The Swiss-Army Knife for Python Web Developers

Armin Ronacher — http://lucumr.pocoo.org/

About Me

About Me

- Name: Armin Ronacher
- Werkzeug, Jinja, Pygments, ubuntuusers.de
- Python since 2005
- WSGI warrior since the very beginning (well, not quite)

Why Python?

Why Python?

- agile
- active community
- countless modules
- powerful introspection functionality
- **WSGI**

WSGI

WSGI

- **W**eb **S**erver **G**ateway **I**nterface
- lowlevel interface between application and server
- allows to reuse code between applications
- CGI / FastCGI / SCGI / AJP / mod_python / mod_wsgi / twisted / standalone
- simple and fast

Hello World

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```
def application(environ, start_response):
    start_response('200 OK', [('Content-Type', 'text/html')])
    return [
        '<!DOCTYPE HTML>\n<title>Hello World</title>\n'
        '<h1>Hello World!</h1>'
    ]
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Hello World

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Response #2

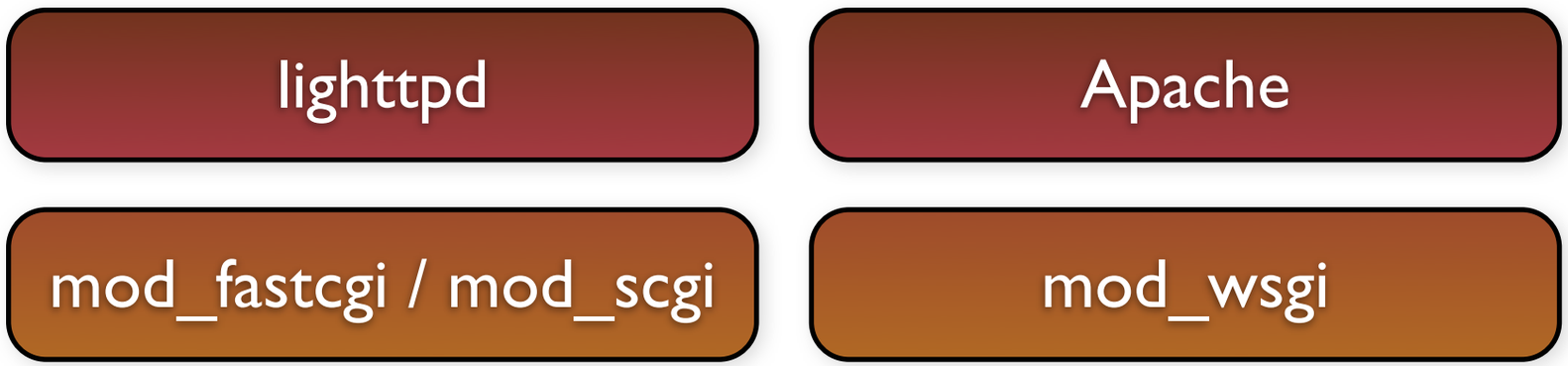
Deployment

Deployment

lighttpd

Apache

Deployment



Deployment

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Apache

mod_fastcgi / mod_scgi

mod_wsgi

flup

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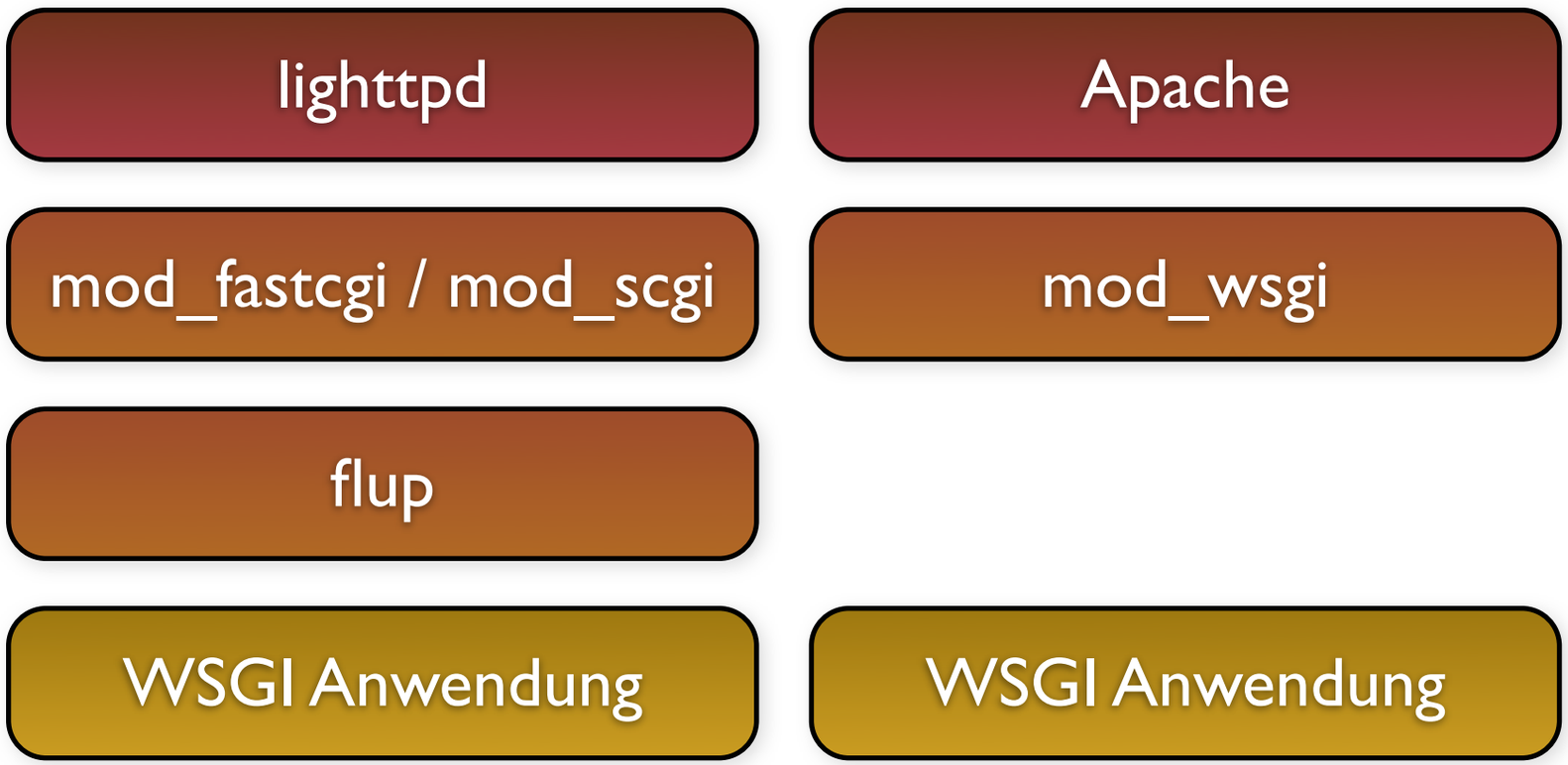
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WSGI Anwendung
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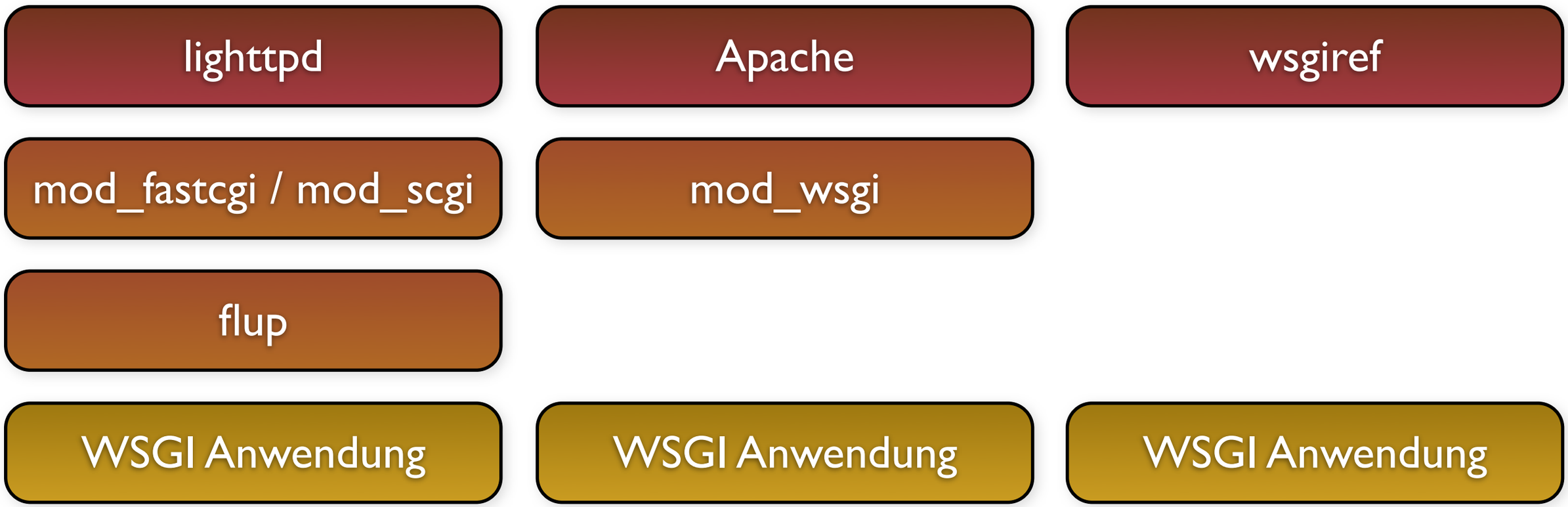
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- can manipulate incoming and outgoing data
- useful to …
  - … log errors
  - … fix broken server data
  - … combine multiple applications

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http://dirtsimple.org/2007/02/wsgi-middleware-considered-harmful.html

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- combines it and creates and `application` object or calls the gateway

```
from yourapplication import Application
from yourmiddleware import YourMiddleware
from vendormiddleware import VendorMiddleware

application = Application(configuration=here)
application = YourMiddleware(application, configuration=here)
application = VendorMiddleware(application)
```

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Summary

- application: callable object
  - `environ` … incoming data
  - `start_response` … starts the response
  - `app_iter` … an iterator, each iteration sends data to the client
- middleware: between application and gateway
- gateway: translates WSGI to CGI etc.

Werkzeug

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- form data / file uploads / url parameter parsing

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- countless small helpers

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Why not?

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Why not?

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- you can combine them
- everybody wants something else
- cherry picking!

What does it look like?

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```
>>> from werkzeug import Request, create_environ
>>> environ = create_environ('/index.html?foo=bar&foo=baz&blah=42')
>>> request = Request(environ)
>>> request.args['foo']
u'bar'
>>> request.args.getlist('foo')
[u'bar', u'baz']
>>> request.args.get('blah', type=int)
42
>>> request.path
u'/index.html'
>>> request.method
'GET'
```

DumpIt!

a pastebin in 15 minutes

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```
easy_install Werkzeug
easy_install Jinja
easy_install Pygments
```

#0: Database

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schema.sql

```
CREATE TABLE pastes (
    id INTEGER NOT NULL,
    code TEXT,
    lang VARCHAR(40),
    PRIMARY KEY (id)
);
```

#1: Imports

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```
import sqlite3
from os import path
from werkzeug import Request, Response, redirect
from werkzeug.exceptions import HTTPException, NotFound
from werkzeug.routing import Map, Rule
from jinja import Environment, FileSystemLoader
from pygments import highlight
from pygments.lexers import get_lexer_by_name, TextLexer
from pygments.formatters import HtmlFormatter
```

#2: Configuration

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```
DATABASE = '/path/to/dumpit.db'
PYGMENTS_STYLE = 'pastie'
LANGUAGES = [
    ('text',            'No Highlighting'),
    ('python',          'Python'),
    ('c',               'C')
]
TEMPLATES = path.join(path.dirname(__file__), 'templates')

jinja_env = Environment(loader=FileSystemLoader(TEMPLATES))
pygments_formatter = HtmlFormatter(style=PYGMENTS_STYLE)

def render_template(template_name, **context):
    template = jinja_env.get_template(template_name)
    return template.render(context)
```

#3: Dispatching

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def application(environ, start_response):
    request = Request(environ)
    request.db = sqlite3.connect(DATABASE)
    url_adapter = url_map.bind_to_environ(environ)
    try:
        endpoint, values = url_adapter.match()
        response = globals()[endpoint](request, **values)
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http://localhost:5000/
http://localhost:5000/42
http://localhost:5000/42/raw
http://localhost:5000/pygments.css

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#4: „Views“

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```
def new_paste(request):
    if request.method == 'POST':
        code = request.form.get('code')
        lang = request.form.get('lang')
        if code and lang:
            paste = Paste(lang, code)
            paste.save(request.db)
            return redirect(str(paste.id))
    return render_template('new_paste.html', languages=LANGUAGES)
```

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            return
    return render_t
```

```
def show_paste(request, id):
    paste = Paste.get(request.db, id)
    if paste is None:
        raise NotFound()
    return render_template('show_paste.html', paste=paste)
```

#4: „Views“

```python
def new_paste(request):
    if request.method == 'POST':
        code = request.form.get('code')
        lang = request.form.get('lang')
        if code and lang:
            paste =
            paste.s
            return
    return render_t
```

```python
def show_paste(request, id):
    paste = Paste.get(request.db, id)
    if paste is None:
        raise NotFound()
    return render_template('show_paste.html', paste=paste)
```

```python
def download_paste(request, id):
    paste = Paste.get(request.db, id)
    if paste is None:
        raise NotFound()
    return Response(paste.code)
```

#4: „Views“

```
def new_paste(request):
    if request.method == 'POST':
        code = request.form.get('code')
        lang = request.form.get('lang')
        if code and lang:
            paste =
            paste.s
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    return render_t
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```
def show_paste(request, id):
    paste = Paste.get(request.db, id)
    if paste is None:
        raise NotFound()
    return render_template('show_paste.html', paste=paste)
```

```
def download_paste(request, id):
    paste = Paste.get(request.db, id)
    if paste is None:
        raise NotFound()
    return Response(paste.code)
```

```
def pygments_style(request):
    return Response(pygments_formatter.get_style_defs(),
                    mimetype='text/css')
```

#5: Model

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```
class Paste(object):

    def __init__(self, lang, code, id=None):
        self.lang = lang
        self.code = code
        self.id = id

    @property
    def highlighted_code(self):
        try:
            lexer = get_lexer_by_name(self.lang)
        except ValueError:
            lexer = TextLexer
        return highlight(self.code, lexer, pygments_formatter)

    @classmethod
    def get(cls, con, id):
        cur = con.cursor()
        cur.execute('select lang, code, id from pastes where id = ?', [id])
        row = cur.fetchone()
```

#5: Model

```
    @classmethod
    def get(cls, con, id):
        cur = con.cursor()
        cur.execute('select lang, code, id from pastes where id = ?', [id])
        row = cur.fetchone()
        if row:
            return cls(*row)

    def save(self, con):
        cur = con.cursor()
        if self.id is None:
            cur.execute('insert into pastes (lang, code) values (?, ?)',
                        [self.lang, self.code])
            self.id = cur.lastrowid
        else:
            cur.execute('update pastes set lang = ?, code = ? where '
                        'id = ?', [self.lang, self.code, self.id])
        con.commit()
```

#6: Templates

#6: Templates

layout.html

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01//EN"
  "http://www.w3.org/TR/html4/strict.dtd">
<html>
  <head>
    <title>Dump It!</title>
    <link rel="stylesheet" href="/static/style.css" type="text/css">
    <link rel="stylesheet" href="/pygments.css" type="text/css">
  </head>
  <body>
    <div id="header">
      <h1>Dump It!</h1>
    </div>
    <div id="page">
      {% block body %}{% endblock %}
    </div>
  </body>
</html>
```

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    <link
  </head>
  <body>
    <div
      <h1
    </div
    <div
      {%
    </div
  </body>
</html>
```

new_paste.html

```
{% extends "layout.html" %}
{% block body %}
  <h2>New Paste</h2>
  <form action="" method="post">
    <p><textarea name="code" rows="8" cols="50"></textarea></p>
    <p><select name="lang">
    {% for code, name in languages %}
      <option value="{{ code }}">{{ name }}</option>
    {% endfor %}
    </select><input type="submit" value="Paste"></p>
  </form>
{% endblock %}
```

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      <option value="{{ code }}">{{ name }}</op
    {% endfor %}
    </select><input
  </form>
{% endblock %}
```

show_paste.html

```
{% extends "layout.html" %}
{% block body %}
  <h2>Paste #{{ paste.id }}</h2>
  <div class="paste">
    {{ paste.highlighted_code }}
  </div>
{% endblock %}
```

Development Server

Development Server

```
if __name__ == '__main__':
    from werkzeug import run_simple, SharedDataMiddleware
    application = SharedDataMiddleware(application, {
        '/static': path.join(path.dirname(__file__), 'static')
    })
    run_simple('localhost', 4000, application)
```

Development Server

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    from werkzeug import run_simple, SharedDataMiddleware
    application = SharedDataMiddleware(application, {
        '/static': path.join(path.dirname(__file__), 'static')
    })
    run_simple('localhost', 4000, application)
```

```
mitsuhiko@nausicaa:~/DumpIt$ sqlite3 /path/to/dumpit.db < schema.sql
mitsuhiko@nausicaa:~/DumpIt$ python dumpit.py runserver
 * Running on http://localhost:4000/
```

„Dump It!“ In Action

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More Than One Way

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- Templates: XML / Text-based / Sandbox

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- Dispatching: Controller / View-Functions
- Auth: Apache / LDAP / OpenID

http://werkzeug.pocoo.org/

http://lucumr.pocoo.org/talks/ltgraz08/