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ngx_openresty: an Nginx ecosystem glued by Lua

ngx_openresty:
an **Nginx** ecosystem glued by **Lua**

由 Lua 粘合的 Nginx 生态环境

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♥ I've been *hacking* in the **Fuzhou** city
in the last 7 months

过去 7 个月中我一直在福州写码。。。。



♡ The trend in *AJAX-ization* and *service-ization* makes everything speak the **HTTP protocol**

AJAX 化和 Service 化的趋势让所有东西开始讲 HTTP 协议

♥ Nginx is *fast*, because of I/O multiplexing

Nginx 很快，因为 I/O 多路复用

request 1
R/W

request 2
R/W

request 3
R/W

epoll_wait

♥ ngx_openresty is a *bundle* for Nginx,
lots of useful **Nginx modules**,
and lots of useful Lua libraries.

ngx_openresty 是 Nginx ，许多有用的 Nginx 模块 ，
以及有用的 Lua 库的软件集合。

♥ Our *homepage*: <http://openresty.org>

我们的主页

OpenResty

a powerful web app server by extending nginx

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OpenResty

ZhangYichun, 21 June 2011 (created 21 June 2011)

permalink

no tags

OpenResty (aka. ngx_openresty) is a full-fledged web application server by bundling the standard **Nginx** core, lots of 3rd-party Nginx modules, as well as most of their external dependencies.

By taking advantage of various well-designed Nginx modules, OpenResty effectively turns the nginx server into a powerful web app server, in which the web developers can use the Lua programming

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♥ The Nginx *configure file* notation
is a small **language**

Nginx 的配置文件记法就是一种小语言

```
location = '/hello' {  
    set_unescape_uri $person $arg_person;  
    set_if_empty $person 'anonymous';  
    echo "hello, $person!";  
}
```

```
$ curl 'http://localhost/hello?person=%E7%AB%A0%E4%BA%A6%E6%98%A5'
```

```
hello, 章亦春
```

```
$ curl 'http://localhost/hello'  
hello, anonymous
```

♥ Various Nginx modules are *enriching* its **vicabulary**

众多 Nginx 模块正丰富着它的词汇表

♥ **ngx_memc**

➔ an Nginx **upstream** module for *Memcached*

针对 Memcached 服务器的 Nginx 上游模块


```
# (not quite) REST interface to our memcached server  
# at 127.0.0.1:11211  
location = /memc {  
    set $memc_cmd $arg_cmd;  
    set $memc_key $arg_key;  
    set $memc_value $arg_val;  
    set $memc_exptime $arg_exptime;  
  
    memc_pass 127.0.0.1:11211;  
}
```

```
$ curl 'http://localhost/memc?cmd=flush_all';
```

OK

```
$ curl 'http://localhost/memc?cmd=replace&key=foo&val=FOO';
```

NOT_STORED

♥ ngx_drizzle

→ an Nginx **upstream** module for *MySQL* and *Drizzle*

针对 MySQL 和 Drizzle 数据库的 Nginx 上游模块

```
upstream my_mysql_backend {  
    drizzle_server 127.0.0.1:3306 dbname=test  
        password=some_pass user=monty  
        protocol=mysql;  
  
    # a connection pool that can cache up to  
    # 200 mysql TCP connections  
    drizzle_keepalive max=200 overflow=reject;  
}
```

```
location ~ '^/cat/(.*)' {  
    set $name $1;  
    set_quote_sql_str $quoted_name $name;  
    drizzle_query "select *  
        from cats  
        where name=$quoted_name";  
  
    drizzle_pass my_mysql_backend;  
  
    rds_json on;  
}
```

```
$ curl 'http://localhost/cat/Jerry'  
[{"name":"Jerry","age":1}]
```

♥ ngx_postgres

➔ an Nginx **upstream** module for *PostgreSQL*

针对 PostgreSQL 数据库的 Nginx 上游模块

```
upstream my_pg_backend {  
  postgres_server 10.62.136.3:5432 dbname=test  
    user=someone password=123456;  
  
  postgres_keepalive max=50 mode=single overflow=ignore;  
}
```



```
location ~ '^/cat/(.*)' {  
    set $name $1;  
    set_quote_pgsql_str $quoted_name $name;  
    postgres_query "select *  
        from cats  
        where name=$quoted_name";  
  
    postgres_pass my_pg_backend;  
  
    rds_json on;  
}
```

```
$ curl 'http://localhost/cat/Jerry'  
[{"name":"Jerry","age":1}]
```

♡ ngx_redis2

➔ an Nginx **upstream** module for *Redis*

针对 Redis 服务器的 Nginx 上游模块

```
upstream my_redis_node {  
    server 127.0.0.1:6379;  
    keepalive 1024 single;  
}
```

multiple pipelined queries

location /foo {

set \$value 'first';

redis2_query set one \$value;

redis2_query get one;

redis2_pass my_redis_node;

}

♥ ngx_srcache

→ General location response *cache*
based on Nginx **subrequests**

基于 Nginx 子请求的通用 **location** 响应缓存

```
location /api {  
    set $key "$uri?$args";  
    srcache_fetch GET /memc key=$key;  
    srcache_store PUT /memc key=$key&exptime=3600;  
  
    # proxy_pass/drizzle_pass/postgres_pass/etc  
}
```

```
location /memc {  
    internal;  
  
    set_unescape_uri $memc_key $arg_key;  
    set $memc_exptime $arg_exptime;  
  
    set_hashed_upstream $backend my_memc_cluster $memc_key;  
  
    memc_pass $backend;  
}
```



```
upstream memc1 {  
    server 10.32.126.3:11211;  
}
```

```
upstream memc2 {  
    server 10.32.126.4:11211;  
}
```

```
upstream_list my_memc_cluster memc1 memc2;
```

♡ **ngx_iconv**

→ *Character set* converter based on **libiconv**

基于 **libiconv** 的字符编码转换器

```
location /api {  
    # drizzle_pass/postgres_pass/etc  
  
    iconv_filter from=UTF-8 to=GBK;  
}
```

♥ Add some *sugar* of Lua

添加一点儿 Lua 糖果...

```
# nginx.conf
```

```
location = /hello {
```

```
    content_by_lua '
```

```
        ngx.say("Hello World")
```

```
    ;
```

```
}
```

```
$ curl 'http://localhost/hello'  
Hello World
```

♡ or use an *external* Lua file
to keep things *clean*

或者使用外部的 Lua 文件让代码保持整洁

```
# nginx.conf
```

```
location = /hello {
```

```
    content_by_lua_file conf/hello.lua;
```

```
}
```



```
-- hello.lua
```

```
ngx.say("Hello World")
```

♥ *Reuse existing **Nginx modules** in **Lua***
by means of Nginx **subrequests**

通过 Nginx 子请求实现在 Lua 中复用现有的 Nginx 模块

```
location = /memc {  
    internal;  
    memc_pass ...;  
}
```

```
location = /api {  
    content_by_lua '  
        local resp = ngx.location.capture("/memc")  
        if resp.status ~= 200 then  
            ngx.exit(500)  
        end  
        ngx.say(resp.body)  
    ;  
}
```

♥ Multiple *concurrent* subrequests in Lua

Lua 中发起多个并发子请求

```
location = /api {  
  content_by_lua '  
    local res1, res2, res3 =  
      ngx.location.capture_multi{  
        {"/memc"}, {"/mysql"}, {"/postgres"}  
      }  
    ngx.say(res1.body, res2.body, res3.body)  
  ;  
}
```

♡ *Shared-memory* dictionary API in Lua

Lua 中的共享内存字典 API

```
lua_shared_dict dogs 10m;
```

```
server {
```

```
    location = /set {
```

```
        content_by_lua '
```

```
            local dogs = ngx.shared.dogs
```

```
            dogs:set("Tom", ngx.var.arg_n)
```

```
            ngx.say("OK")
```

```
        '
```

```
    }
```

```
    location = /get {
```

```
        content_by_lua '
```

```
            local dogs = ngx.shared.dogs
```

```
            ngx.say("Tom: ", dogs.get("Tom"))
```

```
        ';
```

```
    }
```

```
}
```

```
$ curl 'localhost/set?n=58'
```

```
OK
```

```
$ curl 'localhost/get'
```

```
Tom: 58
```


♥ *Non-buffered* response body output in Lua

在 Lua 中不带缓存的数据输出

-- api.lua

-- asynchronous emit data as a response body part

ngx.say("big data chunk")

-- won't return until all the data flushed out

ngx.flush(true)

-- ditto

ngx.say("another big data chunk")

ngx.flush(true)

♥ TCP *socket* API
for accessing **upstream services** in Lua

用于在 Lua 中访问上游服务的 TCP 套接字 API

```
local sock = ngx.socket.tcp()
```

```
sock:settimeout(1000) -- one second
```

```
local ok, err = sock:connect("127.0.0.1", 11211)
```

```
if not ok then
```

```
    ngx.say("failed to connect: ", err)
```

```
    return
```

```
end
```

```
local bytes, err = sock:send("flush_all\r\n")  
if not bytes then  
    ngx.say("failed to send query: ", err)  
    return  
end
```

```
local line, err = sock:receive()  
if not line then  
    ngx.say("failed to receive a line: ", err)  
    return  
end
```

```
ngx.say("result: ", line)
```

```
local ok, err = sock:setkeepalive(60000, 500)
if not ok then
    ngx.say("failed to put the connection into pool "
        .. "with pool capacity 500 "
        .. "and maximal idle time 60 sec")
return
end
```

♥ *Unix Domain Socket* is also supported

Unix 域套接字也是支持的

```
local sock = ngx.socket.tcp()
local ok, err = sock:connect("/tmp/some.sock")
if not ok then
    ngx.say("failed to connect to /tmp/some.sock: ", err)
return
end
```


♥ The socket API is implemented atop *Lua coroutines* and is **synchronous** and **non-blocking**

这些套接字 API 都是在 Lua 协程的基础上实现的，
是同步和非阻塞的。

♥ We call this socket API "*cosocket*"

我们把这组套接字 API 称为“cosocket”。

♥ *cosocket API* can also be used to
read huge **request body** data

cosocket API 还可以用于读取
巨大的请求体数据

```
local sock, err = ngx.req.socket()  
if not sock then  
    ngx.say("failed to get request socket: ", err)  
    return  
end  
  
sock:settimeout(10000) -- 10 sec timeout
```

```
while true do  
  local chunk, err = sock:receive(4096)  
  if not chunk then  
    if err == "closed" then  
      break  
    end  
    ngx.say("faile to read: ", err)  
    return  
  end  
  process_chunk(chunk)  
end
```

♡ High-level **Lua libraries** based on the *cosocket API*

基于 cosocket API 构建的高层次的 Lua 库

☺ lua-resty-mysql: pure Lua MySQL driver
based on cosocket

<https://github.com/agentzh/lua-resty-mysql>

lua-resty-mysql: 基于 cosocket 的纯 Lua 实现的
MySQL 驱动

☺ lua-resty-memcached: pure Lua Memcached driver

<https://github.com/agentzh/lua-resty-memcached>

lua-resty-memcached: 基于 cosocket 的纯 Lua 实现的 Memcached 驱动

☺ lua-resty-redis: pure Lua Redis driver

<https://github.com/agentzh/lua-resty-redis>

lua-resty-redis: 基于 cosocket 的纯 Lua 实现的 Redis 驱动

☺ lua-resty-upload: support for *big* file **uploading**
(multipart/form-data)

<https://github.com/agentzh/lua-resty-upload>

lua-resty-upload: 大文件上传支持

♥ I've been hacking on *GitHub*!

<http://github.com/agentzh>

我在 GitHub 上玩开源！

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😊 *Any questions?* 😊

