't need to be a sysadmin. We look after the servers so you can concentrate on writing code.

**Works with everything**

We support Django, Pylons, Pyramid, Flask, Trac and any other WSGI compatible application.

**Room to grow**

Our grid will intelligently assign you more servers and load balance between them when you need it.

**Only pay for what you use**

We give you a generous free quota, then you only pay for your bandwidth and CPU usage.

Epio is currently invite-only, but we invite more people every week. If you'd like an invite, fill out the form below; we'll send you an invitation when we're ready (usually only a few weeks).

ook through our documentation and our prices.

Email:

Join invite list

(Got an invite? Sign up here.)

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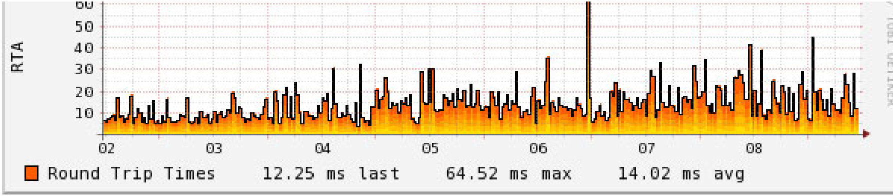
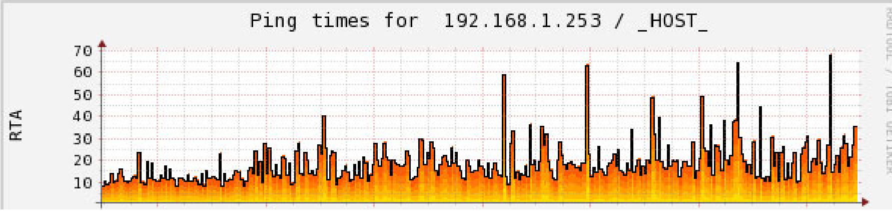
# Monitoring

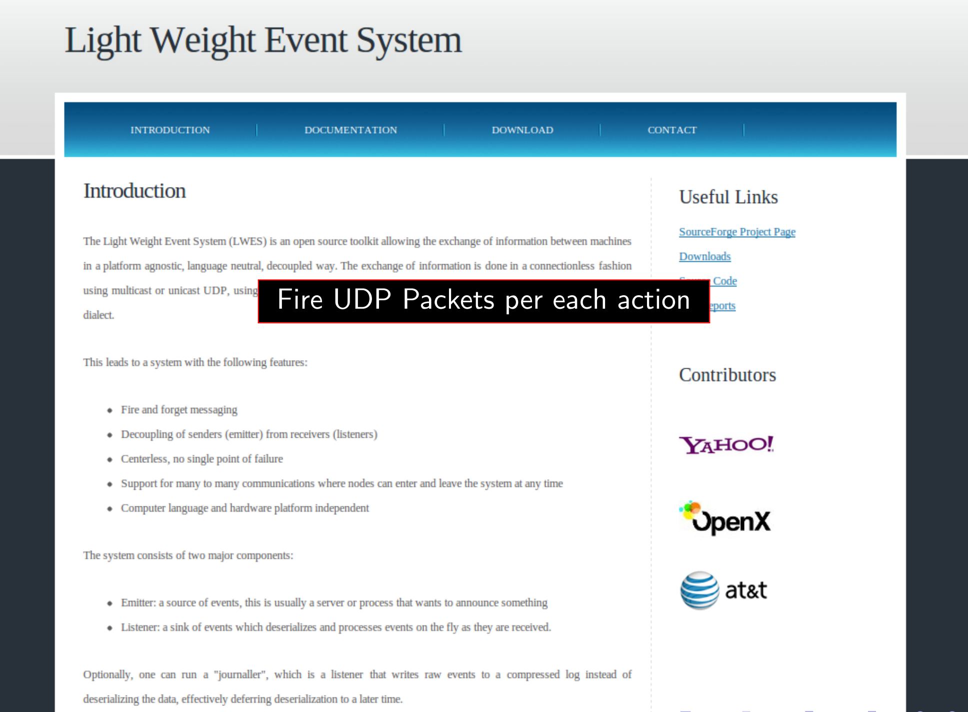
- Nagios
- Monit
- PingDom
- PagerDuty, ServiceUptime, ...

# Monitor Resources, generate pretty graphs



192.168.1.253 Host Performance Graph





# Light Weight Event System

## Introduction

The Light Weight Event System (LWES) is an open source toolkit allowing the exchange of information between machines in a platform agnostic, language neutral, decoupled way. The exchange of information is done in a connectionless fashion using multicast or unicast UDP, using

dialect.

This leads to a system with the following features:

- Fire and forget messaging
- Decoupling of senders (emitter) from receivers (listeners)
- Centerless, no single point of failure
- Support for many to many communications where nodes can enter and leave the system at any time
- Computer language and hardware platform independent

The system consists of two major components:

- Emitter: a source of events, this is usually a server or process that wants to announce something
- Listener: a sink of events which deserializes and processes events on the fly as they are received.

Optionally, one can run a "journaller", which is a listener that writes raw events to a compressed log instead of deserializing the data, effectively deferring deserialization to a later time.

## Useful Links

SourceForge Project Page

Downloads

Code

eports

## Contributors

Fire UDP Packets per each action

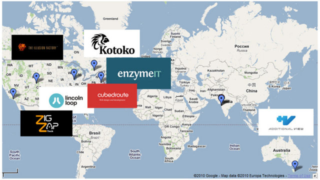
One more thing...

# For PyCon India attendees

- epio invite code: pyconindia82731
- django-zoom priority invites!

# About Me

- Active Djangonaut and active in Python world
- Part of a few popular open source django applications github.com/becomingGuru, stackoverflow.com/users/55562
- Co-Authored an ebook "django-design-patterns"
- Architect and develop django applications at InMobi
- Earlier, Consulting and Development via Agiliq Solutions
- Developed several custom proprietary django applications



- twitter.com/becomingGuru http://becomingguru.com

# Resources

```
So starving:
https://github.com/agiliq/so-starving

Scaling:
"Cal␣Henderson:␣Building␣Scalable␣Web␣Sites"
Highscalability.com, Kitchensoap.com

Performance:
"Steve␣Souders:␣Even␣Faster␣Websites"

Cloud Hosting:
"Ken␣Cochrane␣http://kencochrane.net/blog/"

"Jacob␣Kaplan␣Moss:␣Django␣in␣the␣Real␣World"
```

# Image Attributions

```
http://www.flickr.com/photos/tejedoro_de_luz/3157690060/
http://www.flickr.com/photos/23820645@N05/4287681570/
http://www.flickr.com/photos/aidan_jones/3575000735/
http://jacobian.org/
http://sanjuancollege.edu/lib/images/philosophy_brain.jpg
http://www.flickr.com/photos/uhop/105062059/
http://s3.amazonaws.com/memebox/uploads/136/exponential_graph_2.jpg
http://geekandpoke.typepad.com/geekandpoke/images/2008/06/03/sexpl18.jpg
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