



# Python 于 web-game 的应用

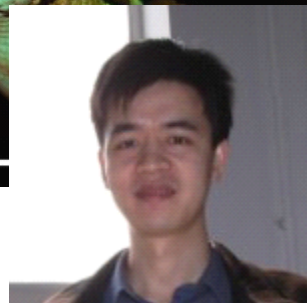
赖勇浩 (<http://laiyonghao.com>)

2011.12.04

# 自我介绍

- 网游从业超过 6 年
- 曾在网易、江苏盛典（广州）等工作
- 珠三角技术沙龙
- 赖勇浩的编程私伙局
  - pv 1,000,000+
  - csdn blog top100
- [twitter/weibo/42qu/CPyUG/gzlug](#)
- 天下盛境
  - 团队建设
  - 项目管理
  - 服务器端
  - 通信与安全
- 斩魂
  - 服务器端
  - AI
- 幻想三国、疯狂石头和泡泡游戏等

# 启发于.....



<http://slidesha.re/aGrXfY>



<http://slidesha.re/fQhtkL>

以我经历的项目为蓝本，向大家讲述  
**web-game** 服务器端技术与工具

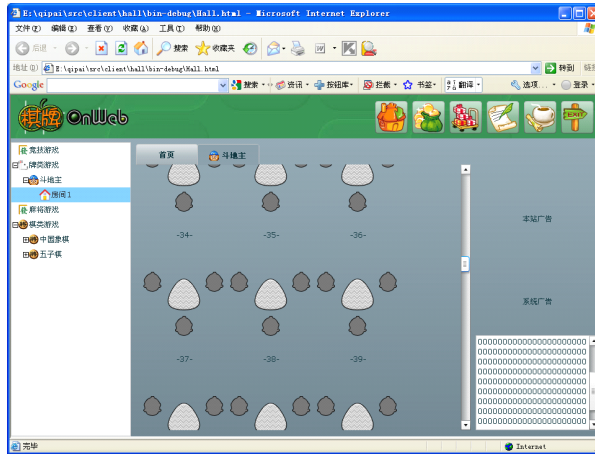
源于项目，高于项目。

# 项目介绍1

- 天下盛境
  - 横版卷轴
  - 动作类网页游戏
- 0505u.com
- 服务器端完全使用 Python 开发
- 2010.08~现在



# 项目介绍2



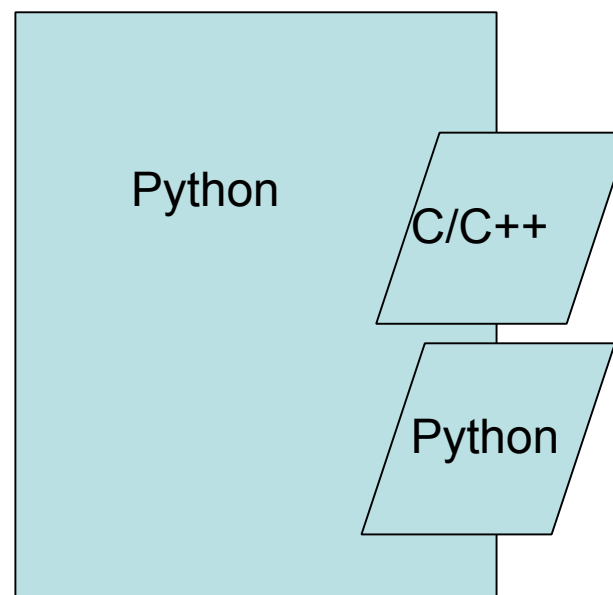
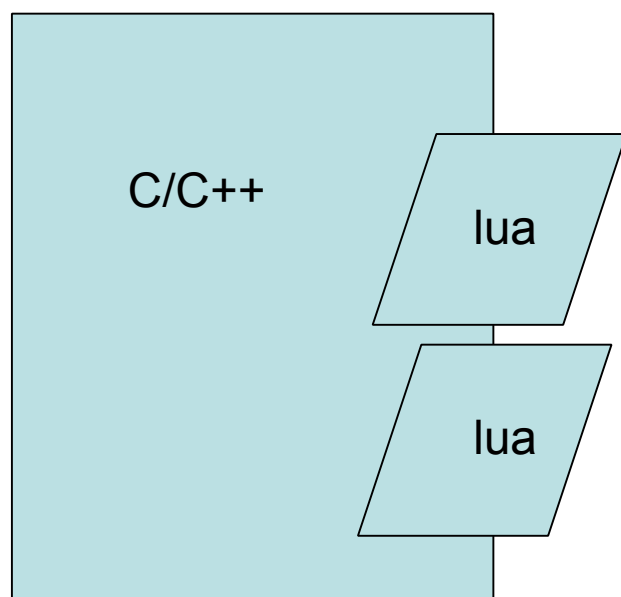
售

- 棋牌OnWeb
  - QQgame copy cat
- <http://qp-demo.laiyonghao.com/client/>
- 服务器端完全使用 Python 开发
- 2009.01~2009.03



library

# Python 在 Python 项目中的位置





# 大中型 Python 项目

```
C:\py-sample>tree /F
卷 S3A7161D002 的文件夹 PATH 列表
卷序列号码为 0024F848 FC56:ECE8
C:.
|   file1.py
|   file2.py
|   main.py
|
|-- lib1
|-- lib2
|-- lib3
```

# 大中型 Python 项目

```
C:\py-sample>tree /F
卷 S3A7161D002 的文件夹 PATH 列表
卷序列号码为 0024F848 FC56:ECE8
C:.
|   file1.py
|   file2.py
|   main.py
|
|--- lib1
|--- lib2
|--- lib3
```

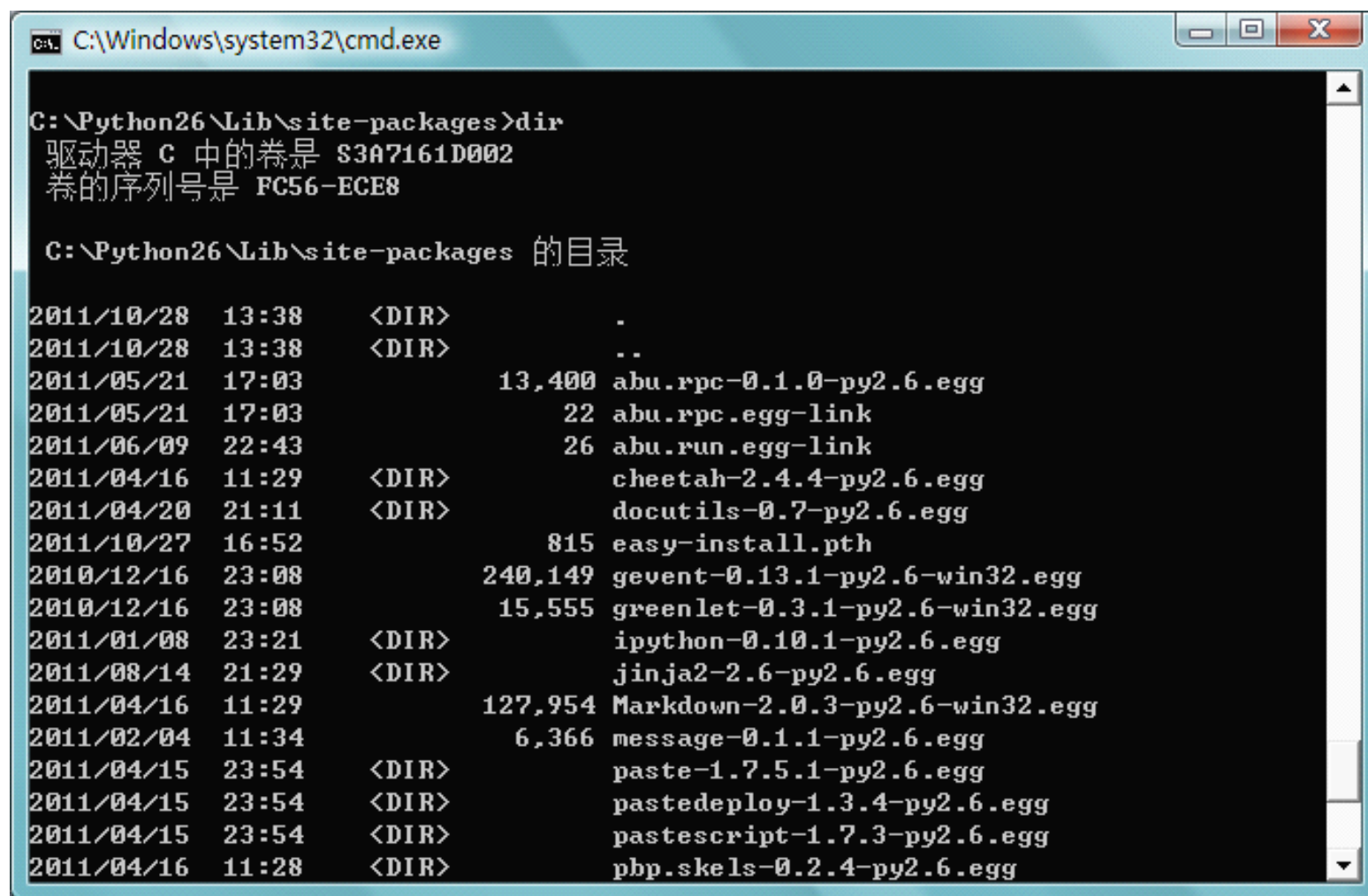


# 大中型 Python 项目

```
C:\py-sample>tree /F
卷 S3A7161D002 的文件夹 PATH 列表
卷序列号码为 0024F848 FC56:ECE8
C:.\
|   file1.py
|   file2.py
|   main.py
```



# lib 应该在 Lib/site-packages 目录



```
C:\Windows\system32\cmd.exe

C:\Python26\Lib\site-packages>dir
驱动器 C 中的卷是 S3A7161D002
卷的序列号是 FC56-ECE8

C:\Python26\Lib\site-packages 的目录

2011/10/28  13:38    <DIR>          .
2011/10/28  13:38    <DIR>          ..
2011/05/21  17:03         13,400  abu.rpc-0.1.0-py2.6.egg
2011/05/21  17:03           22  abu.rpc.egg-link
2011/06/09  22:43           26  abu.run.egg-link
2011/04/16  11:29    <DIR>          cheetah-2.4.4-py2.6.egg
2011/04/20  21:11    <DIR>          docutils-0.7-py2.6.egg
2011/10/27  16:52          815  easy-install.pth
2010/12/16  23:08       240,149  gevent-0.13.1-py2.6-win32.egg
2010/12/16  23:08       15,555  greenlet-0.3.1-py2.6-win32.egg
2011/01/08  23:21    <DIR>          ipython-0.10.1-py2.6.egg
2011/08/14  21:29    <DIR>          jinja2-2.6-py2.6.egg
2011/04/16  11:29       127,954  Markdown-2.0.3-py2.6-win32.egg
2011/02/04  11:34          6,366  message-0.1.1-py2.6.egg
2011/04/15  23:54    <DIR>          paste-1.7.5.1-py2.6.egg
2011/04/15  23:54    <DIR>          pastedeploy-1.3.4-py2.6.egg
2011/04/15  23:54    <DIR>          pastescript-1.7.3-py2.6.egg
2011/04/16  11:28    <DIR>          php.skels-0.2.4-py2.6.egg
```

要整这么复杂吗？



# 就一个 setup.py 而已.....

```
C:\abu\abu.rpc>tree /F
卷 S3A7161D002 的文件夹 PATH 列表
卷序列号码为 0008F970 FC56:ECE8
C:.\
|  setup.py
|  |
|  --abu
|  |   |
|  |   |  __init__.py
|  |   |  |
|  |   |  --rpc
|  |   |  |
|  |   |  |  compile_rpc_proto.bat
|  |   |  |  README.txt
|  |   |  |  rpc.proto
|  |   |  |  rpc_pb2.py
|  |   |  |  void.proto
|  |   |  |  void_pb2.py
|  |   |  |  __init__.py
```

- 避免手写 setup.py
- 如何建立命名空间包

# 神器 paster

```
C:\abu\abu.rpc>paster help
Usage: paster-script.py [paster_opt]

Options:
  --version            show program's version number and exit
  --plugin=PLUGINS    Add a plugin to the list of plugins; will also
                      be used for the default plugin
  -h, --help          Show this help message

Commands:
  create              Create the file layout for a new project
  help               Display help
  make-config        Install a package and its dependencies
  points             Show information about the current project
  post               Run a request for the current project
  request            Run a request for the current project
  serve              Serve the described application
  setup-app          Setup an application
```

- <http://pypi.python.org/pypi/PasteScript>
- 创建、安装、测试、部署、运行
- Many different kinds of projects have created skeletons for their projects (Pylons, TurboGears, ZopeSkel, and others).
- <http://pypi.python.org/pypi/PasteDeploy>

# 基本用法

```
C:\abu\abu.rpc>paster create --list-template
Available templates:
  basic_package:      A basic setuptools-enabled package
  paste_deploy:       A web application deployed through paste.deploy
```

```
C:\abu\abu.rpc>paster create -t basic_package my_pkg
Selected and implied templates:
  pastescript#basic_package  A basic setuptools-enabled package

Variables:
  egg:      my_pkg
  package:  my_pkg
  project:  my_pkg
Enter version <Version <like 0.1>> ['']>:
```



# pbp.skels

- <http://pypi.python.org/pypi/pbp.skels>
- pbp.skels is a collection of templates to speed up the creation of standardized, boiler-plate code.

```
C:\abu\abu.rpc>paster create --list-template
Available templates:
  basic_package:      A basic setuptools-enabled package
  paste_deploy:       A web application deployed through paste.deploy
  pbp_design_doc:     A Design document
  pbp_module_doc:     A Module helper document
  pbp_package:        A namespaced package
  pbp_recipe_doc:     A recipe document
  pbp_tutorial_doc:   A Tutorial document
```

- `paster create -t pbp_package my.package`

<http://lucasmanual.com/mywiki/PythonPaste>

编写自己的 templates, commands

# 开发、测试、打包、更新

- `python setup.py develop`
- `python setup.py test`
- `python setup.py bdist`
- `python setup.py sdist --formats=gztar,zip`
- `python setup.py register`
- `python setup.py upload`

# virtualenv

- <http://pypi.python.org/pypi/virtualenv>
- Virtual Python Environment builder
- 《Python于Web 2.0网站的应用》介绍过了

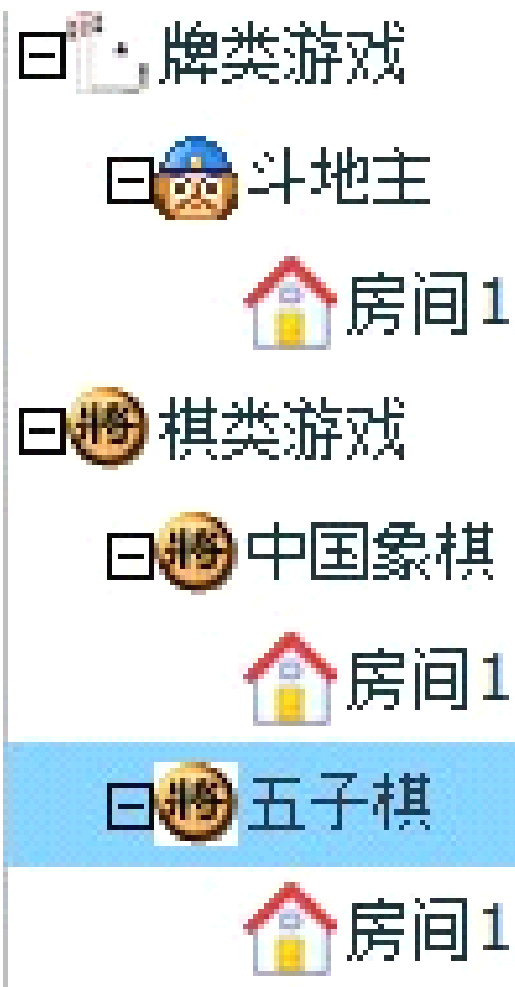


plugin

# what is the difference between plugin and library?

- A plugin extends the capabilities of a larger application.
- A library is a collection of subroutines or classes used to develop software.
- <http://stackoverflow.com/a/2792342>

# 以《棋牌OnWeb》为例.....





# 到后台看看.....

```
/usr/bin/python run.py conf.ini
\_ python /home/qipai-v1/src/server/dbmysql/server.py 18844 dbmysql /home
\_ python /home/qipai-v1/src/server/hall/server.py 18844 hall /home/qipai
\_ python /home/qipai-v1/src/server/room/server.py 18844 room1 /home/qipa
  \_ python /home/qipai-v1/src/server/desk/main.py xiangqi 2 14621 0
  \_ python /home/qipai-v1/src/server/desk/main.py xiangqi 2 14621 1
  \_ python /home/qipai-v1/src/server/desk/main.py xiangqi 2 14621 6
\_ python /home/qipai-v1/src/server/room/server.py 18844 room2 /home/qipa
  \_ python /home/qipai-v1/src/server/desk/main.py gobang 2 14621 0 1
\_ python /home/qipai-v1/src/server/room/server.py 18844 room0 /home/qipa
  \_ python /home/qipai-v1/src/server/desk/main.py doudizhu 3 14621 0 1
/usr/sbin/apachectl start
```

```
server/desk/main.py xiangqi 2 14621 0
server/desk/main.py xiangqi 2 14621 1
server/desk/main.py xiangqi 2 14621 6
er/room/server.py 18844 room2 /home/qipai-v1
server/desk/main.py gobang 2 14621 0 1
er/room/server.py 18844 room0 /home/qipai-v1
server/desk/main.py doudizhu 3 14621 0 1
```

# 神器 setuptools

```
C:\qipai-v1\src\server\games\doudizhu>tree /F
卷 S3A7161D002 的文件夹 PATH 列表
卷序列号码为 0022F6E0 FC56:ECE8
C:.\
|   setup.cfg
|   setup.py
|
|_ doudizhu
   |   ask_rule.py
   |   ask_status.py
   |   card.py
   |   ddz_const.py
   |   game_impl.py
   |   game_status.py
   |   msg_template.py
   |   player.py
   |   rule.py
   |   user.py
   |   __init__.py
```

# setup.py

```
entry_points="""  
# -*- Entry points: -*-  
[qipaionweb.games]  
doudizhu = doudizhu.game_impl:GameImpl  
"""
```

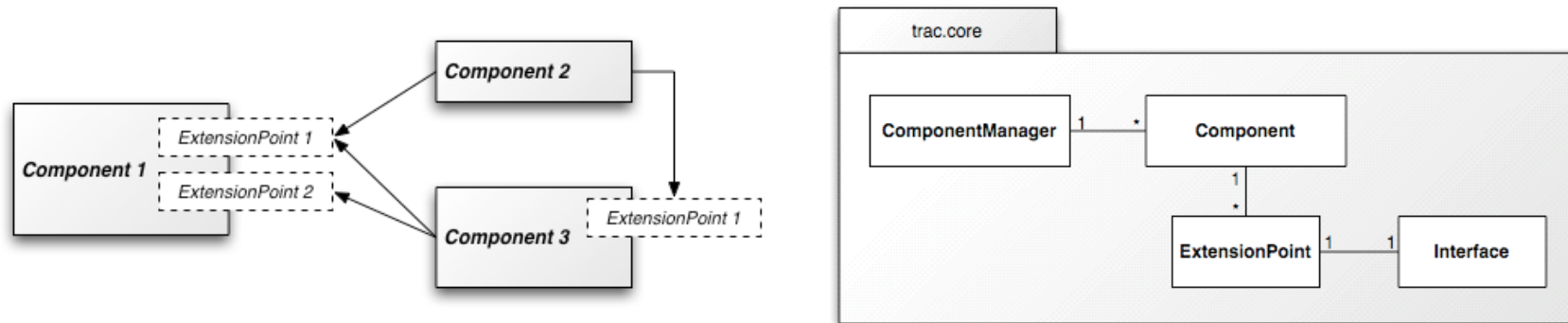
```
def get_game_impl_class(game_name):  
    group = 'qipaionweb.games'  
    prj = game_name  
    return pkg_resources.load_entry_point(  
        prj,  
        group,  
        game_name)
```

# 接口与实现

- **game\_interface**
  - 与房间进程交互
  - 通用功能（踢人）
  - 计时器管理
  - 定义接口
- **game\_impl**
  - 实现接口
  - 实现业务逻辑
  - 不接触网络
  - 不接触数据库
  - 单线程

# 进阶：Trac Component Architecture

- trac.core.ComponentManager
- trac.core.Component
- trac.core.ExtensionPoint
- trac.core.Interface



<http://trac.edgewall.org/wiki/TracDev/ComponentArchitecture>

<http://trac.edgewall.org/wiki/TracDev/PluginDevelopment>

## 参考：ulipad

- <http://code.google.com/p/ulipad/source/browse/trunk/modules/Mixin.py>
- 另一种 plugin 机制



I/O



I/O needs to be done differently.

I/O needs to be done differently.



```
db.query("select..", function (result) {  
    // use result  
});
```

This is how I/O should be done.

```
db.query("select..", function (result) {  
    // use result  
});
```

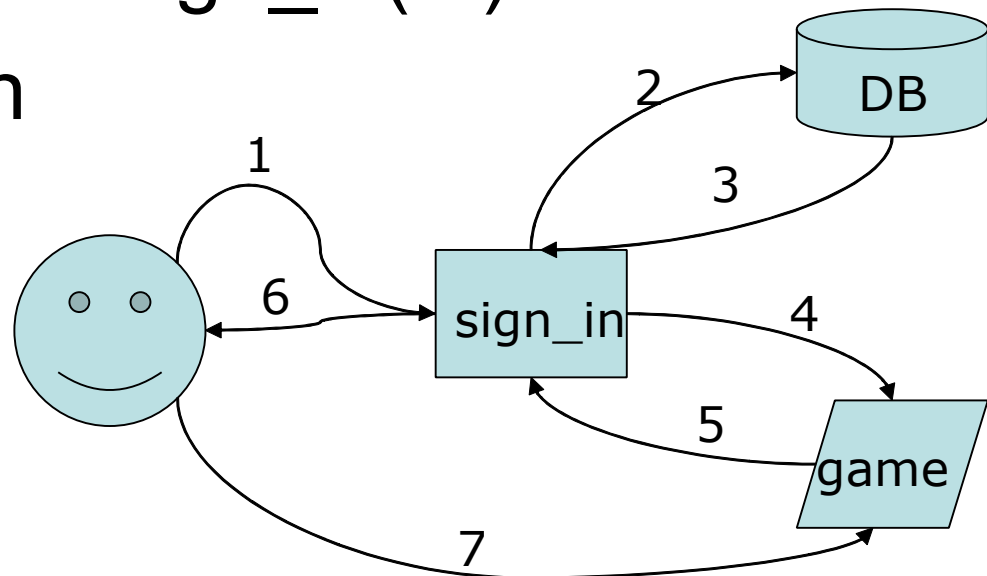
This is how I/O should be done.



<http://s3.amazonaws.com/four.livejournal/20091117/jsconf.pdf>

# This is how I/O should be done.

```
def sign_in(username, password):  
    result = db.query('select ...')  
    if len(result) == 1:  
        token = game.sign_in(...)  
    return token
```



协程才是未来！



gevent

gevent = libevent + greenlet



# libevent

- 提供指定文件描述符事件发生时调用回调函数的机制
- **timeouts, signals**

# greenlet

- green thread
  - user space
  - pseudo-concurrently
  - scheduled by VM
  - [http://wikipedia.org/wiki/Green\\_threads](http://wikipedia.org/wiki/Green_threads)
- greenlet = python's green thread

# echo server

- `from gevent.server import`  
`StreamServer`
- `def echo(socket, address):`
- `fileobj = socket.makefile()`
- `while True:`
- `line = fileobj.readline()`
- `if not line:`
- `break`
- `if line.strip().lower() == 'quit':`
- `print ("client quit")`
- `break`
- `fileobj.write(line)`
- `fileobj.flush()`
- `if __name__ == '__main__':`
- `server =`  
`StreamServer(('0.0.0.0', 6000),`  
`echo)`
- `print ('Starting echo server`  
`on port 6000')`
- `server.serve_forever()`

# 参考：eurasia

- <http://code.google.com/p/eurasia/>



```
from eurasia.web import httpserver, mainloop
def handler(httpfile):
    httpfile.start_response('200 OK', [('Content-Type', 'text/plain')])
    httpfile.sendall('hello world!')
    httpfile.close()

httpd = httpserver('0.0.0.0:8080', handler)
httpd.start()
mainloop()
```



protocol

# google protobuf

- <http://code.google.com/p/protobuf/>
- 协议描述语言
- C++、java、Python and more



RPC

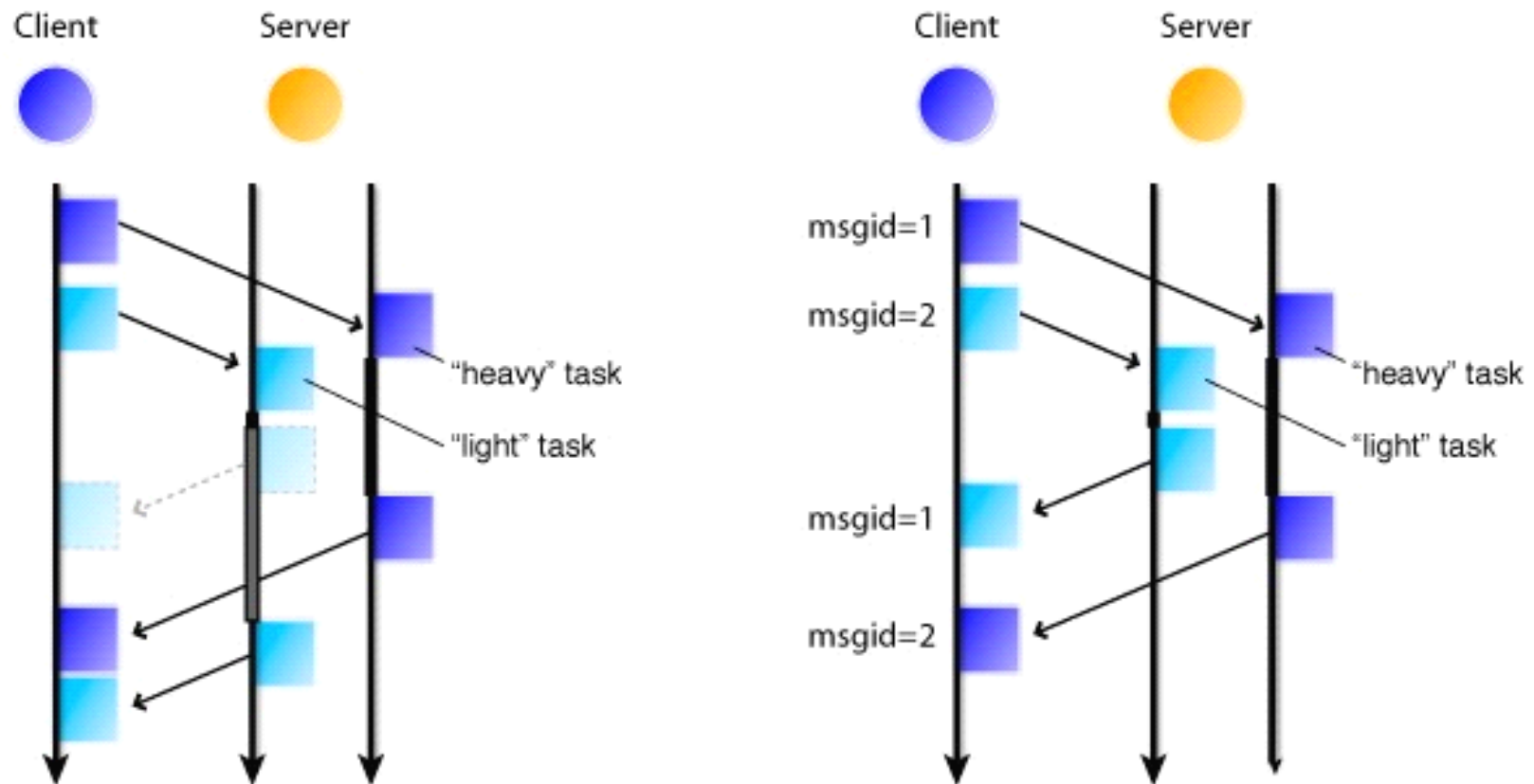
abu.RPC = gevent + protobuf



# abu.RPC

- 更小（得益于 google protobuf）
- 更快（得益于 libevent）
- 同步**API**（利益于 greenlet）
- 并行管线
- 双向调用

# 并行管线



<http://wiki.msgpack.org/display/MSGPACK/Design+of+RPC>

# echo server

```
from abu.rpc import Server, send_return
import echo_pb2 as echo
class EchoService(echo.EchoService):
    @send_return
    def echo(self, controller, request, done):
        return request
server = Server(('0.0.0.0', 1008),(EchoService(),))
print 'serving...'
server.serve_forever()
```



publish-subscribe

```
import message
def hello(context, name):
    print 'hello, %s.'%name
    message.sub('greet', hello)
    message.pub('greet', 'lai')
```

- hello, lai.

# python-message

- <http://pypi.python.org/pypi/message>
- 进程内的 publish-subscribe 机制
- 受 falcon 编程语言启发而写
- <http://www.slideshare.net/laiyonghao/pythonmessage010>
- 应用于任务、邮件、好友等子系统



utils

# absolute32

- <http://pypi.python.org/pypi/absolute32>
- $[-2^{31}, 2^{31}-1]$
- ubuntu 10.04 LTS 32-bit/64-bit
- python 2.6/3.1
- hash
- add
- crc
- adler





谢谢。  
Q&A

<http://laiyonghao.com>