OpenEyes - Setting up a development environment on a Macintosh

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Target Audience

General Interest	
Heathcare managers	
Ophthalmologists	
Developers	✔

Amendment Record

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Introduction

In 2001 Apple introduced a new operation system (OSX) based on UNIX. As a result, modern Macintosh systems represent an ideal development environment for OpenEyes, since most of the open source software employed in OpenEyes was developed and runs well on a UNIX operating system. This document provides a step by step guide to setting up a Macintosh computer as a development environment. When installing UNIX software, the use of MacPorts is recommended, as it greatly simplifies the steps required to install and update UNIX software. Familiarity with the use of the command line is essential for carrying out this task. The following table summarises the software required, and the function of each component.

Software	Function
Apache	Industry standard web server software
PHP	Widely used scripting language for dynamic web pages
MySQL	Backend relational database
OpenLdap	Implementation of LDAP server
Eclipse	Widely used open source integrated development environment

Software Installation

Install Developer Tools

Your Macintosh installation disks include an optional installation of the OSX Development tools, which are also available for download from the Apple website. Run this installer to make Xcode (integrated development environment) and other tools available.

Installing MacPorts

Download the latest version of the MacPorts package installer from the MacPorts website. At the time of writing the required file was “MacPorts-1.8.1-10.6-SnowLeopard.dmg”. Following download, the file should open a disk image automatically, and run the installer software which will proceed with the installation (accept all defaults). This installs a skeleton structure in a separate directory (/opt/local), allowing you to install any UNIX software without interfering with items supplied with the operating system, which tend to be installed in /usr/local.

Once installation is complete, run the Terminal application, as all subsequent steps will be run from the command line.

The next step is to update all the ports in the tree by running the following command;

```
▸ sudo /opt/local/bin/port -v selfupdate
```

To simplify command line access to the Developer tools, and newly installed software through MacPorts, add the following line to your BASH profile.

```
PATH=/Developer/usr/bin:/Developer/usr/sbin:/opt/local/bin:/opt/local/sbin:$PATH
```

Installing the Apache web server

A version of Apache is provided with the standard installation. However this version is not updated using the OSX software update system, so it is recommended to install the latest version using MacPorts. This can be achieved as follows;

1. Turn off the Apple provided version

Turn off Apple’s "Personal Web Sharing" in the System Preferences so that the default Apache server is not running.

2. Install Apache

Return to the Terminal, and run the following commands to install the latest version of Apache;

```
▸ cd /opt/local
▸ sudo port install apache2
```

This will take some time (about 15 minutes), so go and make a cup of tea.

3. Configuring Apache

When installation is complete, you should edit the Apache configuration file by running the following command;

```
▸ sudo edit apache2/conf/httpd.conf
```

FInd the following line,

```
DocumentRoot "/opt/local/apache2/htdocs"
```

and change it to the path to your ‘Sites’ folder, for example (replace ‘bill’ with your user name);

```
DocumentRoot "/Users/bill/Sites”
```

Repeat for the following line,

```
<Directory "/opt/local/apache2/htdocs">
```

Changing it to;

```
<Directory "/Users/bill/Sites">
```

Find the following line;

```
#ServerName www.example.com:80
```

and uncomment it, replacing the domain with localhost as follows;

```
ServerName localhost:80
```

Save the edited file, entering your password if requested by the editor software.

4. Running Apache

The following command will launch Apache, and will also make use of launchd to ensure it runs at boot time.

```
‣ sudo launchctl load -w /Library/LaunchDaemons/
  org.macports.apache2.plist
```

5. Testing Apache

To test that everything is working, use a text editor to save the following lines in a text file called index.html placed in your Sites sub-directory (eg: /Users/bill/Sites/index.html)

```
<html><body><h1>Apache is running successfully</h1></body></html>
```

Pointing your browser to http://localhost/ should display this file. Any subsequent edits of the Apache httpd.conf file should be followed by running the following command to force Apache to reload the configuation

```
‣ sudo /opt/local/apache2/bin/apachectl -k restart
```

Installing MySQL

1. Install software

Change your directory back to /opt/local by typing at the command line

```
‣ cd /opt/local
```

Install the latest version of MySQL server by typing the following;

```
‣ sudo port install mysql5-server
```

2. Configure MySQL

Set up the main database;

```
‣ sudo -u mysql mysql_install_db5
‣ sudo chown -R mysql:mysql /opt/local/var/db/mysql5/
‣ sudo chown -R mysql:mysql /opt/local/var/run/mysql5/
‣ sudo chown -R mysql:mysql /opt/local/var/log/mysql5/
```

Rename link to mysql client to make it more familiar

```
‣ sudo cd /opt/local/bin
‣ sudo mv mysql5 mysql
```

3. Running MySQL

Launch MySQL server and ensure it auto starts when rebooting

```
‣ sudo launchctl load -w /Library/LaunchDaemons/
  org.macports.mysql5.plist
```

4. Configuring MySQL

Copy a template configuration file to my.cnf

```
‣ sudo cp -Rfp /opt/local/share/mysql5/mysql/my-small.cnf /opt/
  local/etc/mysql5/my.cnf
```

Edit the file and ensure following line is included in the [mysqld] section. Also uncomment all the lines starting ‘innodb’.

```
default-storage_engine = innodb
```

Re-start MySQL by stopping and restarting as in step 3. To stop MySQL use;

```
‣ sudo launchctl unload -w /Library/LaunchDaemons/
  org.macports.mysql5.plist
```

Installing PHP

1. Install software

Change your directory back to /opt/local by typing at the command line;

```
‣ cd /opt/local
```

Install the latest version of PHP, including necessary extensions, by typing the following;

```
▸ sudo port install php5 +apache2
▸ sudo port install php5-mysql
▸ sudo port install php5-sockets
▸ sudo port install php5-gd (optional)
```

2. Let Apache know that PHP is available

The following commands register PHP with Apache and alters the httpd.conf file accordingly

```
▸ cd /opt/local/apache2/modules
▸ sudo /opt/local/apache2/bin/apxs -a -e -n "php5" libphp5.so
```

3. Edit the Apache configuration file using the following command

```
▸ sudo edit /opt/local/apache2/conf/httpd.conf
```

Add the following lines to the end of the file

```
#
# Include PHP configurations
#
Include conf/extra/mod_php.conf
```

Restart Apache to read the new httpd.conf file

```
▸ sudo /opt/local/apache2/bin/apachectl -k restart
```

4. Create a custom php.ini file

Copy the supplied development ini file to the active location;

```
▸ sudo cp /opt/local/etc/php5/php.ini-development /opt/local/etc/
  php5/php.ini
```

5. Configure PHP

Edit the PHP.ini file by typing;

```
▸ sudo edit /opt/local/etc/php5/php.ini
```

Find the ‘Module Settings’ section and uncomment the date.timezone line, making it equal to GMT;

```
date.timezone = GMT
```

Find the line beginning ‘pdo_mysql.default_socket=’ and edit it to equal the default MySQL socket;

```
pdo_mysql.default_socket=/opt/local/var/run/mysql5/mysqld.sock
```

Similarly for the line beginning ‘mysql.default_socket =’;

```
mysql.default_socket = /opt/local/var/run/mysql5/mysqld.sock
```

And for ‘mysqli.default_socket =’;

```
mysqli.default_socket = /opt/local/var/run/mysql5/mysqld.sock
```

Also, add a location for an error log;

```
error_log = /opt/local/var/log/php_errors.log
```

For this to work, you will need to create the file and change ownership to www;

```
‣ sudo cd /opt/local/var/log
‣ sudo touch php_errors.log
‣ sudo chown www php_errors.log
```

Restart Apache;

```
‣ sudo /opt/local/apache2/bin/apachectl -k restart
```

6. Testing PHP

To test that everything is working, use a text editor to save the following lines in a text file called phpinfo.php placed in your Sites sub-directory (eg: /Users/bill/Sites/phpinfo.php)

```
<?php phpinfo();?>
```

Point your browser to http://localhost/phpinfo.php and a very long page of information about your php installation should be displayed.

Install OpenLdap

1. Install software

Change your directory back to /opt/local by typing at the command line;

```
‣ cd /opt/local
```

Install the latest version of OpenLdap using the following command;

```
‣ sudo port install openldap
```

(NB - you may need to run this last command twice if a db44 build error is reported)

2. Configure OpenLdap

Copy the default file to make an editable configuration file;

```
▸ sudo cp /opt/local/etc/openldap/slapd.conf.default /opt/local/
  etc/openldap/slapd.conf
```

Edit it by running the following command;

```
▸ sudo edit /opt/local/etc/openldap/slapd.conf
```

FInd the following line near the top of the configuration file;

```
include         /opt/local/etc/openldap/schema/core.schema
```

Add the following three lines after it to import the necessary schemas. NB The oerbac schema file needs to be created at this point (see OpenEyes - RBAC for details of this file).

```
include         /opt/local/etc/openldap/schema/cosine.schema
include         /opt/local/etc/openldap/schema/inetorgperson.schema
include         /opt/local/etc/openldap/schema/oerbac.schema
```

(NB ensure the oerbac.schema file is copied to this directory first!)

Further down the file, under the BDB database definitions, edit the first three lines to refer to your domain, as follows;

```
database        bdb
suffix          "dc=openeyes,dc=com"
rootdn          "cn=Manager,dc=openeyes,dc=com"
```

Save the file.

3. Set the Berkely database

Go to the OpenLdap data directory;

```
▸ cd /opt/local/var/openldap-data
```

Copy the example configuration file to an active one;

```
▸ sudo cp DB_CONFIG.example DB_CONFIG
```

4. Running OpenLdap

The following command will load OpenLDAP, and will also make use of launchd to ensure it runs at boot time.

```
‣ sudo launchctl load -w /Library/LaunchDaemons/
  org.macports.slapd.plist
```

There is a permissions issue which will mean that slapd will not run at boot time, even following this command. The permissions can be set properly using the following commands;

```
‣ cd /opt/local/var
‣ sudo dscl localhost append /Local/Default/Groups/admin
  GroupMembership ldap
‣ sudo chmod g+w /opt/local/var/run/
‣ sudo chown -R ldap:ldap /opt/local/etc/openldap
‣ sudo chown -R ldap:ldap /opt/local/var/openldap-data/
```

To stop slapd, run the following command;

```
‣ sudo kill -INT `cat /opt/local/var/run/slapd.pid`
```

To start slapd;

```
‣ sudo /opt/local/libexec/slapd
```

5. Testing OpenLdap

Download and install the free Apache Directory Studio from http://directory.apache.org/studio/downloads.html.

Run the software, and add a new connection called OpenLDAP with a hostname of 127.0.0.1, a port of 389, and no encryption. The Bind user should be set to the same as in your OpenLdap configuration file (cn=Manager,dc=openeyes,dc=com). Similarly the password. Accept the other defaults, and ignore any Java error messages. At this point, there will be nothing in the directory. See the OpenEyes-Access document for details on how to import data.

Eclipse IDE

Eclipse is a fully equipped integrated development environment including advanced features. and is open Source,

1. Install Eclipse

Go to http://www.eclipse.org/downloads and download the version of eclipse for PHP developers most suited to your system (eg Mac Cocoa 64bit). Double click on the downloaded tar file to decompress it, and a folder called ‘eclipse will appear. Drag this to your Applications folder, and run it from there

Set up a folder for workspaces in a different location to the ‘Sites folder’, and make this your default workspace location. Create new projects there, but import and create files in a folder of the same name in the Sites folder, so that they can be served by Apache.

I order to get UK formatted dates, go to System Preferences, load ‘Language and Text’, and click the ‘Edit list’ button. Scroll to find ‘British English’ and check the box. The next time you launch Eclipse, it should use UK date. In about Eclipse, Installation details, Configuration, there should now be a line like;

```
user.country=GB
```

Debugger

You have two choices of debugger to use with Eclipse, and the instructions for both now follow. The author uses the second of these options.

Xdebug

Return to the terminal and type;

```
▸ cd /opt/local
▸ sudo port install php5-xdebug
```

Edit php ini tile so that php knows about xdebug

```
▸ sudo edit /opt/local/etc/php5/php.ini
```

Add the following lines to the end and save the file

```
;;;;;;;;;;;;;;;;;;;;
;  Xdebug        ;
;;;;;;;;;;;;;;;;;;;;
zend_extension=/opt/local/lib/php/extensions/no-debug-non-zts-20090626/xdebug.so
xdebug.remote_enable=1
xdebug.remote_host="localhost"
xdebug.remote_port=9000
xdebug.remote_handler="dbgp"
xdebug.profiler_enable = Off
xdebug.default_enable = On
```

Restart Apache;

```
▸ sudo /opt/local/apache2/bin/apachectl -k restart
```

Zend Debugger

Go to http://www.zend.com/en/products/studio/downloads and download the latest version of the ZendDebugger (eg Studio Web Debugger, Mac OSX 64 bit version, depending on your system). Double click on the downloaded file which will unpack a directory. Within it, find the version of ZendDebugger.so compatible with version 5.3 of PHP. Copy this to the PHP extensions directory using the following command in the terminal;

```
‣ sudo cp /Users/bill/Downloads/ZendDebugger-5.2.26-darwin9.5-
  x86_64/5_3_x_comp/ZendDebugger.so /opt/local/lib/php/extensions/
  no-debug-non-zts-20090626/
```

Edit the PHP.ini file by typing;

```
‣ sudo edit /opt/local/etc/php5/php.ini
```

Include the following lines at the end of the file

```
;;;;;;;;;;;;;;;;;;;;
;  Zend Debugger   ;
;;;;;;;;;;;;;;;;;;;;
zend_extension="/opt/local/lib/php/extensions/no-debug-non-zts-20090626/ZendDebugger.so"
zend_debugger.allow_hosts=127.0.0.1
zend_debugger.expose_remotely=always
```

Save the file, and restart Apache;

```
‣ sudo /opt/local/apache2/bin/apachectl -k restart
```

Configure Eclipse

Launch Zend Studio, and open the preferences. Change the following

PHP>PHO Interpreter>PHP Version: PHP 5.3

Notes

To start mysqld at boot time you have to copy

support-files/mysql.server to the right place for your system

```
PLEASE REMEMBER TO SET A PASSWORD FOR THE MySQL root USER !

To do so, start the server, then issue the following commands:


/opt/local/lib/mysql5/bin/mysqladmin -u root password 'new-password'

/opt/local/lib/mysql5/bin/mysqladmin -u root -h macpro.aylwards.co.uk password 'new-password'


Alternatively you can run:

/opt/local/lib/mysql5/bin/mysql_secure_installation


which will also give you the option of removing the test

databases and anonymous user created by default.  This is

strongly recommended for production servers.


See the manual for more instructions.


You can start the MySQL daemon with:

cd /opt/local ; /opt/local/lib/mysql5/bin/mysqld_safe &


You can test the MySQL daemon with mysql-test-run.pl

cd /opt/local/mysql-test ; perl mysql-test-run.pl


Please report any problems with the /opt/local/lib/mysql5/bin/mysqlbug script!


The latest information about MySQL is available at http://www.mysql.com/

Support MySQL by buying support/licenses from http://shop.mysql.com/
```