

Status Report

Open Source Software in State

Government Operations

January 2005

State of Hawaii
Department of Accounting and General Services
Information and Communications Services Division

INTRODUCTION

This report on the status of Open Source software use in State Government operations was prepared to meet the requirements of House Concurrent Resolution 83 Senate Draft 1 (HCR83 SD1).

HCR83 SD1 (Appendix I) requests DAGS (Department of Accounting and General Services) *to provide a status report on the current use of open source software applications within state government and to adopt a state policy on the use of open source software applications within government agencies.*

Software applications for computers are usually associated with commercial companies that design, build, and sell a license to permit the use the software under various kinds of restrictions such as the number of computers or processors that the software can be used with. The person using the application (the end-user) sees the presentation layer of the application but does not have access to the underlying computational instructions.

Open Source software, on the other hand, attempts to create complete transparency between the creators of the computer software application and the people use the software application. This is done by making the actual human-readable computer instructions (software source code) available to everyone.

The Open Source model for software development and distribution has, especially in the past few years, changed the way many technology companies operate. Apple, HP, IBM, Novell, and many other well established technology firms now offer Open Source software in ways that integrates with their existing proprietary software catalog. Even Microsoft, a company considered at odds with the Open Source movement, has released three projects using the Common Public License (CPL) developed by IBM and approved by the Open Source Initiative (OSI). Many firms involved with Open Source now derive their revenue from maintenance, consulting, custom software design, and training instead of the applications sales (since Open Source software can be freely obtained).

DEFINING KEY TERMS

There is, sometimes, a misunderstanding or confusion of the different terms used to distinguish Open Source software from others kinds of technology categories. It is common, for example, to hear or read statements confusing Open Source with Public Domain, Freeware, Shareware, and Open Standard. Similarly, there is often a mistaken assumption that Open Source software cannot be a Commercial product. This section starts with a basic description of Open Source. It then describes other computer software terms listed alphabetically.

Open Source

The most basic description of Open Source software is human readable computer instruction code that can be freely distributed by one person or institution to another person of institution. This, however, would be an incomplete description of Open Source

software. The full industry-wide accepted Open Source definition from the Open Source Initiative (OSI) is found in Appendix II. Unlike computer software placed in the public domain, Open Source software have licenses defining how the software can be used and distributed. At the time of this writing (September 2004), there are 54 Open Source licenses certified by the OSI. Although these licenses do have variation between them in specific areas, all of the licenses adhere to the 10 criteria described by the OSI Open Source Definition. A summary of these criteria specified by the OSI are provided below using excerpts from or paraphrasing of the OSI definitions:

1. The license shall not require a royalty or other fee for such sale.
2. The program must include source code, and must allow distribution in source code as well as compiled form.
3. The license must allow modifications and derived works, and must allow them to be distributed under the same terms as the license of the original software.
4. The license protects the integrity of the author's source code while still allowing modification of the source code under specified conditions.
5. The license must not discriminate against any person or group of persons.
6. The license must not restrict anyone from making use of the program in a specific field of endeavor.
7. The rights attached to the program must apply to all to whom the program is redistributed without the need for execution of an additional license by those parties.
8. The rights attached to the program must not depend on the program's being part of a particular software distribution.
9. The license must not place restrictions on other software that is distributed along with the licensed software.
10. No provision of the license may be predicated on any individual technology or style of interface.

It is important to note that the Open Source Linux operating system is not a requirement for working with other Open Source applications. There are many Open Source applications that work with other operating system platforms such as Microsoft Windows XP or Apple OS/X.

Commercial

Some people incorrectly believe that Open Source software cannot also be Commercial software. There are many examples of Open Source products that are also commercial products in the sense that a fee is paid to obtain both the product and the services related to the product. These services include centrally managed security updates and fixes and technical support for configuration and operations. The main difference is that source code (computer instruction set) is available for Open Source commercial products while it is not for proprietary commercial products.

Freeware

Freeware is proprietary software that can be used without any time limit restrictions. However, some freeware software applications are only free under specific conditions.

The most common restriction found is allowing the free use of the software for personal use but not for corporate or institutional use.

Public Domain

Software is said to be placed in the public domain when all ownership rights to the software have been relinquished or lost. The main difference between public domain software and Open Source software is that Open Source software has a license associated with it that defines the nature of its use and distribution. Software placed in the public domain does not have any license, copyright, or patent associated with it.

Open Standard

The terms *Open Source* and *Open Standard* are sometimes incorrectly used interchangeably when, in fact, the terms do not have the same meaning.

Specifications for hardware and/or software that are publicly available. Open standards imply that multiple vendors can compete directly based on the features and performance of their products. It also implies that the existing open system can be removed and replaced with that of another vendor with minimal effort and without major interruption.

From TechWeb TechEncyclopedia

<http://techweb.com/encyclopedia/defineterm.jhtml?term=open+standards>

One example of an Open Standard is the Structured Query Language (SQL) used by many database applications. This includes both proprietary database products (such as IBM DB2, Microsoft SQL Server, and Oracle Database) as well as Open Source database products such as Firebird, MySQL, and PostgreSQL.

Proprietary

Proprietary software for computers is, generally, developed by and owned by one organization or individual. Most proprietary software applications are licensed for use by paying a fee. However, there are also free proprietary software applications (sometimes but not always falling under the category of Freeware). The most important difference between proprietary software and Open Source software is that the human readable instructions (software source code) for the proprietary software is not available to anyone except the organization or individual who owns the software or a third party who signs a legally binding document that allows access to the source code but does not allow for any disclosure of information about the source code to others.

Shareware

Shareware is proprietary software that can be used without charge for a limited trial basis (typically 15 to 30 days). If you want to use the shareware software application beyond the trial period, a payment is expected by the vendor. The human readable software instruction code for share is not available as with other proprietary products.

Internet

Although there are very specific and technical definitions of what the Internet is, the important point for the State of Hawaii is that computer systems on the Internet are visible to the general public.

Intranet

An Intranet is a private closed network. Most of the computing resources and the computer work that goes on within the State of Hawaii are not visible to the general public. Thus, much of the development work using Open Source is going on within this private network space and not visible to the general public.

OPEN SOURCE SOFTWARE USED BY STATE OF HAWAII DEPARTMENTS AND AGENCIES

DAGS/ICSD has been researching and doing exploratory work with Open Source products since 2001. Several application systems, characterized as important but not mission critical, have been developed with Open Source products. These systems have been implemented in production mode, and are used daily on both the State's internal network and the public Internet. DAGS/ICSD developed strict criteria that it uses to screen the multitude of Open Source products to qualify and select those that are included in its "Open Source Toolkit." DAGS/ICSD shares the knowledge it gains with other departments and government jurisdictions, and will continue with this research and exploratory work in the future.

The criteria developed and used by DAGS/ICSD to qualify and select Open Source software development tools are as follows:

- The software must be a widely used best-of-breed product.
- The development support community surrounding the software must have demonstrable activities as measured by reviews, instructional material, news group discussions, published books, and other community efforts.
- The software maintainers must have past behavior that demonstrates a timely responsiveness to security issues.
- The software must be able to be supported by current staff and fit into existing computer and network architectural infrastructure.
- The software must be cost-effective from both initial purchase and going-forward operational perspectives.

Server and Workstation Software Product Categories

There are numerous Open Source software used by various State of Hawaii Departments and Agencies. It is important to distinguish between two important types of products that apply to both Open Source and proprietary products.

Most people are familiar with what is referred to here as **workstation software**. This is the category of software most commonly found on desktop and notebook personal computers (PCs). This category of software includes word processors, spreadsheets, presentation software, email clients, and many other personal productivity and creativity applications that are installed on a PC that can be used by the one person using the computer at a specific time.

The server software category includes the kind of computer software that is not generally recognized by product name by most non-technical people but plays a major role in the function of well known large scale web sites such as Google and Yahoo. Server software are installed on fewer computers than workstation software. However, server software can reach and serve anyone connected to a computer data network such as the Internet or a company Intranet.

Apache HTTP Web Server

<http://httpd.apache.org/>

The Apache HTTP Web Server is a widely used application that provides web pages for the majority of web servers running worldwide. It is platform-neutral and can be run on top of Linux, Microsoft Windows, and other computer operating systems.

Apache Jakarta Tomcat

<http://jakarta.apache.org/tomcat/>

Tomcat is described as a *servlet container that is used in the official Reference Implementation for the Java Servlet and JavaServer Pages technologies*. It is useful to note here that while the Java programming language is not an Open Source product (it is owned by SUN Microsystems), the Apache Jakarta Tomcat project and many other Java-based projects are available as Open Source products.

Linux

<http://www.linux.org/>

Linux is, perhaps, the best known Open Source project. It is an operating system that provides the basis for interaction between a human and the underlying computer hardware.

Mozilla and Firefox

<http://www.mozilla.org/>

The Mozilla project includes several products targeting web users of all kinds. The best known products are the Mozilla browser and the Firefox browser. The Firefox browser received a great deal of attention in Fall 2004 as the press focused on security problems related to the widely used Microsoft Internet Explorer browser. Firefox, like many other Open Source products, is platform neutral and can be run on computers using a variety of operating systems including Linux and Microsoft Windows.

MySQL

<http://www.mysql.com/>

MySQL is a database server noted for its ability to be used with modest computer hardware configurations and deliver exceptional performance. While it lacks some features of some more complex database servers such as Microsoft SQL Server, Oracle, and PostgreSQL, it has found a good fit in web-based applications that require fast simple database operations.

PHP

<http://www.php.net/>

PHP is a scripting language for developing web-based applications. It is said to be the most widely using web programming language in the world. It is simple to learn and use and has been used extensively in recent years to deliver projects that may have been cost prohibitive using proprietary technology.

PostgreSQL

<http://www.postgresql.org/>

PostgreSQL, like MySQL, is a database server application. It has many of the more sophisticated database features missing from MySQL and rivals the features provided by many high-end proprietary database server products.

Python

<http://www.python.org/>

Python is a general purpose programming language that is easy to learn and promotes good programming practices. It is often used to write crucial system level software that is generally unseen by everyone except system administrators. Many of the Red Hat Linux system administration tools, for example, are written using this programming language.

Zope/Plone

<http://www.zope.org/>

<http://www.plone.org/>

Zope is described as *an open source application server for building content management systems, intranets, portals, and custom applications*. Plone is an add-on product for Zope that is described as *an intranet and extranet server, as a document publishing system, a portal server and as a groupware tool for collaboration between separately located entities*. The key feature of Zope and Plone is the ability it gives system managers and content creators to modify a web site without any special tools. All development and management can be performed using any contemporary graphical web browser. This reduces development overhead as well as encouraging the separation of content creation from system management functions. It has been used extensively in the creation of Intranet and Internet web sites for the State of Hawaii.

STATE OF HAWAII PROJECTS USING OPEN SOURCE PRODUCTS

Many of the projects using Open Source products are web-based ones running on the State of Hawaii Intranet (internal) or Internet (public). The list below provides an overview of the kinds of projects that have been deployed by the State of Hawaii using Open Source development tools and products.

- Internet web sites and applications
- Intranet web sites and applications
- Data capture software for budget planning
- Status and expenditure tracking
- Electronic tax form filing
- Records reporting system

SUMMARY

The State of Hawaii Executive Branch departments have been evaluating and using Open Source solutions on a case by case basis for at least three years now. Open Source software is currently used by numerous State of Hawaii Executive Branch departments and agencies for a wide variety of project types. The majority of these projects are server oriented (one large computer serving many people) rather than workstation oriented (one computer providing service to one person at a time).

RECOMMENDATION

DAGS recommends a policy that allows Open Source products to be considered along with proprietary software products in the business case analysis for any project. For each project the software products to be used must be selected on their merits. In some cases Open Source products will offer a better solution, and in other cases proprietary products will. DAGS cautions against legislation or policy that mandates the use of Open Source products, and offers to coordinate the development of a policy and standards for the effective use of Open Source products.

Appendix I: H.C.R. No. 83 S.D. 1

http://www.capitol.hawaii.gov/sessioncurrent/bills/hcr83_sd1_.htm

HOUSE OF REPRESENTATIVES
TWENTY-SECOND LEGISLATURE,
2004

H.C.R. NO. 83
S.D. 1

STATE OF HAWAII

HOUSE CONCURRENT RESOLUTION

REQUESTING a status report on THE current USE of OPEN SOURCE SOFTWARE in state GOVERNMENT and the adoption of a state policy supporting use of OPEN SOURCE SOFTWARE in state GOVERNMENT OPERATIONS.

WHEREAS, state government agencies are among the largest consumers of commercial computer software within the State; and

WHEREAS, some of the applications of commercial computer software may not necessarily be compatible with government functions, operations, and needs, and the software may also contain programming glitches; and

WHEREAS, traditional commercial computer software is based on a closed model in which only a very few programmers can see the software source code and modify and improve the software; and

Open Source Software in State Government Operations

WHEREAS, for this reason commercial software glitches and incompatibilities cannot be fixed by government agencies, which must hire consultants to address these software problems; and

WHEREAS, unlike traditional commercial software, open source software source code is accessible to and may be read and modified by most programmers to improve, adapt it, and fix bugs; and

WHEREAS, open source software provides the opportunity for state agencies to procure at little or no cost, software programs or utilities that may be modified by the agency to more closely meet the agency's needs; and

WHEREAS, open source software, upon modification, may be redistributed for use by other agencies that may yet again modify the software, therefore resulting in further improvements to the software; and

WHEREAS, with the growth of the Internet, there has been a rapid expansion in the sharing of information technology to the point where the philosophy of open source software is being promoted by the nonprofit, Open Source Initiative; and

WHEREAS, the Open Source Initiative has been embraced by those in the industry who want to provide a means for rapid development of better software and community access to these constantly evolving, mainstream software products; and

WHEREAS, the Open Source Initiative has developed and adopted criteria to certify open source software products, protect the credibility of the open source philosophy, as well as ensure that no harm is brought to end users of open source software products; now, therefore,

BE IT RESOLVED by the House of Representatives of the Twenty-second Legislature of the State of Hawaii, Regular Session of 2004, the Senate concurring, that the Department of Accounting and General Services (DAGS) is requested to provide a status report on the current use of open source software applications within state government and to adopt a state policy on the use of open source software applications within government agencies; and

Open Source Software in State Government Operations

BE IT FURTHER RESOLVED that DAGS submit a report of its findings and recommendations to the Legislature no later than twenty days prior to the convening of the Regular Session of 2005; and

BE IT FURTHER RESOLVED that certified copies of this Concurrent Resolution be transmitted to the Comptroller, directors of each state department, Superintendent of Education, State Librarian, and the President of the University of Hawaii.

Report Title:

Open source software in state government operations

Appendix II: The Open Source Definition

<http://opensource.org/docs/definition.php>

The Open Source Definition

Version 1.9

*The indented, italicized sections below appear as annotations to the Open Source Definition (OSD) and are **not** a part of the OSD. A plain version of the OSD without annotations can be found [here](#).*

A printable version of this annotated page is available [here](#).

Introduction

Open source doesn't just mean access to the source code. The distribution terms of open-source software must comply with the following criteria:

1. Free Redistribution

The license shall not restrict any party from selling or giving away the software as a component of an aggregate software distribution containing programs from several different sources. The license shall not require a royalty or other fee for such sale.

***Rationale:** By constraining the license to require free redistribution, we eliminate the temptation to throw away many long-term gains in order to make a few short-term sales dollars. If we didn't do this, there would be lots of pressure for cooperators to defect.*

2. Source Code

The program must include source code, and must allow distribution in source code as well as compiled form. Where some form of a product is not distributed with source code, there must be a well-publicized means of obtaining the source code for no more than a reasonable reproduction cost—preferably, downloading via the Internet without charge. The source code must be the preferred form in which a programmer would modify the program. Deliberately obfuscated source code is not allowed. Intermediate forms such as the output of a preprocessor or translator are not allowed.

***Rationale:** We require access to un-obfuscated source code because you can't evolve programs without modifying them. Since our purpose is to make evolution easy, we require that modification be made easy.*

3. Derived Works

The license must allow modifications and derived works, and must allow them to be distributed under the same terms as the license of the original software.

distributed under the same terms as the license of the original software.

Rationale: *The mere ability to read source isn't enough to support independent peer review and rapid evolutionary selection. For rapid evolution to happen, people need to be able to experiment with and redistribute modifications.*

4. Integrity of The Author's Source Code

The license may restrict source-code from being distributed in modified form *only* if the license allows the distribution of "patch files" with the source code for the purpose of modifying the program at build time. The license must explicitly permit distribution of software built from modified source code. The license may require derived works to carry a different name or version number from the original software.

Rationale: *Encouraging lots of improvement is a good thing, but users have a right to know who is responsible for the software they are using. Authors and maintainers have reciprocal right to know what they're being asked to support and protect their reputations.*

*Accordingly, an open-source license **must** guarantee that source be readily available, but **may** require that it be distributed as pristine base sources plus patches. In this way, "unofficial" changes can be made available but readily distinguished from the base source.*

5. No Discrimination Against Persons or Groups

The license must not discriminate against any person or group of persons.

Rationale: *In order to get the maximum benefit from the process, the maximum diversity of persons and groups should be equally eligible to contribute to open sources. Therefore we forbid any open-source license from locking anybody out of the process.*

Some countries, including the United States, have export restrictions for certain types of software. An OSD-conformant license may warn licensees of applicable restrictions and remind them that they are obliged to obey the law; however, it may not incorporate such restrictions itself.

6. No Discrimination Against Fields of Endeavor

The license must not restrict anyone from making use of the program in a specific field of endeavor. For example, it may not restrict the program from being used in a business, or from being used for genetic research.

Rationale: *The major intention of this clause is to prohibit license traps that prevent open source from being used commercially. We want commercial users to join our community, not feel excluded from it.*

7. Distribution of License

The rights attached to the program must apply to all to whom the program is redistributed without the need for execution of an additional license by those parties

redistributed without the need for execution of an additional license by those parties.

***Rationale:** This clause is intended to forbid closing up software by indirect means such as requiring a non-disclosure agreement.*

8. License Must Not Be Specific to a Product

The rights attached to the program must not depend on the program's being part of a particular software distribution. If the program is extracted from that distribution and used or distributed within the terms of the program's license, all parties to whom the program is redistributed should have the same rights as those that are granted in conjunction with the original software distribution.

***Rationale:** This clause forecloses yet another class of license traps.*

9. License Must Not Restrict Other Software

The license must not place restrictions on other software that is distributed along with the licensed software. For example, the license must not insist that all other programs distributed on the same medium must be open-source software.

***Rationale:** Distributors of open-source software have the right to make their own choices about their own software.*

Yes, the GPL is conformant with this requirement. Software linked with GPLed libraries only inherits the GPL if it forms a single work, not any software with which they are merely distributed.

***10. License Must Be Technology-Neutral**

No provision of the license may be predicated on any individual technology or style of interface.

***Rationale:** This provision is aimed specifically at licenses which require an explicit gesture of assent in order to establish a contract between licensor and licensee. Provisions mandating so-called "click-wrap" may conflict with important methods of software distribution such as FTP download, CD-ROM anthologies, and web mirroring; such provisions may also hinder code re-use. Conformant licenses must allow for the possibility that (a) redistribution of the software will take place over non-Web channels that do not support click-wrapping of the download, and that (b) the covered code (or re-used portions of covered code) may run in a non-GUI environment that cannot support popup dialogues.*

Origins: Bruce Perens wrote the first draft of this document as "The Debian Free Software Guidelines", and refined it using the comments of the Debian developers in a month-long e-mail conference in June, 1997. He removed the Debian-specific references from the document to create the "Open Source Definition."

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Send questions or suggestions about the website to Steve M.: [webmaster at
opensource.org](mailto:webmaster@opensource.org)