

Website Build Handbook

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0.1 Installation

1. Mysql:

(a) download mysql community version and install. It will have an icon in **System Preferences**

(b) add environment path: `export PATH="/usr/local/mysql/bin:$PATH"` in `/.bash_profile`

2. Nodejs: download from official website

3. Phpmyadmin:

(a) download Phpmyadmin

(b) put the folder in nginx doc root (if php config above is correct, phpmyadmin page will show)

(c) link to mysql

i. find mysql.socket: `mysql_config socket` or `mysql -u root -p`, after entering, `mysql» status`

ii. modify `/private/etc/php.ini`

```
1 pdo_mysql.default_socket = /tmp/mysql.sock
2 mysqli.default_socket = /tmp/mysql.sock
```

iii. restart php-fpm

iv. copy `phpmyadmin/config.sample.ini.php` to `config.ini.php`

v. modify `phpmyadmin/libraries/config.default.php`

```
1 $cfg['Servers'][$i]['user'] = 'root';
2 $cfg['Servers'][$i]['password'] = 'your password';
```

4. **Boot:** After setting up the above steps, whenever restart computer, you have to type `nginx` (start server) and `php-fpm` (start php support).

One method is to set boot

(a) create a `run.sh` in `/`

(b) modify file access authority: `sudo chmod 777 run.sh`

(c) modify the file is open with terminal (Get Info)

(d) System Preferences/Users&Groups/Login Items/add the file and click hide.

5. Apache: Mac built-in

0.2 Languages

1. Frontend: [HTML](#), [CSS](#), [Javascript](#)

2. Backend: [Php](#), [Python](#)

0.3 Resources

1. **Wordpress:** content management system
 - (a) download the package and put it in doc root
 - (b) if there is wp_config.php, delete it and start installation(config database).
2. **Discourse:** online forum
3. **Moodle:** learning management system
4. **Disqus:** Comment System

Chapter 1

Server

1.1 Apache

1.1.1 Config File Paths

For original Apache:

1. config file: `/etc/apache2/httpd.conf`

For `brew install httpd`

- 1.

1.1.2 Change Port

Change this part of config file. Port 81 and 82 work as same as port 8000.

```
1 <IfDefine SERVER_APP_HAS_DEFAULT_PORTS>
2     Listen 8080
3 </IfDefine>
4 <IfDefine !SERVER_APP_HAS_DEFAULT_PORTS>
5     Listen 8000
6     Listen 81
7     Listen 82
8 </IfDefine>
```

1.1.3 Specify Hostname

This includes two steps. First is to modify Apache config file.

```
1 # ServerName gives the name and port that the server uses to
   identify itself.
2 # This can often be determined automatically , but we recommend you
   specify
3 # it explicitly to prevent problems during startup .
4 #
5 # If your host doesn't have a registered DNS name, enter its IP
   address here .
6 #
7 # opened by Shark
```

```
8 ServerName www.assignment.com:8000
```

Second is add this snippet to [/etc/hosts](#):

```
1 127.0.0.1      www.assignment.com
```

[/etc/hosts](#) is a file (Description about [/etc/hosts](#) in Linux Environment 2017) responsible for swiftly analyzing ip and domain name. Priority from the highest to the lowest is DNS Cache → [/etc/hosts](#) → DNS Server.

1.1.4 Change Docroot

index.html is put default docroot [/Library/WebServer/Documents](#).

There are 3 steps to change this.

First, change [DocumentRoot](#)

```
1 # DocumentRoot: The directory out of which you will serve your
2 # documents. By default, all requests are taken from this directory
3 # , but
4 # symbolic links and aliases may be used to point to other
5 # locations.
6 #
7 # DocumentRoot "/Library/WebServer/Documents"
8 # <Directory "/Library/WebServer/Documents">
9 #   Modified by Shark
10 # DocumentRoot "/Users/sj/Documents/zzz/wp"
11 # <Directory "/Users/sj/Documents/zzz/wp">
12 #
13 # Possible values for the Options directive are "None", "All",
14 # or any combination of:
15 #   Indexes Includes FollowSymLinks SymLinksifOwnerMatch
16 #   ExecCGI MultiViews
17 #
18 # Note that "MultiViews" must be named *explicitly* — "
19 #   Options All"
20 # doesn't give it to you.
21 #
22 # The Options directive is both complicated and important.
23 # Please see
24 # http://httpd.apache.org/docs/2.4/mod/core.html#options
25 # for more information.
26 #
27 # Options FollowSymLinks Multiviews
28 # added by Shark
29 Options FollowSymLinks Multiviews
30
31 MultiviewsMatch Any
32
33 #
34 # AllowOverride controls what directives may be placed in .
35 #   htaccess files.
36 # It can be "All", "None", or any combination of the keywords:
```

```

31 # AllowOverride FileInfo AuthConfig Limit
32 #
33 AllowOverride None
34
35 #
36 # Controls who can get stuff from this server.
37 #
38 Require all granted
39 </Directory>

```

Setting are detailed as follows:

1. Options

- (a) **All**: All server characteristics except for MutliViews.
- (b) **None**: Not start server characteristics.
- (c) **Indexes**: If there are no default files which are designated in DirectoryIndex, the server will return a directory list which is generated by mod_autoindex modular.
- (d) **FollowSymLinks**: Allow server to use symbol connection.
- (e) **Multiviews**: Allow server to provide multiple
- (f) **ExecCGI**: Allow mod_cgi to execute CGI script.
- (g) **Includes**: Allow mod_include.
- (h) **IncludesNOEXEC**
- (i) **SymLinksIfOwnerMatch**

2. AllowOverride

3. Require all granted

Secondly, change [DirectoryIndex](#) These are default access files

```

1 #
2 # DirectoryIndex: sets the file that Apache will serve if a
   directory
3 # is requested.
4 #
5 <IfModule dir_module>
6     DirectoryIndex index.html index.php
7 </IfModule>

```

Thirdly, change [User](#) and [Group](#). Or 403 Permission Error will occur.

To see what the use and group of website directory, use `ls -l` and we get:

```

1 -rwxrwxrwx@ 1 sj  staff  61 Apr  9 12:51 index.html

```

1. **sj** is User

2. **staff** is Group

3. **-rwxrwxrwx** is file permission.

| | | |
|------------|---|---|
| r | 4 | 100 |
| w | 2 | 010 |
| x | 1 | 001 |
| none | 0 | 000 |
| rwxrwxrwx | | |
| File owner | Other users in same group with file owner | Other users not in same group with file owner |

Change file permission by `chmod 777 <filename>` on terminal.

```
1 <IfModule unixd_module>
2 #
3 # If you wish httpd to run as a different user or group, you must
  run
4 # httpd as root initially and it will switch.
5 #
6 # User/Group: The name (or #number) of the user/group to run httpd
  as.
7 # It is usually good practice to create a dedicated user and group
  for
8 # running httpd, as with most system services.
9 #
10 #User _www
11 #Group _www
12 # added by Shark
13 User sj
14 Group staff
15 </IfModule>
```

1.1.5 Change php

From built-in php to brew php

1. `brew install php`
2. `brew search php`
3. `brew install php@7.2`
4. See which version of php is installed by brew: `brew list`
5. How to change: `brew info php@7.2`
6. change extension dir in php.ini

```
1 To enable PHP in Apache add the following to httpd.conf and restart
  Apache:
2     LoadModule php7_module /usr/local/opt/php@7.2/lib/httpd/modules
      /libphp7.so
3
```

```

4      <FilesMatch \.php$>
5          SetHandler application/x-httpd-php
6      </FilesMatch>
7
8  Finally , check DirectoryIndex includes index.php
9      DirectoryIndex index.php index.html
10
11 The php.ini and php-fpm.ini file can be found in:
12     /usr/local/etc/php/7.2/
13
14 php@7.2 is keg-only , which means it was not symlinked into /usr/
15     local ,
16 because this is an alternate version of another formula .
17
18 If you need to have php@7.2 first in your PATH run:
19     echo 'export PATH="/usr/local/opt/php@7.2/bin:$PATH"' >> ~/.
20         bash_profile
21     echo 'export PATH="/usr/local/opt/php@7.2/sbin:$PATH"' >> ~/.
22         bash_profile
23
24 For compilers to find php@7.2 you may need to set:
25     export LDFLAGS="-L/usr/local/opt/php@7.2/lib"
26     export CPPFLAGS="-I/usr/local/opt/php@7.2/include"
27
28 To have launchd start php@7.2 now and restart at login:
29     brew services start php@7.2
30
31 Or, if you don't want/need a background service you can just run:
32     php-fpm

```

1.1.6 Commands

1. look version: `httpd -v`
2. `apachectl -v` to check version
3. start apache: `sudo apachectl start`
/System/Library/LaunchDaemons/org.apache.httpd.plist: service already loaded
4. stop apache: `sudo apachectl stop`
5. restart apache: `sudo apachectl restart`
6. `apachectl -S` to check which files are parsed
7. `apachectl -t -D DUMP_MODULES` to see all loaded modules
8. `apachectl -t` to check httpd.conf syntax

1.1.7 Dealing With Errors

Cannot connect to the server

1. Check whether the port is taken by `lsof -i:8000`
2. Check whether network is ok by `ping localhost`
3. Check connection by `curl -v http://localhost:8000`
4. If above steps return ok, then try this `http://www.assignment.com:8000/index.html` on the browser, because sometimes `http://www.assignment.com:8000` will not turn to that page.

403 Forbidden

1.1.8 Check

All instructions work fine on host (MacBook Pro) to get the screenshot (Figure ??)

```
1 curl -v HTTP://www.assignment.com:8000 (specified domain)
2 curl -v HTTP://www.127.0.0.1:8000 (lookback ip)
3 curl -v 10.20.129.180:8000 (local ip)
```

1.2 Nginx

Difference to Apache is that Apache is relatively slow while handling heavy load and processing large number of requests.

1.2.1 Installation

```
brew install nginx
```

1.2.2 Config File Paths

1. load all files in `/usr/local/etc/nginx/servers/`
2. config file with default port 8080: `/usr/local/etc/nginx/nginx.conf`
3. doc root: `/usr/local/var/www`
4. `/usr/local/Cellar/nginx/1.17.2`

1.2.3 Commands

1. start nginx: `brew services start nginx`
2. start nginx: `nginx`
If 127.0.0.1:8080 can show nginx welcome page, then everything is fine.
3. stop nginx: `nginx -s stop`
4. check config syntax: `nginx -t`
5. show configurations: `nginx -V`

1.2.4 Config

```
1 #user  nobody;
2 worker_processes  1;
3
4 #error_log  logs/error.log;
5 #error_log  logs/error.log  notice;
6 #error_log  logs/error.log  info;
7
8 #pid        logs/nginx.pid;
9
10
11 events {
12     worker_connections  1024;
13 }
14
15
16 http {
17     include        mime.types;
```

```

18 default_type application/octet-stream;
19
20 #log_format main '$remote_addr - $remote_user [$time_local] "'
    '$request' '
21 # '$status $body_bytes_sent "$http_referer' '
22 # '"$http_user_agent" "$http_x_forwarded_for
    '"';
23
24 #access_log logs/access.log main;
25
26 sendfile on;
27 #tcp_nopush on;
28
29 #keepalive_timeout 0;
30 keepalive_timeout 65;
31
32 #gzip on;
33
34 server {
35     listen 8080;
36     server_name localhost;
37
38     #charset koi8-r;
39
40     #access_log logs/host.access.log main;
41
42     location / {
43     root html; # [shark] here to change doc root
44     index index.html index.htm index.php; # [shark] add index.
        php to support php, or error "forbidden" will show
45     }
46
47     #error_page 404 /404.html;
48
49     # redirect server error pages to the static page /50x.html
50     #
51     error_page 500 502 503 504 /50x.html;
52     location = /50x.html {
53         root html;
54     }
55
56     # proxy the PHP scripts to Apache listening on 127.0.0.1:80
57     #
58     #location ~ \.php$ {
59     #     proxy_pass http://127.0.0.1;
60     #}
61
62     # pass the PHP scripts to FastCGI server listening on
        127.0.0.1:9000
63     # # [shark] open this block

```

```

64     location ~ /\.php$ {
65         root            html; # [shark] php file root, or error
           "file not found" will show
66         fastcgi_pass    127.0.0.1:9000; # [shark] php-fpm server
           location
67         fastcgi_index   index.php;
68         # fastcgi_param  SCRIPT_FILENAME    /
           scripts$fastcgi_script_name;
69         fastcgi_param    %document_root%fastcgi_script_name; # [
           shark] or error "file not found" will show
70         include         fastcgi_params;
71     }
72
73     # deny access to .htaccess files, if Apache's document root
74     # concurs with nginx's one
75     #
76     #location ~ /\.ht {
77     #     deny    all;
78     #}
79 }
80
81
82 # another virtual host using mix of IP-, name-, and port-based
   configuration
83 #
84 #server {
85 #     listen        8000;
86 #     listen        somename:8080;
87 #     server_name    somename  alias  another.alias;
88
89     #     location / {
90     #         root    html;
91     #         index   index.html index.htm;
92     #     }
93     #}
94
95
96 # HTTPS server
97 #
98 #server {
99     #     listen        443 ssl;
100    #     server_name    localhost;
101
102    #     ssl_certificate      cert.pem;
103    #     ssl_certificate_key  cert.key;
104
105    #     ssl_session_cache    shared:SSL:1m;
106    #     ssl_session_timeout  5m;
107
108    #     ssl_ciphers  HIGH:!aNULL:!MD5;

```

```
109 #    ssl_prefer_server_ciphers    on;
110
111 #    location / {
112 #        root    html;
113 #        index    index.html index.htm;
114 #    }
115 #}
116 include servers/*;
117 }
```

1.2.5 Problem

1. 413 Request Entity Too Large

- (1) add `client_max_body_size = 5m;` (default is 1m) in `nginx.conf`
- (2) `nginx -s reload`

2. 502 Bad Gateway

1.3 Nodejs

1.4 Flask

First, we need to install **Python** and **Flask**.

```
1 conda install flask
2 conda install flask-wtf
3 conda install flask-script
```

Secondly, we build file structures.

```
1 root
2 —app
3 ———static
4 ———templates
5 —root.py
6 —v.flaskenv
```

Thirdly, to get an idea of flask language.

- (1) **Variable:** `{{ x }}`
- (2) **Loop:** `{% for x in xs %} \implies {% endfor %}`
- (3) **If:** `{% if x %} \implies {% else %} \implies {% endif %}`
- (4) **Block:** `{% block content %} \implies {% endblock %}`

Chapter 2

Database

2.1 Mysql

2.1.1 Commands

1. `mysql --version`
2. `mysql -u root -p`
3. Database
 - (a) `show databases;`
 - (b) `create database <dbName>;`
 - (c) `drop database <dbName>;`
 - (d) `use <dbName>;`
4. Table
 - (a) `show tables;`
 - (b) `desc <tableName>;`
 - (c) `drop table <tableName>;`
 - (d) `alter table`
5. Schema
 - (a) `create schema <name>;`
 - (b) `show schemas;`
6. `quit;`

2.1.2 Engine

2.1.3 Data Type

Numeric

TINYINT 1 byte / Integer(-128 to 127, 0 to 255)

SMALLINT 2 bytes

MEDIUMINT 3 bytes

INT 4 bytes

BIGINT 8 bytes

DECIMAL fixed-point (M,X) / maximum(65, 30) / default(10, 0)

FLOAT floating-point

DOUBLE double-precision floating-point

REAL

BIT

BOOLEAN

SERIAL

Date and time

DATE 3 bytes / YYYY-MM-DD

TIME 3 bytes / HH:MM:SS

YEAR 1 byte / YYYY

DATETIME 8 bytes / YYYY-MM-DD HH:MM:SS

TIMESTAMP 4 bytes / YYYYMMDD HHMMSS

String

CHAR

VARCHAR

TINYTEXT

TEXT

MEDIUMTEXT

LONGTEXT

BINAR

VARBINARY

TINYBLOB

MEDIUMBLOB

BLOB

LOBLOB

ENUM

SET

Spatial GEOMETRY

POINT

LINESTRING

POLYGON

MULTIPOINT

MULTILINESTRING

MULTIPOLYGON

GEOMETRYCOLLECTION

JSON

2.1.4 Engine

1. Innodb

2.1.5 Problem Shoot

- 1.

2.1.6 Questions

2.2 Postsql

2.2.1 File Path

1. `/usr/local/var/postgres`
2. `/Library/PostgreSQL/11`

Chapter 3

Language

3.1 HTML

3.2 CSS

3.2.1 Sass

3.3 Javascript

3.3.1 Typescript

3.3.2 JQuery

3.3.3 Webpack

3.4 PHP

3.4.1 Installation

Mac built-in

- (1) `php -v` check php is installed.
- (2) `php-fpm`
 - (a) copy the three files `/private/etc/php.ini`, `/private/etc/php-fpm.conf`, `/private/etc/php-fpm.d/www.conf`
 - (b) modify `php-fpm.ini`

```
1 error_log = /usr/local/var/log/php-fpm.log
```
 - (c) `php-fpm` should work
 - (d) if the ports are taken, try `lsof -i:9000`, then `kill -9 <pid>`
- (3) `nginx`

- (a) modify `/usr/local/etc/nginx/nginx.conf`

```
1 location / {
2     root html; # [shark] here to change doc root
3     index index.html index.htm index.php; # [shark] add index.
        php to support php, or error "forbidden" will show
4 }
5     ...
6 # pass the PHP scripts to FastCGI server listening on
    127.0.0.1:9000
7 # [shark] open this block
8 location ~ \.php$ {
9     root            html; # [shark] php file root, or error "
        file not found" will show
10    fastcgi_pass     127.0.0.1:9000; # [shark] php-fpm server
        location
11    fastcgi_index    index.php;
12    fastcgi_param    %document_root%fastcgi_script_name; # [
        shark] or error "file not found" will show
13    include          fastcgi_params;
14 }
```

Brew

3.4.2 File Paths

1. `php-fpm`: `/private/etc/php-fpm.conf`
2. Built-in
 - (a) command path: `/usr/bin`

- (b) extension: `/usr/lib/php`
 - (c) config: `/private/etc/php.ini`
 - (d) `/usr/local/bin/php` (which php)
 - (e) `/usr/local/etc/php`
 - (f) `/usr/local/lib/php`
3. Brew
- (a) `/usr/local/Cellar/php@7.2`
4. Port
- (1) `/opt/local/lib/php71/`

3.4.3 Commands

- 1. look version: `php -v`
- 2. look modules: `php -m`
- 3. start php-fpm: `php-fpm`

3.4.4 Config

Modify PHP file upload limit

- 1. use `phpinfo()` in webdoc to find php.ini
- 2. modify php.ini

```
1 upload_max_filesize = 2M
2 max_file_uploads = 20
```

- 3. restart server
 - (a) apache: `sudo apachectl restart`
 - (b) nginx: `nginx -s stop; nginx`
- 4. for nginx, need to restart php-fpm also
 - (a) use ActivityMonitor find php-fpm pid
 - (b) stop php-fpm `kill [pid]`
 - (c) start `php-fpm`

Support Mysql

3.4.5 Extension(Pear/Pec)

1. install pear or pecl

```
1 curl -O https://pear.php.net/go-pear.phar
2 sudo php -d detect_unicode=0 go-pear.phar
3 # change installation root directory to /usr/local/pear
```

2. verify installation

```
1 pear version
```

3. install extension

```
1 sudo pecl install intl
```

4. problem 1:

```
1 grep: /usr/include/php/main/php.h: No such file or directory
2 grep: /usr/include/php/Zend/zend_modules.h: No such file or
  directory
3 grep: /usr/include/php/Zend/zend_extensions.h: No such file or
  directory
4 Configuring for:
5 PHP Api Version:
6 Zend Module Api No:
7 Zend Extension Api No:
```

solutions

```
1 cd /Library/Developer/CommandLineTools/Packages/
2 open macOS_SDK_headers_for_macOS_10.14.pkg
```

5. problem 2:

```
1 PHP Api Version:      20160303
2 Zend Module Api No:   20160303
3 Zend Extension Api No: 320160303
4 Cannot find autoconf. Please check your autoconf installation
  and the
5 $PHP_AUTOCONF environment variable. Then, rerun this script.
6
7 ERROR: 'phpize' failed
```

solution:

```
1 brew install autoconf
```

6. problem 3: make problem

3.4.6 Extension(Port)

Chapter 4

Others

4.1 Selenium

Chapter 5

Frameworks

5.1 Wordpress

5.1.1 Problem Shoot

1. **forget admin password**
Enter mysql dataset and modify it.

5.2 Moodle

5.2.1 Installation Issues

1. php intl extension
2. position of moodledata