WEB DEVELOPMENT SHOULD BE

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FIRST OF ALL....

Tatiana and Alvaro

Congratulations to Bruno Rocha
new member of the PSF

SHOULD EVERYBODY LEARN TO PROGRAM?

SHOULD EVERY KID(*) LEARN TO PROGRAM?

Yes!

(*) KID = PERSON YOUNGER THAN ME AND GOING TO SCHOOL

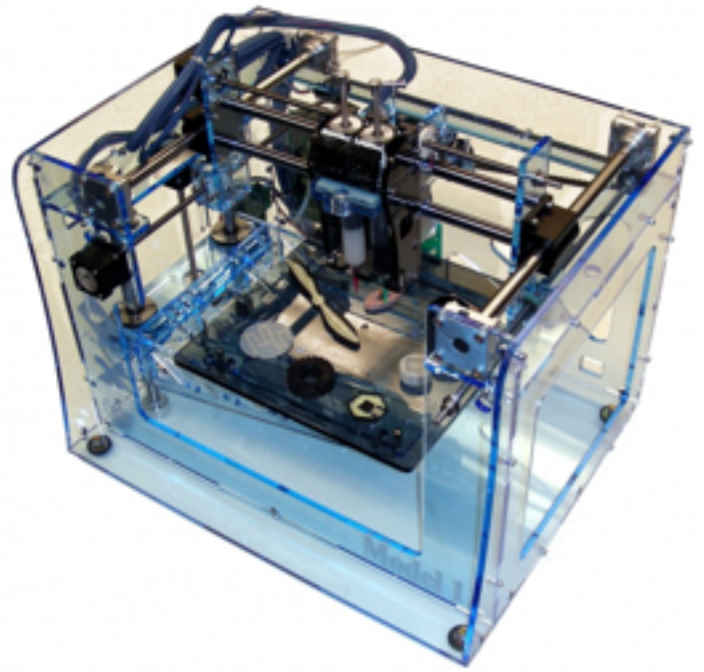
WHY?

- It improves cognitive skills
- In the next 10 years software development jobs are projected to increase 2x as other jobs (in average).
- We want kids to understand technology, not be simply consumers of technology.
- Understanding science and technology is essential for the progress of society.
- Computing technologies have given us unprecedented means to communicate and build social relations but can also be used to take away some of our rights (who owns you digital content?)

ANYTHING ELSE?

- It improves the capitalistic model which makes a distinction between the investors who buy the means of production, and the workers who build products
- Anyone can build software with modest "means of production": a laptop, a good education, and time
- Most software developers have the means to build their own companies and dream of doing so.
- They make a product that has economic value, often social value, can be replicated at no cost, and can be discarded without polluting the environment.
- Production of digital content (especially software) will continue to be an increasing part of the world' future economy.

WHICH SOCIETY DO WE WANT?



DO WE TEACH PROGRAMMING WELL?

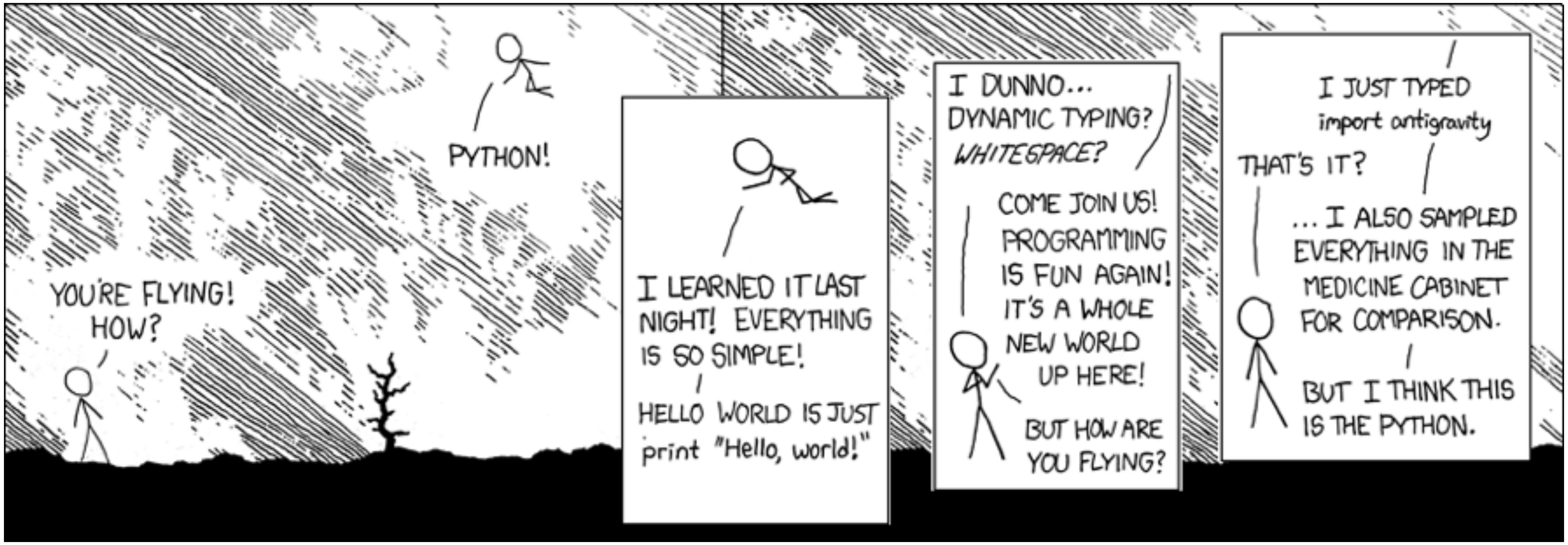
```java
public class HelloWorld {
    public static void main(String[] args) {
        System.out.println("Hello, World");
    }
}
```

NO!

- We put obstacles in the way of young programmer (shell, IDE, ...)
- We use languages that focus on syntax not semantic
- We use examples that do not leverage on students' knowledge
- We do not provide motivation (intro classes far from real life)
- Bottom-up approach instead of top-down approach

HOW CAN WE DO IT BETTER?

```
print “hello world”
```


YOU'RE FLYING! HOW?
PYTHON!
I LEARNED IT LAST NIGHT! EVERYTHING IS SO SIMPLE!
HELLO WORLD IS JUST print "Hello, world!"
I DUNNO... DYNAMIC TYPING? WHITESPACE?
COME JOIN US! PROGRAMMING IS FUN AGAIN! IT'S A WHOLE NEW WORLD UP HERE!
BUT HOW ARE YOU FLYING?
I JUST TYPED import antigravity
THAT'S IT?
...I ALSO SAMPLED EVERYTHING IN THE MEDICINE CABINET FOR COMPARISON.
BUT I THINK THIS IS THE PYTHON.

HOW CAN WE DO IT EVEN BETTER?

```
def index():
    return “hello world”
```

Put in context: www!

- The web provides motivation for learning to program
- The web gives kids means to communicate
- Kids already associate the computer with the web

my job is to make web development easy

my job is to make web development easy

easy != dumbed down
easy != visual programming

easy => more intuitive / less error prone
easy => more expressive
easy => more powerful syntax

easy is not just for kids
easy means experienced developers can concentrate on what is important: algorithms
easy means less development and maintenance costs

Disclaimer: I do not claim any success. I am just trying....

WE2PY: BATTERIES INCLUDED

web server
ssl enabled

DAL + database
auto-migrations SQLite

web IDE
design, deploy, manage

html, xml, json, rss, ics, pdf, rtf,
xmlrpc, jsonrpc, soap,
ldap, pam, janrain, dropbox, google,
CAS, OpenID, oauth 1&2, x509
marmin, markdown,
google wallet, authorize.net, stripe.com
memcache, redis
twitter bootstrap

No installation. No configuration. Just Unzip and Click!

WEB2PY CONTRIBUTORS

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Marcel.Leuthi
Pierre.Thibault
Yannis.Aribaud
Pai
Scott.Roberts
Carlos.Galindo
Limodou
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Mariano.Reingart
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Michael.Willis
Vinicius.Assef
Olaf.Ferger
Yarko.Tymciurak
Andrew.Willimott
Martin.Hufsky
Sharriff.Aina
Hans.Donner
Nathan.Freeze
Fred.Yanowski
Farsheed.Ashouri
Ross.Peoples
Younghyun.Jo
Marcel.Hellkamp
Hamdy.Abdel-Badeea
Marcello.Della.Longa
Robin.Bhattacharyya
Josh.Jaques
Marin.Pranjic
Alvaro.Justen
Bruno.Rocha
Kyle.Smith
Ryan.Seto
Eric.Vicenti
Chris.May

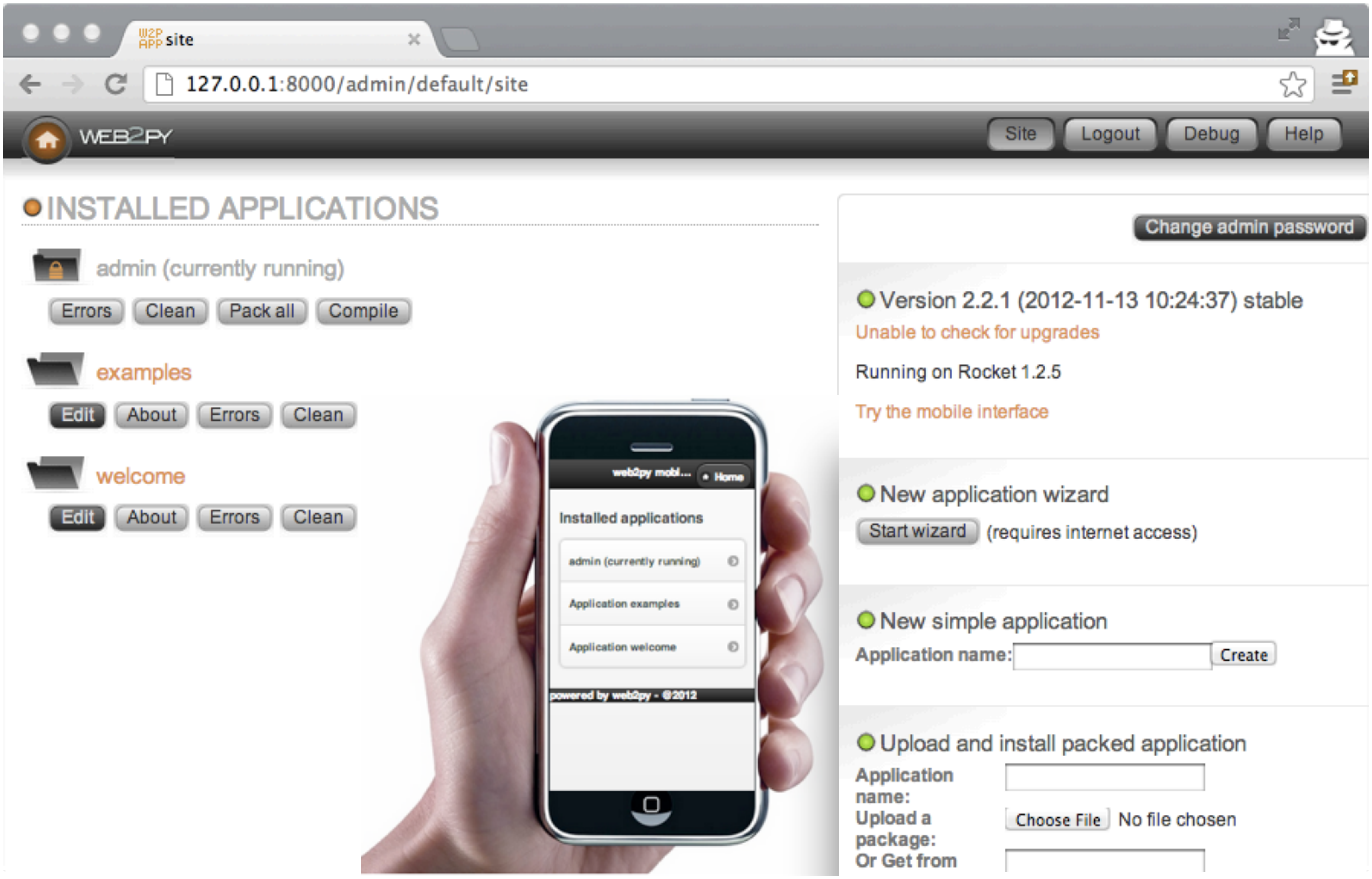
2011

InfoWorld.com ★2011 AWARDS★ BOSSIE

2012

InfoWorld.com ★★AWARDS★★ TECHNOLOGY OF THE YEAR

Web based IDE "admin" with hot plug and play of multiple apps



INSTALLED APPLICATIONS

admin (currently running)

examples

welcome

Installed applications

admin (currently running)

Application examples

Application welcome

Version 2.2.1 (2012-11-13 10:24:37) stable

Unable to check for upgrades

Running on Rocket 1.2.5

Try the mobile interface

New application wizard

Start wizard (requires internet access)

New simple application

Application name:

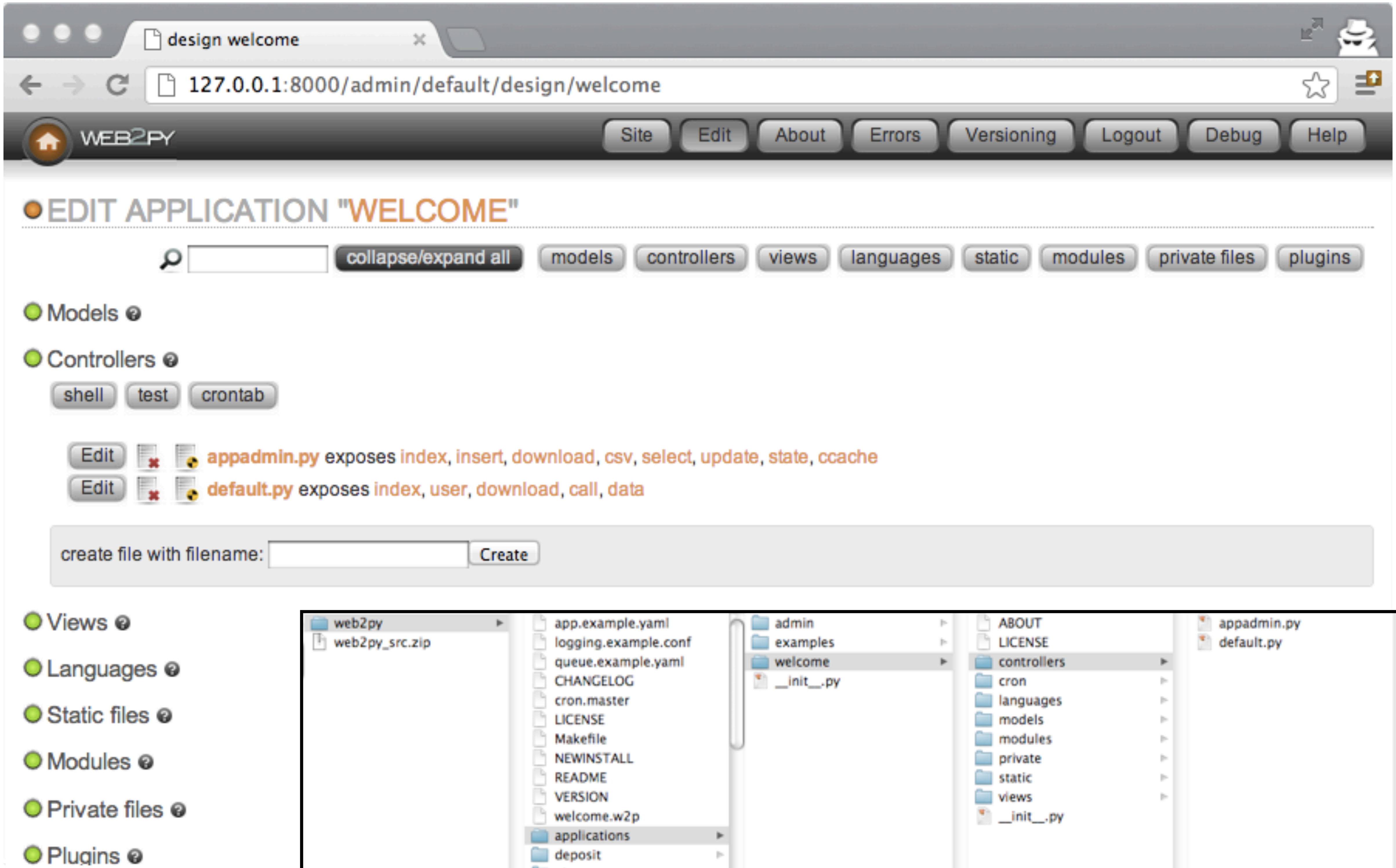
Upload and install packed application

Application name:

Upload a package:

Or Get from

Thin-IDE: only shows file system, no metadata



EDIT APPLICATION "WELCOME"

Models

Controllers

Edit appadmin.py exposes index, insert, download, csv, select, update, state, ccache

Edit default.py exposes index, user, download, call, data

create file with filename: Create

Views

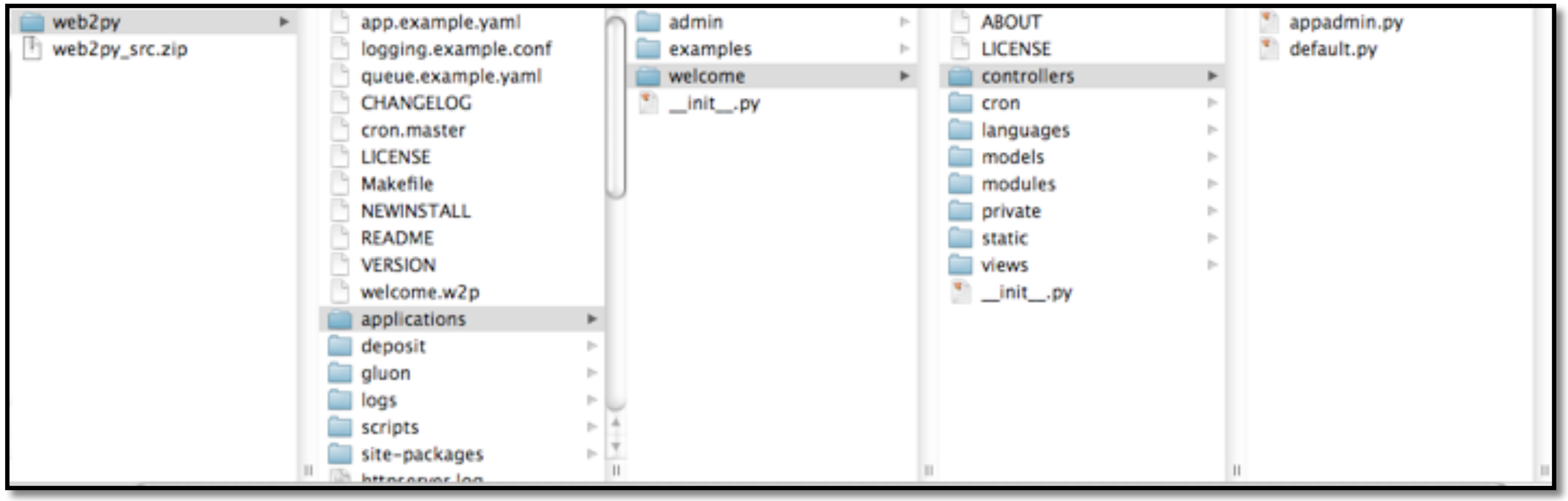
Languages

Static files

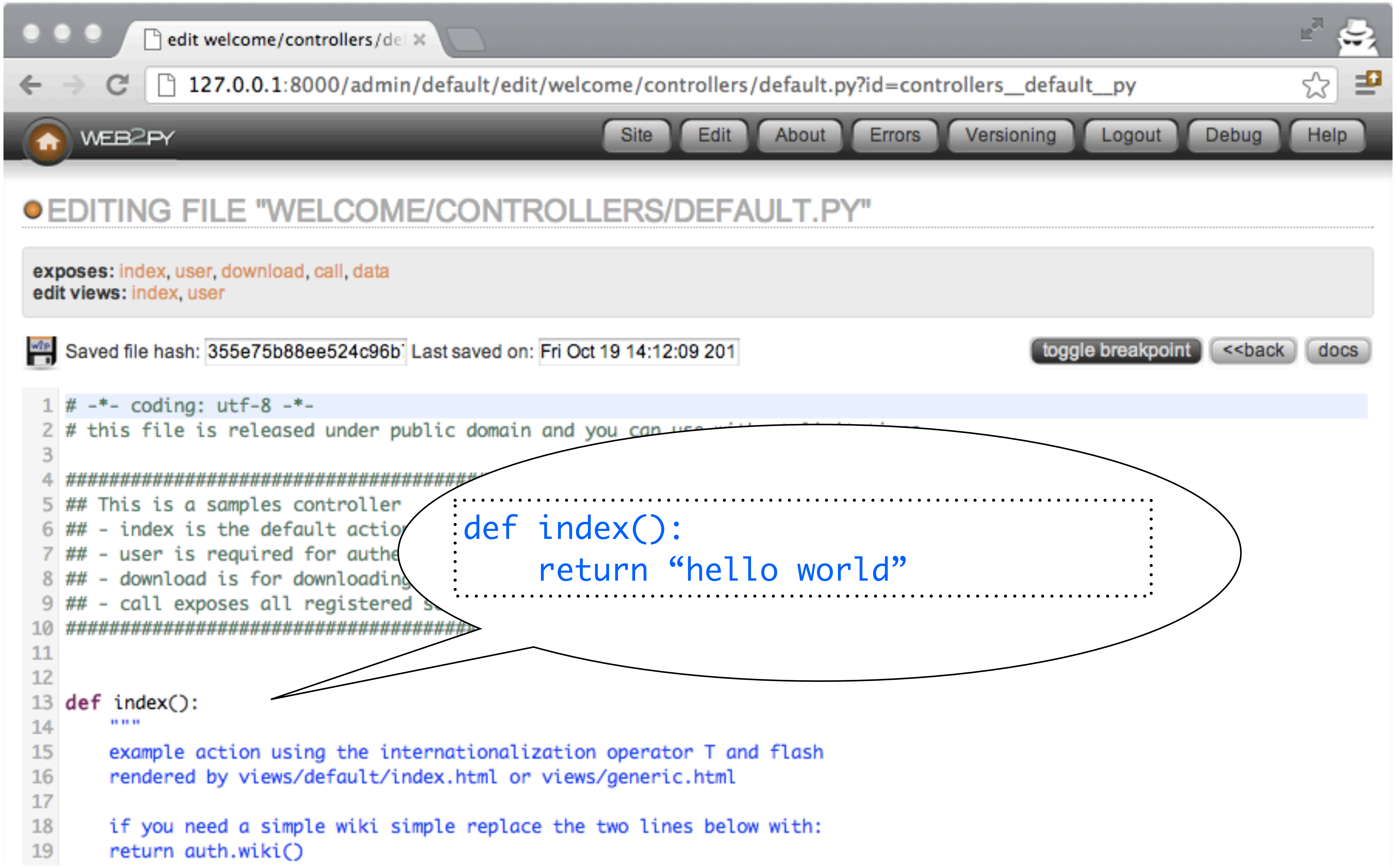
Modules

Private files

Plugins



Web based editor (code-mirror)


edit welcome/controllers/de
127.0.0.1:8000/admin/default/edit/welcome/controllers/default.py?id=controllers__default__py
WEB2PY
Site
Edit
About
Errors
Versioning
Logout
Debug
Help
toggle breakpoint
<<back
docs

EDITING FILE "WELCOME/CONTROLLERS/DEFAULT.PY"

exposes: index, user, download, call, data
edit views: index, user

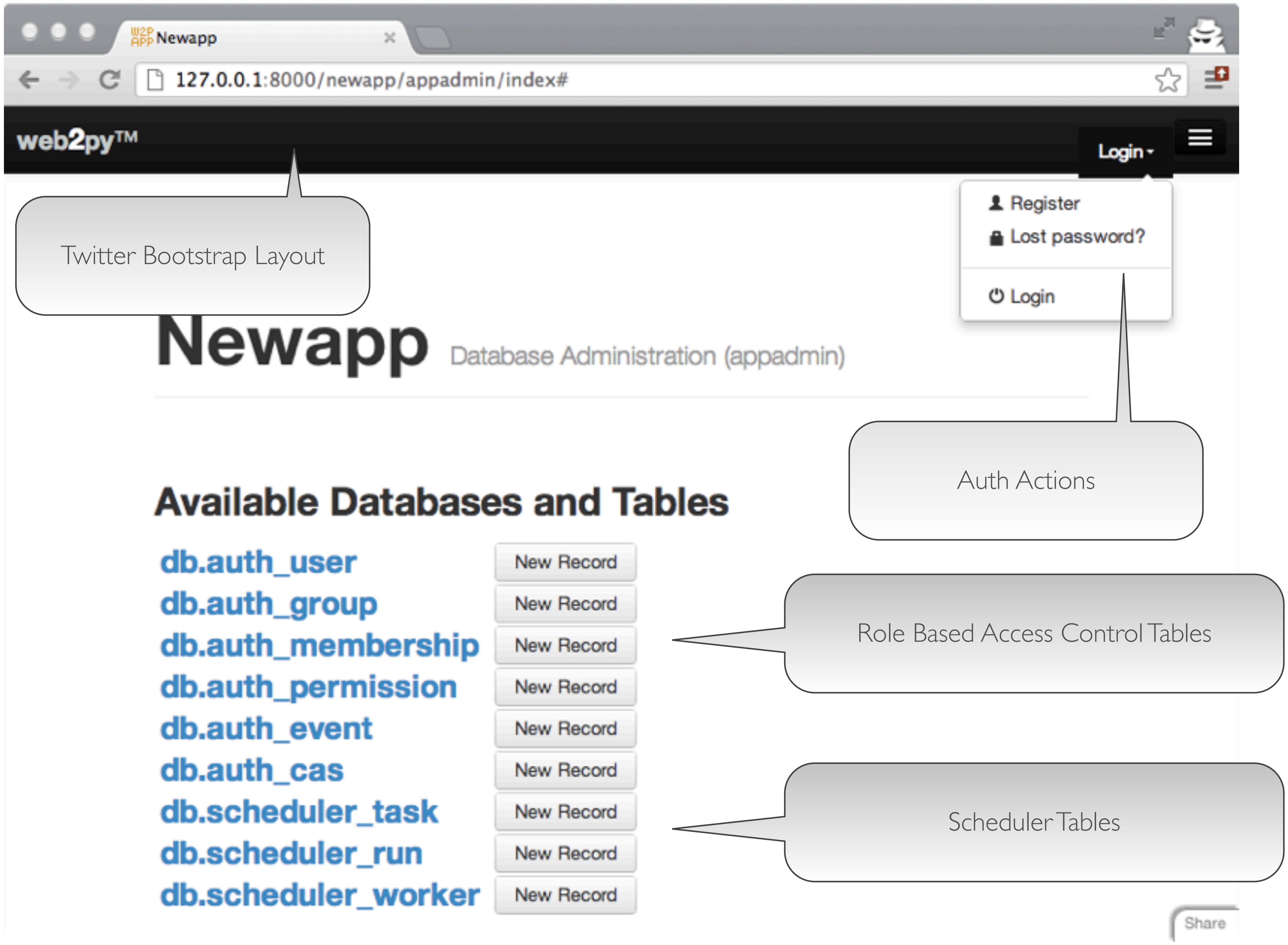
Saved file hash: 355e75b88ee524c96b Last saved on: Fri Oct 19 14:12:09 201

```
# -*- coding: utf-8 -*-
# this file is released under public domain and you can use

#########################################
## This is a samples controller
## - index is the default actio
## - user is required for authe
## - download is for downloading
## - call exposes all registered s
#########################################


def index():
    """
    example action using the internationalization operator T and flash
    rendered by views/default/index.html or views/generic.html

    if you need a simple wiki simple replace the two lines below with:
    return auth.wiki()
```

```
def index():
    return “hello world”
```

Web based database administration (per app)

SQLite, MySQL, PotsgreSQL, MSSQL, Firebid, Oracle, DB2, Ingres, Informix, Ingres, Sybase, GAE, ...

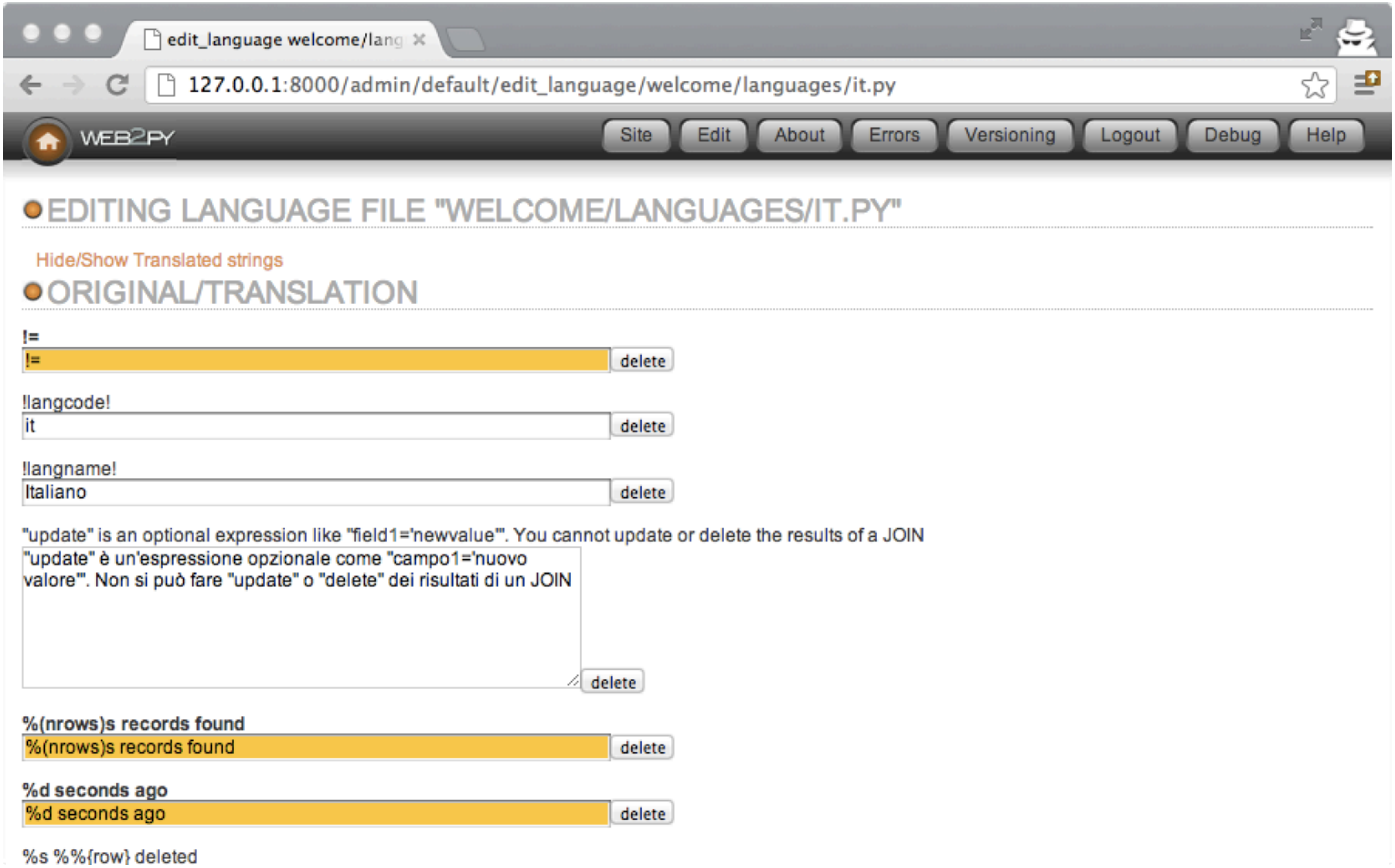


Newapp Database Administration (appadmin)

Available Databases and Tables

db.auth_user	New Record
db.auth_group	New Record
db.auth_membership	New Record
db.auth_permission	New Record
db.auth_event	New Record
db.auth_cas	New Record
db.scheduler_task	New Record
db.scheduler_run	New Record
db.scheduler_worker	New Record

Web translation page for internationalization (per app)


edit_language welcome/lang
127.0.0.1:8000/admin/default/edit_language/welcome/languages/it.py
WEB2PY
Site
Edit
About
Errors
Versioning
Logout
Debug
Help

EDITING LANGUAGE FILE "WELCOME/LANGUAGES/IT.PY"

Hide/Show Translated strings

ORIGINAL/TRANSLATION

!=
!= delete

!langcode!
it delete

!langname!
Italiano delete

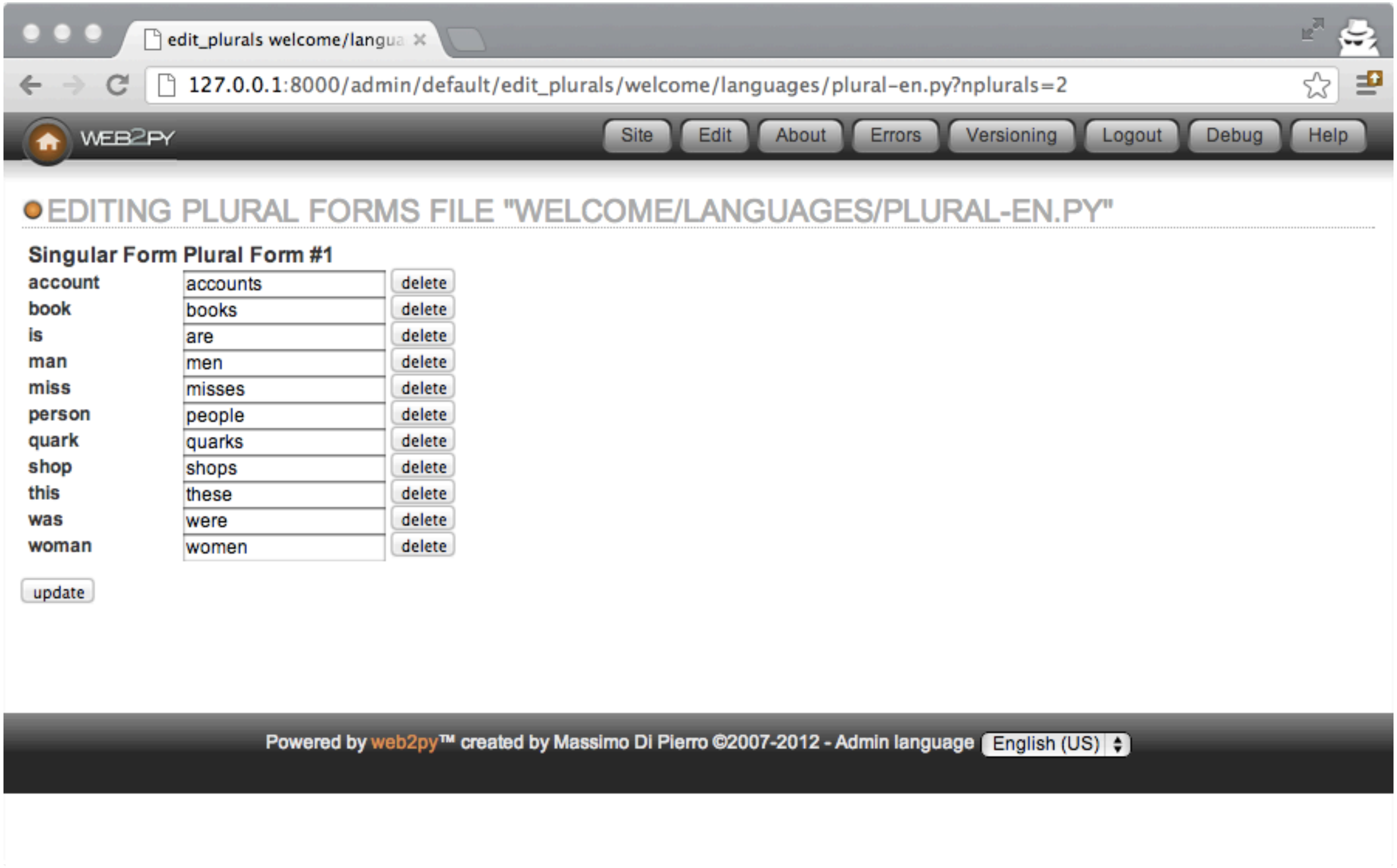
"update" is an optional expression like "field1='newvalue'". You cannot update or delete the results of a JOIN
"update" è un'espressione opzionale come "campo1='nuovo valore'". Non si può fare "update" o "delete" dei risultati di un JOIN delete

%(nrows)s records found
%(nrows)s records found delete

%d seconds ago
%d seconds ago delete

%s %%{row} deleted

Built-in pluralization system



edit_plurals welcome/langua
127.0.0.1:8000/admin/default/edit_plurals/welcome/languages/plural-en.py?nplurals=2
WEB2PY
Site
Edit
About
Errors
Versioning
Logout
Debug
Help

EDITING PLURAL FORMS FILE "WELCOME/LANGUAGES/PLURAL-EN.PY"

Singular Form	Plural Form #1	
account	accounts	delete
book	books	delete
is	are	delete
man	men	delete
miss	misses	delete
person	people	delete
quark	quarks	delete
shop	shops	delete
this	these	delete
was	were	delete
woman	women	delete

update

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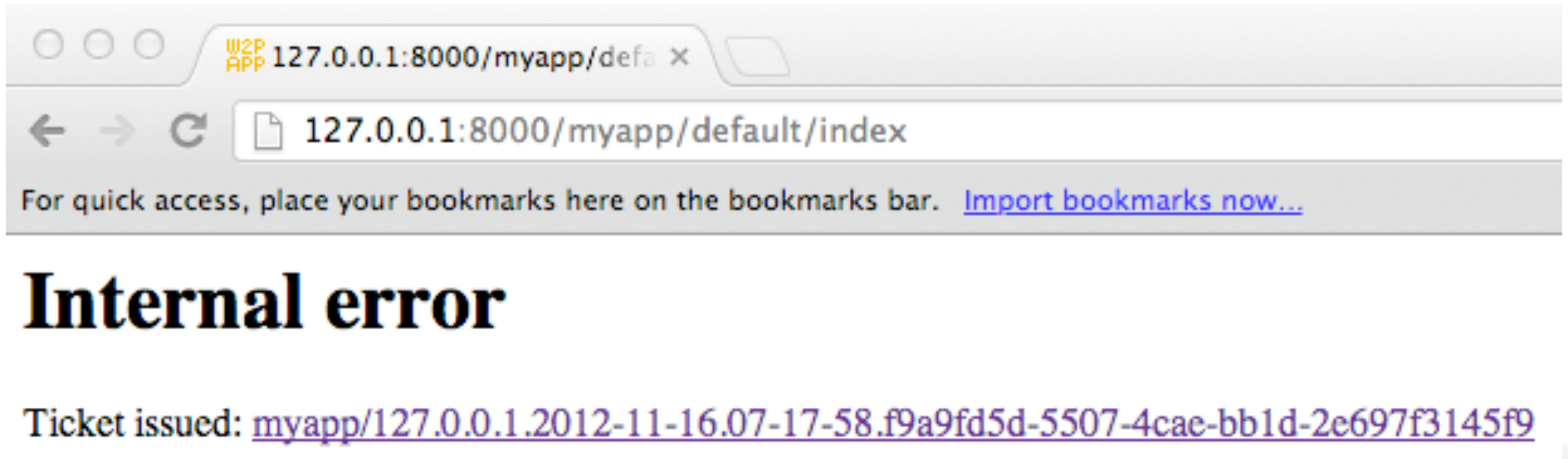
Built-in ticketing system

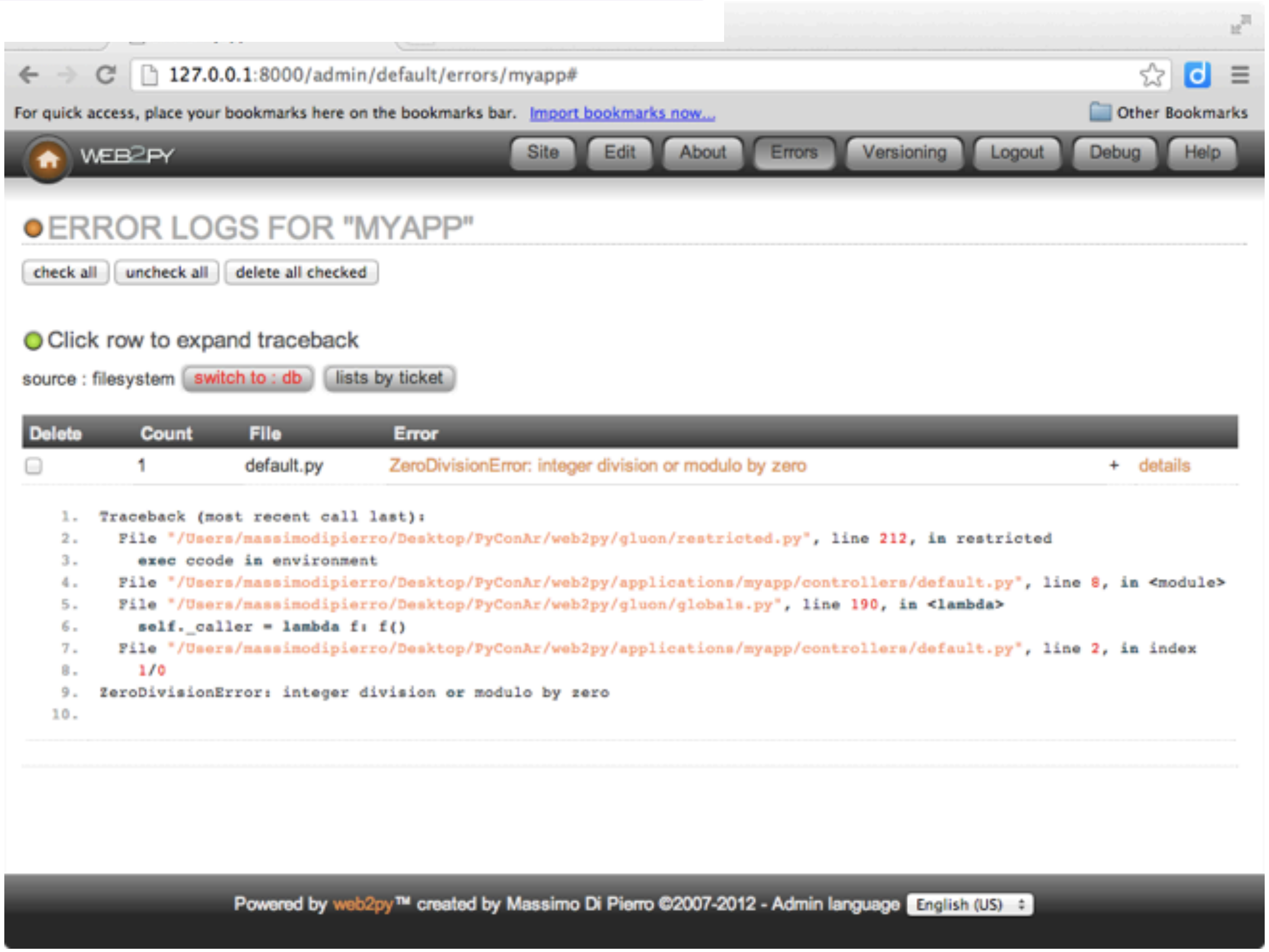


127.0.0.1:8000/myapp/default/index

For quick access, place your bookmarks here on the bookmarks bar. Import bookmarks now...

Internal error

Ticket issued: myapp/127.0.0.1.2012-11-16.07-17-58.f9a9fd5d-5507-4cae-bb1d-2e697f3145f9



127.0.0.1:8000/admin/default/errors/myapp#

ERROR LOGS FOR "MYAPP"

check all | uncheck all | delete all checked

Click row to expand traceback

source : filesystem | switch to : db | lists by ticket

Delete	Count	File	Error	
☐	1	default.py	ZeroDivisionError: integer division or modulo by zero	+ details

```
Traceback (most recent call last):
  File "/Users/massimodipierro/Desktop/PyConAr/web2py/gluon/restricted.py", line 212, in restricted
    exec ccode in environment
  File "/Users/massimodipierro/Desktop/PyConAr/web2py/applications/myapp/controllers/default.py", line 8, in <module>
  File "/Users/massimodipierro/Desktop/PyConAr/web2py/gluon/globals.py", line 190, in <lambda>
    self._caller = lambda f: f()
  File "/Users/massimodipierro/Desktop/PyConAr/web2py/applications/myapp/controllers/default.py", line 2, in index
    1/0
ZeroDivisionError: integer division or modulo by zero
```

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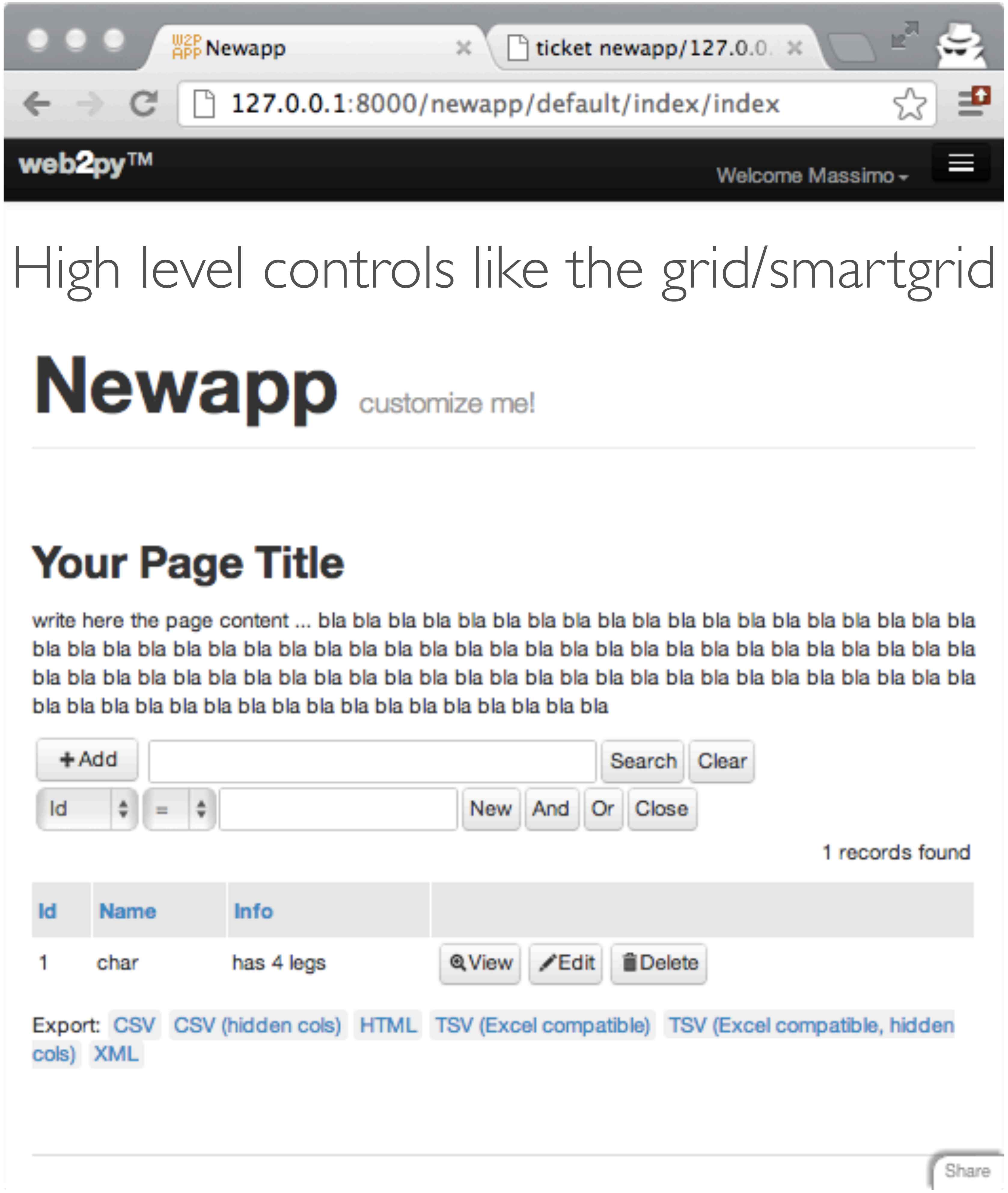


High level controls like the grid/smartgrid

Newapp customize me!

Your Page Title

write here the page content ... bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla

1 records found

Id	Name	Info	
1	char	has 4 legs	View Edit Delete

Export: CSV CSV (hidden cols) HTML TSV (Excel compatible) TSV (Excel compatible, hidden cols) XML

SYNTAX

```
public class HelloWorld {
    public static void main(String[] args) {
        System.out.println("Hello, World");
    }
}
```

VS

```
print “hello world”
```

KEEP NEW PROGRAMMERS IN MIND

BOTTLE EXAMPLE

```
from bottle import run, route, get, static_file


@get('/index')
def index()
    return ‘hello world’

@route('/static/<filename>')
def server_static(filename):
    return static_file(filename, root='static')

run(host='localhost', port=8080)
```

required inputs

routing logic

action

handler for static files

start web server

FLASK EXAMPLE

```
from flask import Flask, request



app = Flask(__name__)
app.config.from_object(__name__)

@app.route('/index',methods=['GET'])
def index()
    return ‘hello world’

app.run(port=8080)
```

required inputs

boilerplate config logic

routing logic

action

start web server

TORNADO EXAMPLE

```
import tornado.ioloop
import tornado.web


def index(request):
    return ‘hello world’

class MainHandler(tornado.web.RequestHandler):
    def get(self): return index(self.request)

application = tornado.web.Application([
   (r"/index", MainHandler),
   (r"/static/(.*)",tornado.web.StaticFileHandler,{"path": "static"})])

application.listen(8080)
tornado.ioloop.IOLoop.instance().start()
```

required inputs

action

routing logic

handler for static files

start web server

PYRAMID EXAMPLE

```
from wsgiref.simple_server import make_server
from pyramid.config import Configurator
from pyramid.response import Response
from pyramid.static import static_view

def index(context, request):
    return Response(‘hello world’)

config = Configurator()
config.add_route('index', '/index')
config.add_view(index, route_name='index')
config.add_static_view(name='static', path='static')
app = config.make_wsgi_app()
server = make_server('0.0.0.0', 8080, app)
server.serve_forever()
```

required inputs

action

routing logic

handler for static files

start web server

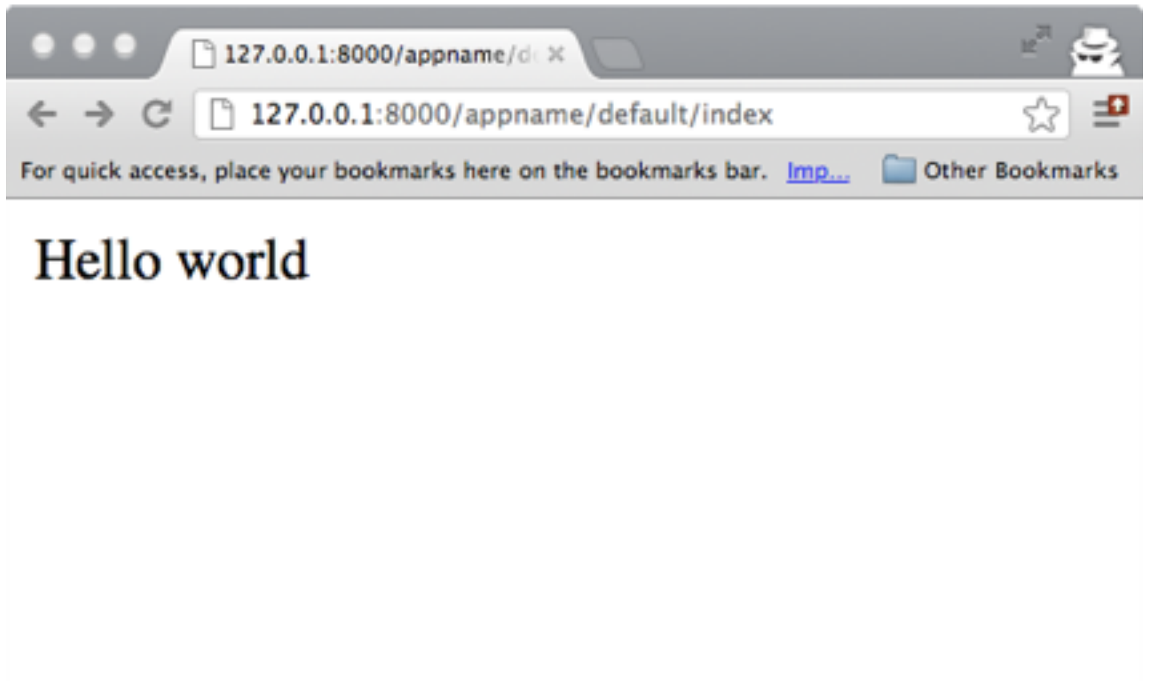
WEB2PY EXAMPLE

http://127.0.0.1:8000/appname/default/index

call

```
def index():
    return ‘hello world’
```

action



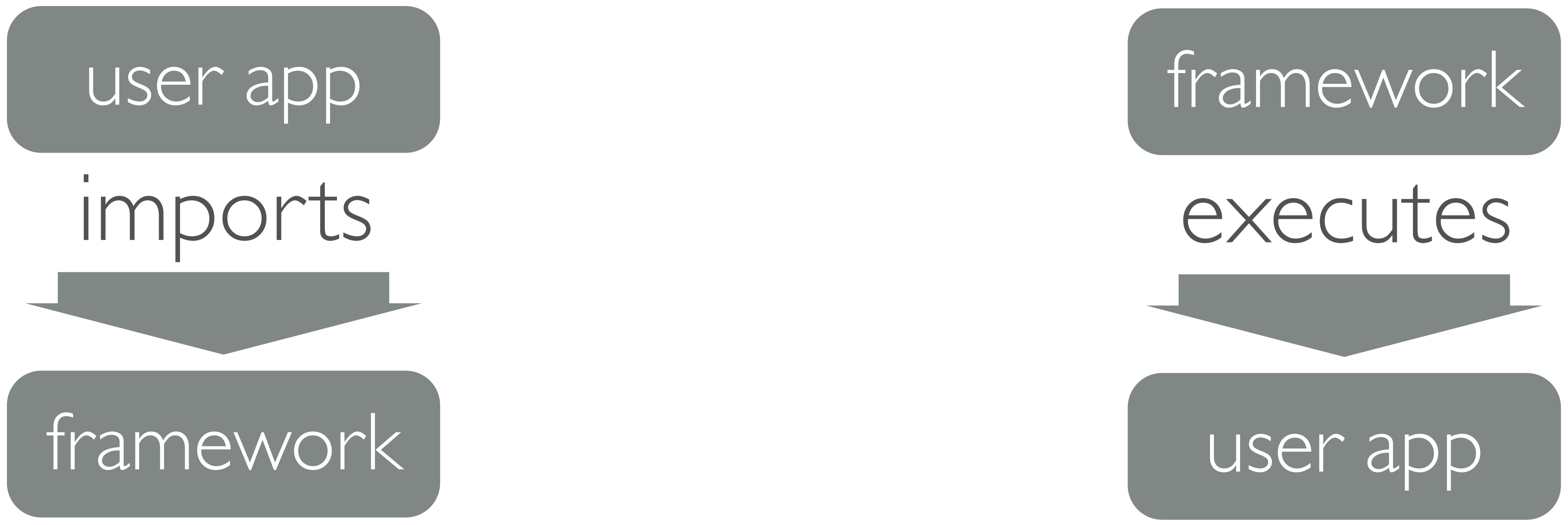
127.0.0.1:8000/appname/d

127.0.0.1:8000/appname/default/index

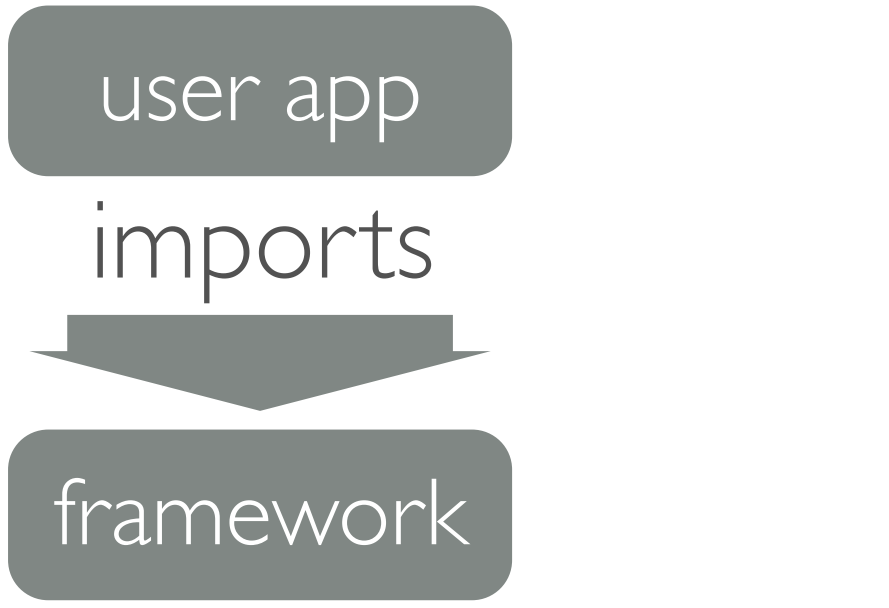
For quick access, place your bookmarks here on the bookmarks bar. Imp... Other Bookmarks

Hello world

IMPORT VS EXEC



IMPORT VS EXEC



```
from bottle import ...
from flask import ...
from tornado import ...
from pyramid import ...
```

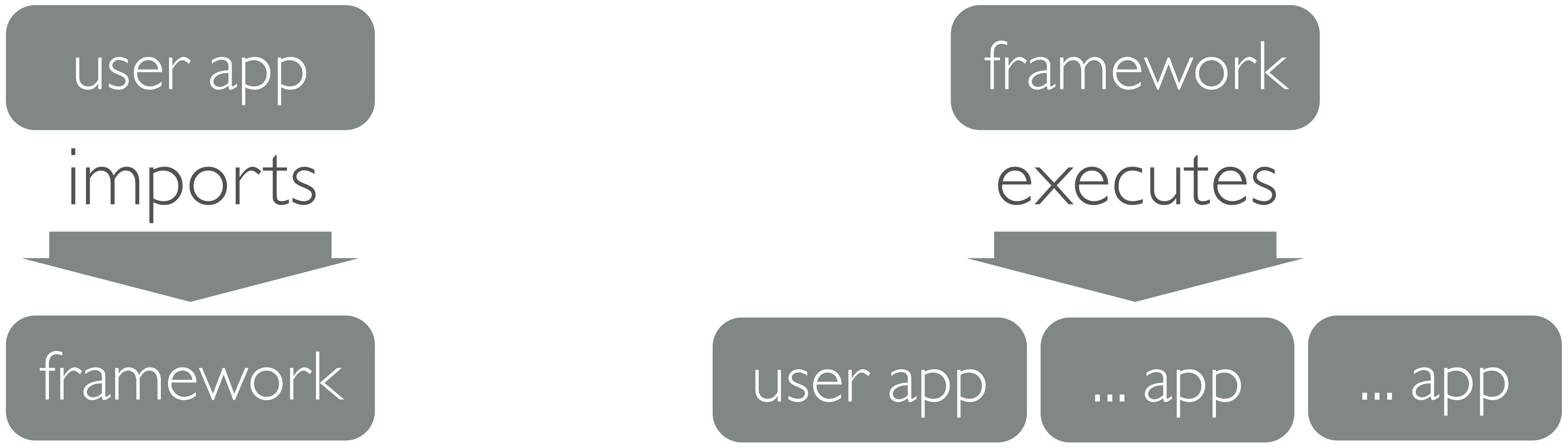
```
env = build_environment(request)
app = find_application(request)
exec app in env   (oversimplification)
```

explicit better than implicit

do not repeat yourself

convention over configuration

IMPORT VS EXEC



faster (for simple apps)
more flexibility
no “magic”

less code (for simple apps)
how swap of code
multi app/multi project
homogeneous environment
“magic”

LAYERS OF CODE

SQL inside Python

(DAL or ORM)

```
execute('select * from users where id=1')
```

```
db(db.users.id==1).select()
```

HTML inside CODE

(helpers)

```
return '<div><h1>%s</h1></div>' % x
```

```
return DIV(H1(x))
```

CODE in HTML

(MVC)

```
<div>{{if x}}check{{endif}}</div>
```

```
<div>{{if x:}}check{{pass}}</div>
```

JS in HTML

```
<div><script>alert('hi!')</script></div>
```

```
<div>{{=LOAD('action',ajax=True)}}</div>
```

WEB2PY DAL

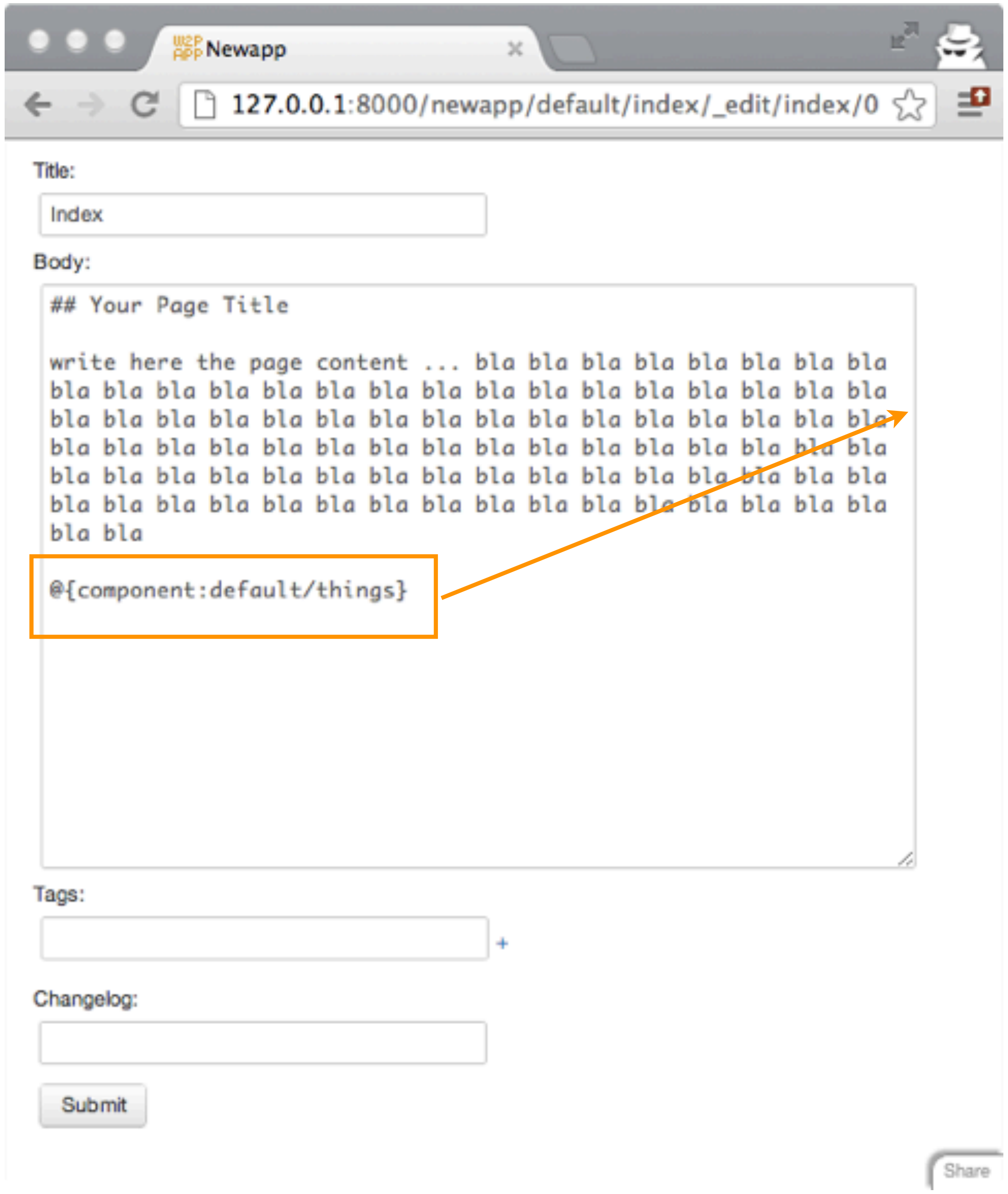
- SQLite, MySQL, PotsgreSQL, MSSQL, Firebid, Oracle, DB2, Ingres, Informix, Ingres, Sybase, GAE, ...
- automatic migrations
- multiple dbs, connection pooling, Round Robin redundancy, distributed transactions
- joins, left joins, aggregates, nested selects, recursive selects

```
db = DAL('postgresql:...', pool_size=10)
db.define_table('person',Field('name'))
db.define_table('thing',Field('name'),Field('owner',db.person))
db.thing.insert(name='PC', owner=db.person.insert(name='John'))

ownership = (db.person.id == db. thing.owner)
thing_counter = db.thing.id.count()
rows = db(ownership).select(db.person.name, thing_counter,
                            groupby= db. person.id)

for row in rows: print row.person.name, row(thing_counter)
```

PROGRAMMING AS WIKI

```
# models/db.py
db.define_table('thing',
    Field('name'),
    Field('info','test'))

# controllers/default.py
def index():
    return auth.wiki()

def things():
    return SQLFORM.grid(db.thing)
```

PROGRAMMING AS WIKI



Title:

Index

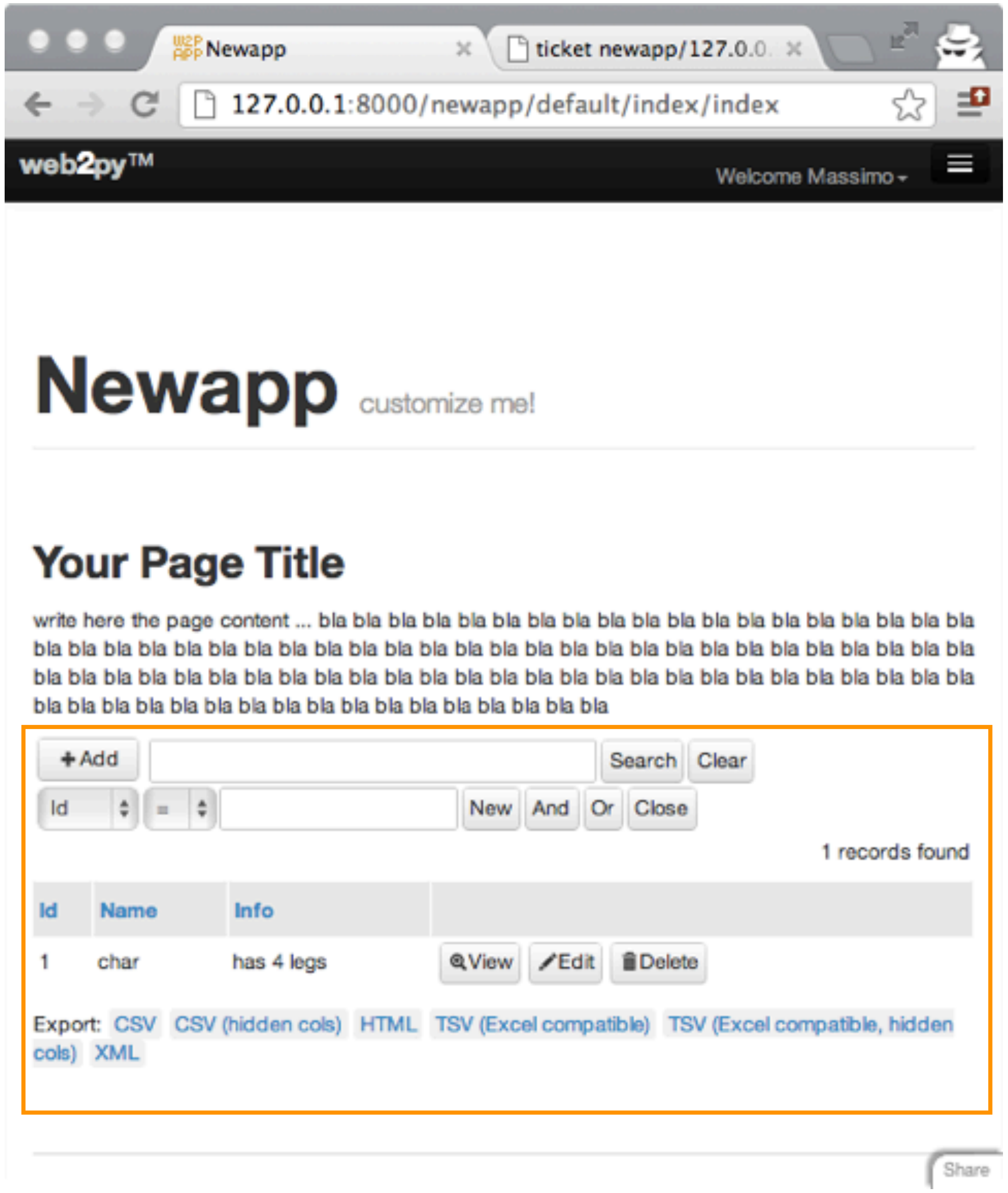
Body:

```
## Your Page Title

write here the page content ... bla bla bla bla bla bla bla bla
bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla
bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla
bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla
bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla
bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla
bla bla

@{component:default/things}
```

Tags:

Changelog:

Submit



Newapp customize me!

Your Page Title

write here the page content ... bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla bla

1 records found

Id	Name	Info	
1	char	has 4 legs	View Edit Delete

Export: CSV CSV (hidden cols) HTML TSV (Excel compatible) TSV (Excel compatible, hidden cols) XML

CONCLUSIONS

- The elitist approach to programming leads us to the wrong path
- There is not only one solution
- There is not only one web framework
- We need to learn from each other
- We need to build a society where technology is understood and therefore controlled by people, not by large corporation
- We need to build tools that are easy to use to allow more people to use technology for public good (for new and experienced users)