Introduction to nginx.conf scripting

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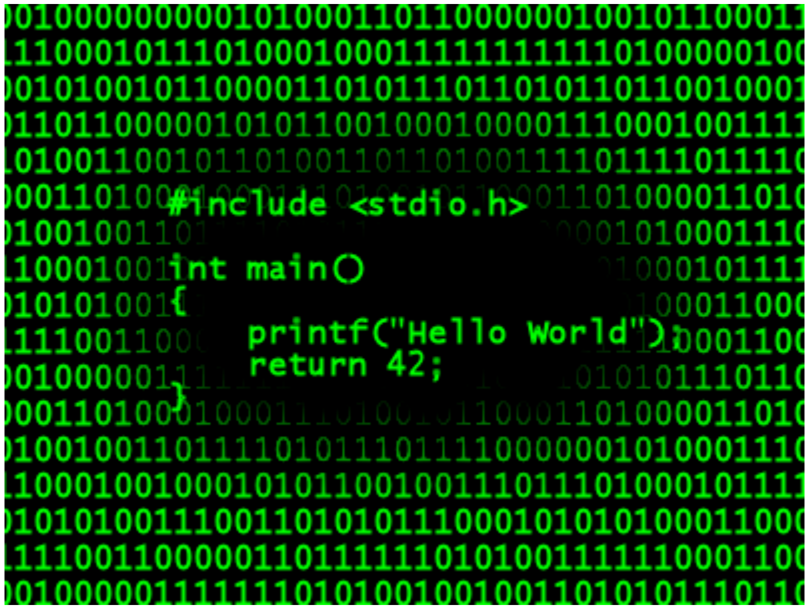
```
$ nginx -c /path/to/nginx.conf
$ ps aux | grep nginx
root   2003  0.0  0.0  25208  412 ? Ss 10:08 0:00 nginx: master process nginx
nobody 2004  0.0  0.0  25608 1044 ? S  10:08 0:00 nginx: worker process
nobody 2005  0.0  0.0  25608 1044 ? S  10:08 0:00 nginx: worker process
```

```
# nginx.conf
worker_processes 2;
events {
  worker_connections 1024;
}
http {
  ...
  server {
      listen 80;
      server_name localhost;
      ...

      location / {
          root /var/www;
          index index.html index.htm;
      }
  }
}
```

♡ *Hello World* on the *nginx* land



```
#include <stdio.h>

int main()
{
    printf("Hello World");
    return 42;
}
```

```
# enable the ngx_echo module in your nginx build
$ ./configure --prefix=/opt/nginx \
        --add-module=/path/to/echo-nginx-module
```

```
location = '/hello' {
  echo "hello, world!";
}
```

```
$ curl 'http://localhost/hello'
hello, world!
```

♡ Introducing *parameterized* hello

```
location = '/hello' {
  echo "hello, $arg_person!";
}
```

```
$ curl 'http://localhost/hello?person=agentzh'
hello, agentzh!

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

♡ Add a *default* value to the *person* parameter

```
location = '/hello' {
    if ($arg_person = '') {
        echo "hello, anonymous!";
        break;
    }
    echo "hello, $arg_person!";
}
```

```
$ curl 'http://localhost/hello?person=agentzh'
hello, agentzh!

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

♡ ...or *avoid* using the if statement

```
# enable the ngx_set_misc module and
#  Marcus Clyne's ngx_devel_kit in your nginx build
$ ./configure --prefix=/opt/nginx \
        --add-module=/path/to/echo-nginx-module \
        --add-module=/path/to/ngx_devel_kit \
        --add-module=/path/to/set-misc-nginx-module
```

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

```
$ curl 'http://localhost/hello?person=agentzh'
hello, agentzh!

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

♡ Some *UTF-8* love in the person parameter?

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

♡ Let's *fix* it using the set_unescape_uri directive!

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

```
# Yay!
$ curl 'http://localhost/hello?person=%E7%AB%A0%E4%BA%A6%E6%98%A5'
hello, 章亦春
```

♡ Nginx *variables* are very powerful, but how about arrays?

```
# enable the ngx_array_var module in your nginx build
$ ./configure --prefix=/opt/nginx \
        --add-module=/path/to/echo-nginx-module \
        --add-module=/path/to/ngx_devel_kit \
        --add-module=/path/to/set-misc-nginx-module \
        --add-module=/path/to/array-var-nginx-module
```

```
location ~ '^/foo/(.*)' {
    set $list $1;

    array_split ',' $list;
    array_map '[$array_it]' $list;
    array_join ' ' $list;

    echo $list;
}
```

```
$ curl 'http://localhost/foo/Bob,Marry,John'
[Bob] [Marry] [John]
```

♡ Using *subrequests* to do mashup

```
location = '/merge' {
    echo '[';
    echo_location_async /moon;
    echo ',';
    echo_location_async /earth;
    echo ']';
}
location /moon {
    echo '"moon"';
}
location /earth {
    echo '"earth"';
}
```

```
$ curl 'http://localhost/merge'
[
"moon"
,
"earth"
]
```

♡ or even dynamic mashups…

```
location ~ '^/merge/(.*)' {
    set $list $1;
    echo '[';
    echo_foreach_split ',' $list;
        echo_location_async "/$echo_it";
        echo ",";
    echo_end;
    echo 'null';
    echo ']';
}
```

```
$ curl 'http://localhost/merge/earch,moon'
[
"earth"
,
"moon"
,
null
]
```

♡ Some *non-blocking* memcached love

```
# enable the ngx_memc module in your nginx build
$ ./configure --prefix=/opt/nginx \
        --add-module=/path/to/echo-nginx-module \
        --add-module=/path/to/memc-nginx-module
```

```
# (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
```

```
$ curl 'http://localhost/memc?cmd=add&key=foo&val=Bar&exptime=60';
STORED

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

$ curl 'http://localhost/memc?cmd=set&key=foo&val=Hello';
STORED
```

```
$ curl 'http://localhost/memc?cmd=get&key=foo';
Hello

$ curl 'http://localhost/memc?cmd=delete&key=foo';
DELETED
```

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

$ curl 'http://localhost/memc?cmd=incr&key=counter&val=1';
<html>
<head><title>404 Not Found</title></head>
<body bgcolor="white">
<center><h1>404 Not Found</h1></center>
<hr><center>nginx/0.8.35</center>
</body>
</html>
```

```
$ curl 'http://localhost/memc?cmd=add&key=counter&val=0';
STORED

$ curl 'http://localhost/memc?cmd=incr&key=counter&val=1';
STORED
```

♡ *Safe* memcached incr operation

```
location = /safe-incr {
    if ($arg_key = '') {
        return 400;
        break;
    }
    if ($arg_val !~ '^\d+$') {
        return 400;
        break;
    }
    echo_exec /safe-memc?cmd=incr&key=$arg_key&val=$arg_val;
}
```

```
location = /safe-memc {
    internal;
    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;

    error_page 404 = /add-and-retry;
}
```

```
location = /add-and-retry {
    internal;
    echo_location /memc?cmd=add&key=$arg_key&val=0;
    echo_location /memc?$query_string;
}
```

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

$ curl 'http://localhost/safe-incr?key=counter&val=1';
STORED
STORED
```

♡ Memcached connection pool support

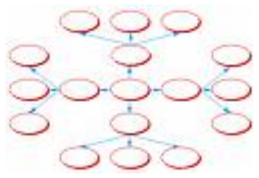
```
# enable Maxim Dounin's ngx_http_upstream_keepalive module
#  in your nginx build
$ ./configure --prefix=/opt/nginx \
        --add-module=/path/to/echo-nginx-module \
        --add-module=/path/to/memc-nginx-module \
        --add-module=/path/to/ngx_http_upstream_keepalive
```

```
http {
    ...
    upstream my_memc_backend {
        server 127.0.0.1:11211;

        # a connection pool that can cache
        #    up to 1024 connections
        keepalive 1024 single;
    }
    ...
}
```

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

♡ Memcached server *hashing* based on user keys
(Hey, memcached cluster!)



```
# enable the ngx_set_misc module and Marcus Clyne's
#  ngx_devel_kit again in your nginx build
$ ./configure --prefix=/opt/nginx \
        --add-module=/path/to/memc-nginx-module \
        --add-module=/path/to/ngx_devel_kit \
        --add-module=/path/to/set-misc-nginx-module
```

```
http {
    upstream A {
        server 10.32.110.5:11211;
    }
    upstream B {
        server 10.32.110.16:11211;
    }
    upstream C {
        server 10.32.110.27:11211;
    }
    upstream_list my_cluster A B C;
    ...
}
```

```
location = /memc {
    set $memc_cmd $arg_cmd;
    set $memc_key $arg_key;
    set $memc_value $arg_val;
    set $memc_exptime $arg_exptime;

    # hashing the $arg_key to an upstream backend
    #  in the my_cluster upstream list, and set $backend:
    set_hashed_upstream $backend my_cluster $arg_key;

    # pass $backend to memc_pass:
    memc_pass $backend;
}
```

♡ *Capture* subrequests' responses into nginx variables

```
# enable Valery Kholodkov's nginx_eval_module
#  in your nginx build
$ ./configure --prefix=/opt/nginx \
        --add-module=/path/to/echo-nginx-module \
        --add-module=/path/to/memc-nginx-module \
        --add-module=/path/to/nginx_eval_module
```

```
location = /save {
    eval_override_content_type 'text/plain';
    eval $res {
        set $memc_cmd 'set';
        set $memc_key $arg_id;
        set $memc_val $arg_name;
        memc_pass 127.0.0.1:11211;
    }
    if ($res !~ '^STORED$') {
        return 500;
        break;
    }
    echo 'Done!';
}
```

♡ Use my *fork* of ngx_eval module to capture *arbitrary* location's response (with filters!)

http://github.com/agentzh/nginx-eval-module

```
location = /hello {
    eval_override_content_type 'text/plain';
    eval_subrequest_in_memory off;
    eval_buffer_size 1k;
    eval $out {
        echo_before_body hello;
        echo world;
    }
    echo "[$out]";
}
```

```
$ curl 'http://localhost/hello'
[hello
world]
```

♡ Some *non-blocking* MySQL love

```
# install libdrizzle first and then
#   enable the ngx_drizzle and ngx_rds_json
#   modules in your nginx build
$ ./configure --prefix=/opt/nginx \
        --add-module=/path/to/drizzle-nginx-module \
        --add-module=/path/to/rds-json-nginx-module
```

```
http {
    upstream my_mysql_backend {
        drizzle_server 127.0.0.1:3306 dbname=test
                    password=some_pass user=monty
                    protocol=mysql;
    }
    ...
}
```

```
location = /cats {
    drizzle_query 'select * from cats';
    drizzle_pass my_mysql_backend;
    rds_json on;
}
```

```
$ curl 'http://localhost/cats'
[{"name":"Jerry","age":1},{"name":"Tom","age":3}]
```

- ♡ Database connection pool support

```
http {
    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;
    }
    ...
}
```

♡ Mysql cluster *hashing* love

```
# re-enable the ngx_set_misc module and Marcus Clyne's
#  ngx_devel_kit in your nginx build
$ ./configure --prefix=/opt/nginx \
        --add-module=/path/to/drizzle-nginx-module \
        --add-module=/path/to/rds-json-nginx-module \
        --add-module=/path/to/ngx_devel_kit \
        --add-module=/path/to/set-misc-nginx-module
```

```
http {
    upstream A {
        drizzle_server ...;
    }
    upstream B {
        drizzle_server ...;
    }
    upstream C {
        drizzle_server ...;
    }
    upstream_list my_cluster A B C;
    ...
}
```

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

    set_hashed_upstream $backend my_cluster $name;
    drizzle_pass $backend;

    rds_json on;
}
```

♡ Highly *dynamic* SQL query construction

```
location ~ '^/cats/(.*)' {
    set $list $1;
    array_split ',' $list;
    array_map_op set_quote_sql_str $list;
    array_map 'name=$array_it' $list;
    array_join ' or ' $list to=$cond;

    drizzle_query "select *
        from cats
        where $cond";

    drizzle_pass my_mysql_backend;
    rds_json on;
}
```

```
# Let's do
#    select * from cats
#    where name='Jerry' or name='Tom'
$ curl 'http://localhost/cats/Jerry,Tom'
[{"name":"Jerry","age":1},{"name":"Tom","age":3}]
```

♡ Piotr Sikora's *ngx_postgres* is drawing near :D

```
upstream my_pg_backend {
    postgres_server 10.62.136.3:5432 dbname=test
            user=someone password=123456;
}
```

```
location /cats {
    postgres_query 'select * from cats';
    postgres_pass my_pg_backend;
    rds_json on;
}
```

♡ chaoslawful is already *working* on ngx_lua :D

♡ A quick *summary* of our existing modules

- ✓ **ngx_echo: Brings "echo", "sleep", "time", "exec", *background job* and even more shell-style goodies to Nginx config file.**
  http://wiki.nginx.org/NginxHttpEchoModule

- ✓ **ngx_chunkin: HTTP 1.1 *chunked*-encoding request body support for Nginx.**
  http://wiki.nginx.org/NginxHttpChunkinModule

- ✓ **ngx_headers_more: Set and clear input and output *headers*...more than "add"!**
  http://wiki.nginx.org/NginxHttpHeadersMoreModule

and even more...

- ✓ **ngx_memc: An extended version of the standard *memcached* module that supports set, add, delete, and many more memcached commands. http://wiki.nginx.org/NginxHttpMemcModule**

- ✓ **ngx_drizzle: ngx_drizzlen nginx upstream module that talks to *mysql*, drizzle, and sqlite3 by libdrizzle. http://github.com/chaoslawful/drizzle-nginx-module**

- ✓ **ngx_rds_json: An nginx output filter that formats Resty DBD Streams generated by ngx_drizzle and others to JSON. http://github.com/agentzh/rds-json-nginx-module**

Well, still continued...

- ✓ **ngx_xss: Native support for *cross-site scripting* (XSS) in an nginx.**
  http://github.com/agentzh/xss-nginx-module

- ✓ **ngx_set_misc: Various nginx.conf variable transformation utilities.**
  http://github.com/agentzh/set-misc-nginx-module

- ✓ **ngx_array_var: Add support for array variables to nginx config files.**
  http://github.com/agentzh/array-var-nginx-module

♡ *New* nginx modules on our TODO list

- ✓ **ngx_form_input**
- ✓ **ngx_iconv**
- ✓ **ngx_srcache**
- ✓ **ngx_encrypted_session**
- ✓ **ngx_rds**
- ✓ **ngx_rds_tt2**

♡ Update: recent developments

http://agentzh.org/misc/slides/recent-dev-nginx-conf/

☺ *Any questions?* ☺