



CHINA  
PyCon 2011

# Python 于 web-game 的应用

赖勇浩 ( <http://laiyonghao.com> )

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# 自我介绍

- 网游从业超过 6 年
- 曾在网易、江苏盛典（广州）等公司工作
- 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

单击此处编辑母版文本样式

- 第二级
- 第三级
- 第四级



单击此处编辑母版文本样式

- 第二级
- 第三级
- 第四级

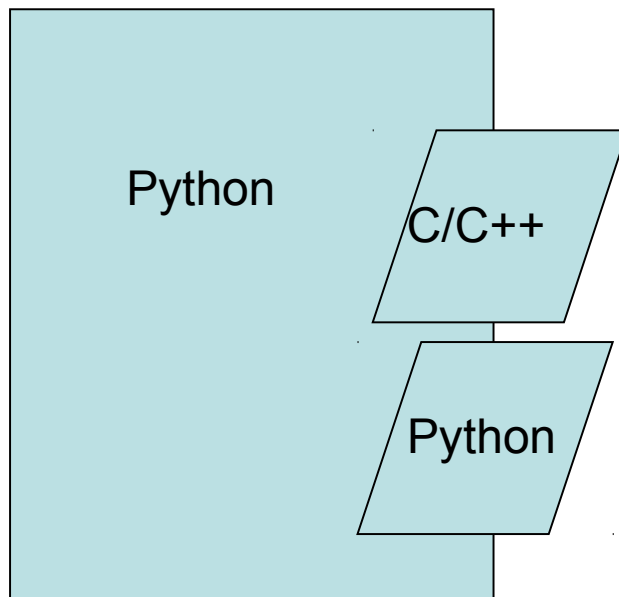
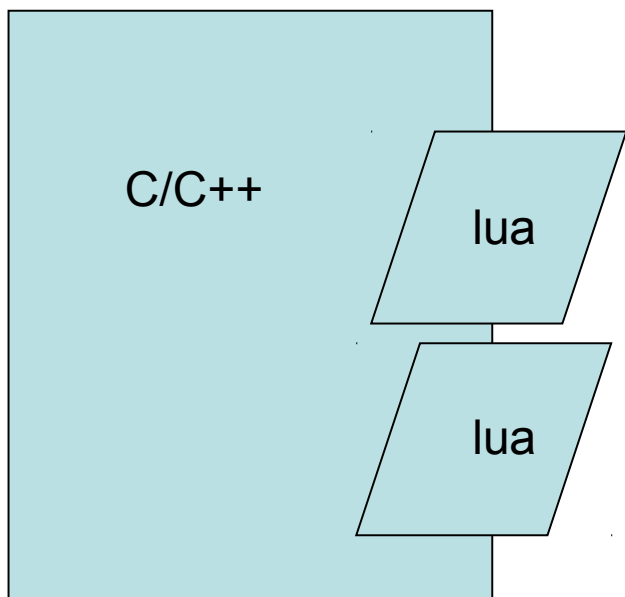






library

# Python 在 Python 项目中的位置





# 大中型 Python 项目

```
C:\py-sample>tree /F
卷 S3971C1D282 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
```

式

# 大中型 Python 项目

```
C:\py-sample>tree /F
卷 S3971C1D282 的文件夹 WORK 列表
卷序列号码为 0024F848 FC56:ECE8
C:
├── file1.py
├── file2.py
├── main.py
├── lib1
├── lib2
└── lib3
```

式



# 大中型 Python 项目

```
C:\py-sample>tree /F
卷 S3A7161D0002 的文件列表
卷序列号码为 0024F848 FC56:EC68
C:.
|
+--- file1.py
+--- file2.py
+--- main.py
```

式

母版文本样式

- 第五级
  - 第二级
  - 第三级
    - 第四级
      - 第五级



# 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 S337161D0C2
卷的序列号是 FC56-EC48

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？

- 单击此处编辑母版文本样式
  - 第二级
  - 第三级
    - 第四级
      - 第五级



# 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
  --plugin=PLUGINS  Add a plugin to
                    specs; will als
  -h, --help        Show this help

Commands:
  create            Create the file layo
  help             Display help
  make-config      Install a package an
  points           Show information abo
  post            Run a request for th
  request         Run a request for th
  serve           Serve the described
  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, Turbo Gears, 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.....

- 单击此处编辑母版文本样式
  - 第二级 地主
  - 第三级 房间1
    - 第四级
- 日将 棋类 第五级
  - 日将 中国象棋
    - 房间1
  - 日将 五子棋
  - 房间1



# 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 14622 2 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 14620 0 0
/usr/bin/apache2 -k start
```

```
server/desk/main.py xiangqi 2 146
server/desk/main.py xiangqi 2 146
server/desk/main.py xiangqi 2 146
er/room/server.py 18844 room2 /ho
server/desk/main.py gobang 2 1462
er/room/server.py 18844 room0 /ho
server/desk/main.py doudizhu 3 14
```

# 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  
"""
```

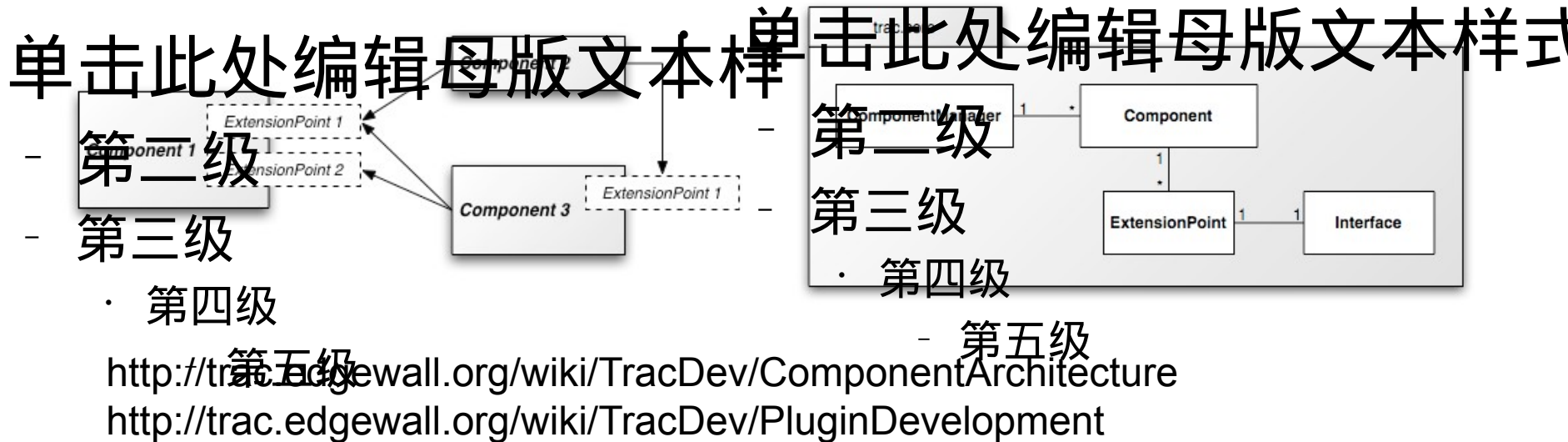
```
def get_game_impl_class(game_name):  
    group = 'qipaiionweb.games'  
    prj = game_name  
    return pkg_resources.load_entry_point(  
        prj,  
        group,  
        game_name)
```

# 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



# 参考： ulipad

- <http://code.google.com/p/ulipad/source/browse>
- 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  
});
```

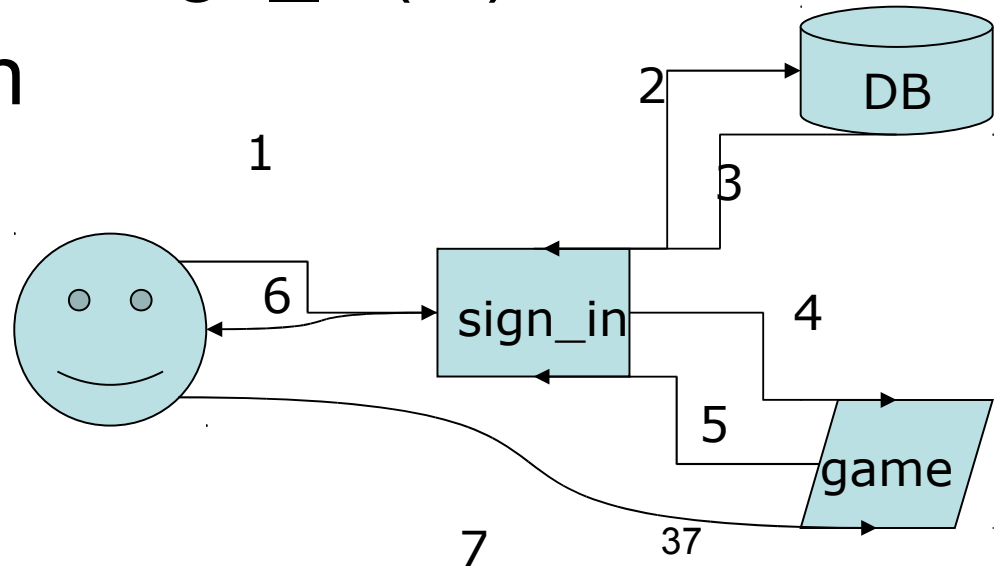
This is how I/O should be done.



<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 StreamServerif __name__ == '__main__':`
- `ver`
- `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()`
- `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

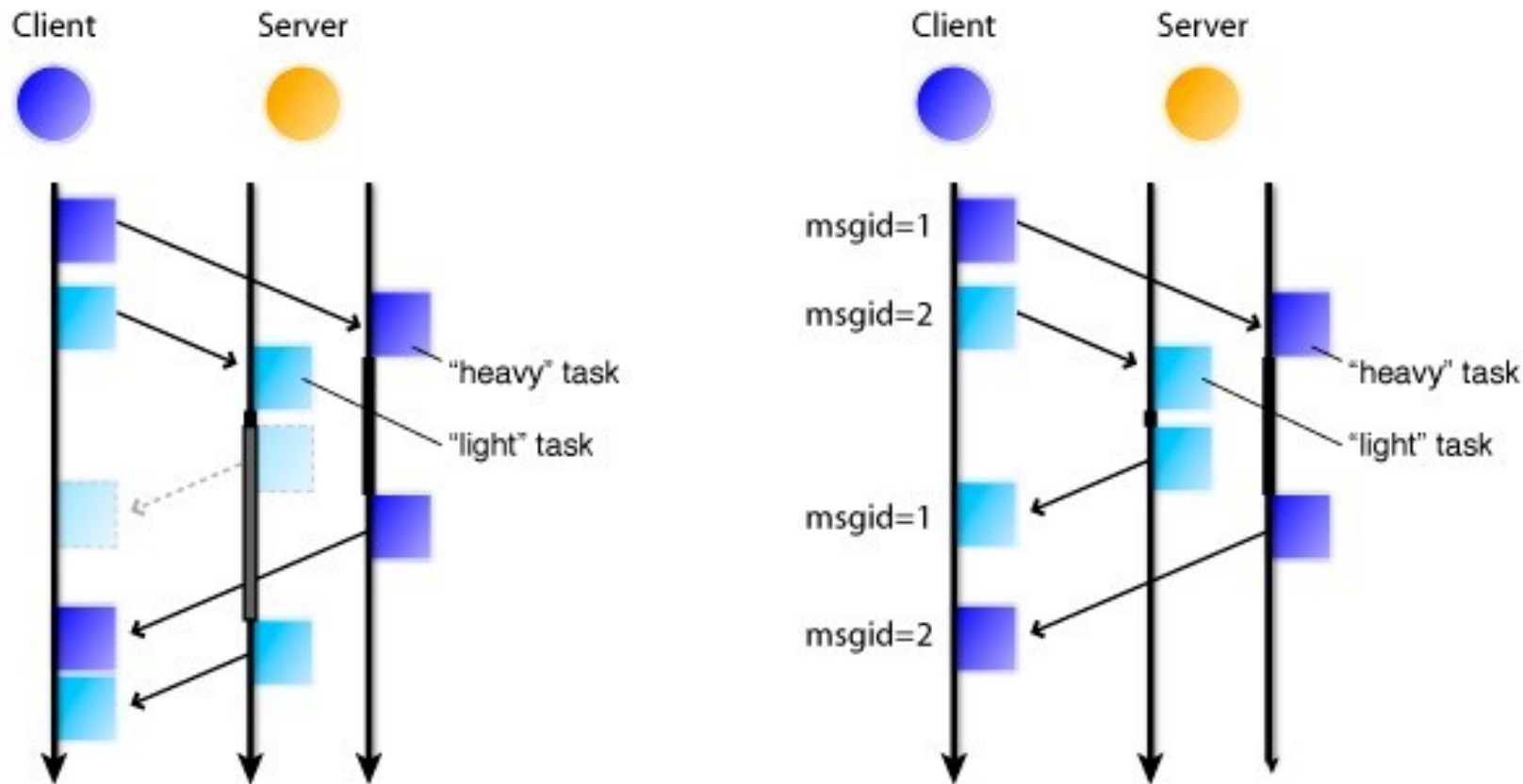
abu.RPC = gevent + protobuf



# abu.RPC

- 更小（得益于 google protobuf）
- 更快（得益于 libevent）
- 同步 API（得益于 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/pythonm>
- 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>