

# Apple OS X Is Unix

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The main reason I chose to use OS X on this piece of over-priced Apple hardware is because it's a Unix system. (Brookshear 2011, p.110)

A popular opinion about Apple MacBooks is they are for the hipsters to showoff in Starbucks (GYEONG-MIN 2010, p.1-2). That is not all the facts. Apple Mac computer with the OS X running on it is a very friendly platform for most of the software developers. Well, unless you are developing Microsoft Windows desktop application.

## 1 OS X as a software developer's environment

### 1.1 Unix-Like System

The OS X operating system running on Apple Mac computers can find its root in the FreeBSD and NetBSD. The BSD (Wikipedia 2014a, Berkeley Software Distribution) systems are implementations of Unix. From 2007, OS X became a registered Unix System. The registered and not registered OSs that conform to the *Single UNIX Specification* are called Unix-like. None of the Linux implementations is registered because of the high registration fee, but they are also Unix-like system, Wikipedia (2014g).

The advantage of being a Unix-like system is obvious, the consistent user experience and compatibility.

More than just user habit and reusability, choosing a Unix system is a cultural thing for a developer. For example, *The UNIX Philosophy* by Gancarz (2003):

- Small is beautiful.
- Make each program do one thing well.
- Build a prototype as soon as possible.
- Choose portability over efficiency.
- Store data in flat text files.
- Use software leverage to your advantage.
- Use shell scripts to increase leverage and portability.
- Avoid captive user interfaces.
- Make every program a filter.

These are the values you can constantly see violated in other systems. I have been using the Unix Philosophy to guide my work as a software developer and would like to see them also in the OS I use.

### 1.2 Clang and POSIX

GCC (Wikipedia 2014d, GNU Compiler Collection) has been the default free compiler for C/C++ and some other programming language on Unix-like system for very long. But now it has grown very large and become extremely hard to maintain.

Clang, with the LLVM as the back end, is an open source tool set designed to replace GCC. The compilation by Clang is faster than GCC and the code generated by Clang are in general faster than by GCC. Even the error and warning messages by Clang is more friendly and useful than by GCC, [Wikipedia \(2014b\)](#).

In the development tools of OS X, Clang already replaced GCC.

Another reason of choosing OS X is because it's POSIX compatible. Many software products have been built based on the POSIX standard, and I often need to develop POSIX standardized software.

### 1.2.1 My story with POSIX

When I worked on a Windows system, I needed to install Cygwin [Wikipedia \(2014c\)](#) to simulate the Unix-like interface including POSIX. But Cygwin couldn't work seamlessly on Windows. And the GCC compiler in Cygwin has been very slow.

I used to work on an ancient proprietary OS of Nokia called DMX. DMX is the operating system for Nokia DX200 server platform, which started since 1973 and ended in 2013, served in Nokia exchanges, 2G GSM, 3G WCDMA and 4G LTE networks, [Wikipedia \(2014f\)](#). My job was to develop and maintain the POSIX component. The OS wasn't POSIX compatible in the beginning. But later it became a problem, for example, it couldn't take the advantage of the free resources, like the TCP/IP stack implementation from FreeBSD. So POSIX interface needed to be introduced to the OS. It had been a very painful move since the legacy system was too different from Unix. The late introducing of POSIX also caused a lot of confusion for the other developers. For example, when they called a function `free()` to free the memory, they were not sure whether they were calling a POSIX function or the DMX native function.

So, native support for POSIX and other standard interfaces is much better than those adopted later, like Cygwin on Window and the POSIX component I used to maintain.

## 1.3 Open source resources

Because OS X is a Unix-like system, just like Linux, there are many open source resources available. I use `homebrew` to manage my software packages, [Wikipedia \(2014e\)](#). `homebrew` is just like the `apt-get` in a Ubuntu OS. It's called "The missing package manager for OS X." For example,

```
brew install mysql
```

Will install the popular open source database MySQL Server on your OS X.

The Python package management system PIP, Ruby package management system Gem/Bundler and Node.js package management system NPM all works smoothly on OS X.

## 1.4 Drawbacks

### 1.4.1 It's not Linux

Unfortunately, OS X is not Linux. Although both are Unix-like system, they still have quite different cores. Nowadays, many software development project is developing software products to be run on a Linux server. Because of the differences, developers still cannot verify everything locally within their OS X, without connecting to a server or using a virtual machine.

### 1.4.2 Too expensive

OS X "almost" only runs on Apple Mac computers. It's possible to run OS X in a virtual machine on a PC, but it's very slow and not officially supported. The Mac hardware is in general very expensive.

### 1.4.3 Addictive

I've never heard anybody switch from OS X to other OS...

## 2 I wish I can have ...

### 2.1 Better AppleScript

It will be great if OS X can have better desktop automation. The AppleScript Neuburg (2006) isn't very easy to use. A friend of mine create an open source project named "Osaka" to wrap the Apple Script into usable Ruby APIs, Vodde (2014). We use Osaka to automate our document generation.

### 2.2 More compatible with Linux

Some open source tools like Docker depends on the Linux specific OS feature. When running Docker on OS X, we still need to run a lightweight virtual machine with VirtualBox. It will be great if Docker can also run on OS X directly.

### 2.3 More open source OS X GUI application

Most of the OS X open source software projects are command line tools. The open source applications with GUI are generally not as great as those commercial applications you can purchase from Apple's App Store. It will be great if OS X can be more open to open source GUI applications.

## 3 Conclusion

Mac OS X is a nearly perfect environment for software development. It's good for cross-platform development among Unix based systems, for example, a service to run on a Linux server. In the same time, software developers can also enjoy the advantages brought by OS X for all the users in general, which should be a lot, but not covered in this paper.

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