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JOURNAL OF INFORMATION SYSTEMS APPLIED RESEARCH

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Open Source Software in the Vertical Market: An Open Niche?

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Abstract

Much of the universe of open-source software is categorized; abundant open-source software is found for most categories. However, relatively few dual-licensed open-source software programs are found, and very little open-source software is found for vertical markets. Explanations are explored.

Keywords: open source, vertical market, horizontal market, dual license

1. INTRODUCTION

The phrase *open source* has been in common use since it was suggested in 1998 by Christine Peterson as an alternative name for what many call *free software* (Open Source Initiative, 2007). This paper is an attempt to categorize each package of a large sample of open source software, so as to discover the domains in which open source development has been occurring, and in which domains, if any, there has been little or no open source development activity.

Much of the earliest open source software consisted of systems software: programming-language processors, utility programs, database management systems, and operating system kernels. For example, the author first downloaded a Linux distribution*, Soft Landing Systems (SLS) Linux* in 1992. (A Linux distribution consists of the Linux kernel, essential utility software such as programs to list, edit, rename, and delete files, other system software, and applications.) The SLS distribution contained a kernel (v. 0.99pl12), the command-line utilities, several language processors, the X-Window System, several programming libraries, but virtually no application software. It was clear at the time that, for Linux to become more-widely used, application software was needed.

Since then, much application software has been either written from scratch or has been open-sourced from previously-proprietary software. There has been substantial progress in developing more and better system software as well. So what potential domains for open-source software remain unexplored? That is the question this paper attempts to answer.

2. HYPOTHESES

The first hypothesis is that, in spite of the large variety of open-source software, very little of it would be vertical market software, i.e., software designed to automate businesses of a particular type. Thus, software for dentists' offices or software for plumbing businesses would be considered vertical-market software.

The second hypothesis is that most general business software would be dual-licensed. Several programs commonly used in business, such as *MySQL*, use the dual-licensing model so that the community of users of the open-source-licensed version can contribute improvements to the software (cutting development costs), and the company can sell support to licensees of the

proprietary-licensed version (providing a revenue stream).

3. DEFINITIONS

Both the Association for Computing Machinery, (1998) and the U.S. Patent and Trademark Office (2011) have developed classification schemes for software. For the purposes of this paper, however, popular classification terms were deemed more appropriate.

Several such categories of software are well-established, with the definition of the category generally agreed-upon. Some other categories are not as well-defined, perhaps because they were coined as marketing terms rather than as scientific categories. This paper will first define the category names so there will be no confusion.

Application software: software whose purpose is to solve users' problems. System software and application software are disjoint sets. Their union is the universe of software.

Art & Entertainment: software for creating, playing, or viewing graphic art, video, and/or music, or for entertaining the user. This category includes most game software, but this study did not examine game software.

Client: any software that requests services from servers. Clients are usually, but not always, interactive with users.

Cloud: any software that provides applications to users via the Worldwide Web. Such applications traditionally would have been provided locally on the user's computer.

Development software: software for creating, debugging, and/or maintaining software or websites.

Dual licensed: software distributed under an open-source license that is also available under a proprietary (non-open-source) license, typically for a fee.

General Business: software that typically would be used by businesses but not by individuals.

Graphics: software that is used to view, generate, or modify graphical art, photographs, or diagrams.

Horizontal market software: all software that is not vertical market software. Most horizontal market software would be of use to a variety of industries.

Music: software that is used to listen to, generate, modify, or notate music.

Operating System: An operating system kernel, or an operating system distribution (see below), provided the distribution is created by the entity that develops and maintains the kernel. This study does not include operating system distributions from third parties, since they are merely collections of software that may be examined separately.

Operating system distribution: a collection of software distributed as a unit, consisting of an operating system kernel, essential utility programs such as programs to list, edit, rename, and delete files, other system software, and applications.

PIM (Personal Information Manager): Email, calendar, collaborative communication, messaging, sticky note, and organizer software, etc., but not database managers.

Productivity: word processors, spreadsheet programs, presentation programs, small-office database management systems, and PDF viewers.

Server: any software that provides services to client software. Servers are never used by users directly; only client software may interact with a server.

System software: software whose purpose is to manage the computer, maintain the computer and its file system, or to help develop and debug software.

Utility: a program for maintenance or management of a computer system.

Vertical market software: software that is specialized to a particular industry, and that fully automates a company in that industry, or nearly so. There is much software that is specialized to just one aspect of a particular industry, and, in this paper, such software is not considered vertical market software.

Video: software that is used to view, generate, or modify moving images.

Web: any software that is involved, in any way, with the Worldwide Web. Such software could be client software, server software, or Web-development software.

4. METHODOLOGY

Selecting Software

There is so much open-source software that it is impractical to study it all. Therefore, one must rely on a sample. Eric Raymond (2000) stated, "The Linux world...has terabytes of open sources generally available." Freshmeat.net (2011) claims that "Thousands of applications, which are preferably released under an open source

license, are meticulously cataloged in the freshmeat database." And SourceForge (2011) claims to host 295,679 open-source projects.

While Freshmeat.net is the canonical listing of open-source software, it obtains its listings from the authors of the software, and so its listings are not vetted for utility, stability, practicality or popularity. Sourceforge serves as an archive for open-source projects, but a large fraction of its projects have had no activity for a substantial time (Rabellino, 2007), implying that they obtained no traction among open-source developers. Indeed, some have never reached version 1.0. Since this paper intends to study vibrant projects, the sample of software must be defined by individuals or organizations independent of the software's creators.

The author was able to find three independent lists of open-source software. Wikipedia (2011) and Harvey (2011) each listed a significant number of open-source packages, and all of them were included in this study. The *Google Summer of Code* (GSOC) (Google, 2011) has supported a large number of projects. All projects involved with GSOC 2005 and most from GSOC 2006 were studied.

For each selected open-source project, the author inspected the project Website and the Website of the referring site. Each site was analyzed to determine into which categories (from section *3* above) the project's software belonged. Not every Website supplied explicitly the information needed for this study. In the small number of cases where the Website was vague, the value for the category was inferred from contextual information in the Websites.

The Spreadsheet

Each open-source package is represented by a row in the spreadsheet. A column was created for each of many software categories, although *vertical market, horizontal market*, and *dual licensed* were of primary interest. If the package seemed to fit the category, a "Y" was entered into the cell at the junction of the package's row and the category's column.

5. RESULTS

As indicated in the table in the appendix, only 5% of the software packages in the sample of one hundred eighty-four were vertical-market software, confirming the hypothesis that open-source vertical-market software would be rare. 5% of the packages in the sample is actually large compared with the percent of industries represented. The 2007 North American Industry Classification System (United States Census Bureau, 2011) lists 1,175 industry categories. Our sample identifies only five industries with open-source, vertical-market (OSVM) software: library, microfinance, tool-and-die, restaurant, and financial services. This computes to 0.43% of all industries.

Only eleven of the forty-nine (22%) of general business software were dual-licensed. Even if general business software where commercial hosting is available from the vendor is counted as dual-licensed, the figure is still only 33%, and the hypothesis that most general business software would be dual licensed is not supported by the data in this sample.

6. DISCUSSION

Vertical Market Software

What explains the scarcity of vertical market open-source software? Eric Raymond (2000) postulated that "Every good work of software starts by scratching a developer's personal itch." When the developer is a hobbyist, he is not likely to be itched by the desire to write dentist-office software, and the chances are that he wouldn't know where to start, unless he were a dentist himself. If he is a dentist, and the software development project was successful, significant money might be earned by licensing the software to other dentists, an incentive to make the software proprietary. If he did make it open-source, he would be offering competitors the ability to operate as efficiently as he does, for no development or licensing cost: not a wise decision in a competitive industry. For a detailed discussion of the obstacles facing open-source projects in vertical markets, refer to Shaffer (2006).

Thus, the domain knowledge combined with the software design talent required to create good vertical market software must be a relatively rare combination, and those that have such knowledge have significant disincentives against open-sourcing their creation.

Nonetheless, this study did find several open-source, vertical-market packages. What factors led to their creation in the face of the above-mentioned disincentives?

Five of the ten were integrated library systems. (ILS's). Two others were microfinance software. Of the remainder, *Floreant POS* is point-of-sale software for restaurants, *Tool and Die ERP* is for tool-and-die companies, and *OpenGamma* is for financial analytics at investment companies.

The existence of the library information systems is easy to explain. As the former treasurer of a small-town, one-room public library, the author was greatly disturbed by the $2000 annual ILS license fee, particularly since this was one-sixth of the library's annual budget. Vertical-market software is notoriously high-priced, and these prices create a significant incentive for a library to find a more economical source for ILS software.

The principles of library operation are more generally understood than those of less-public ventures, so there should be more people competent to create an ILS than, for example, an integrated dentist-office system. As non-profit organizations or government entities, libraries would not find it appropriate to initiate a profit-making software business. Additionally, and unlike for-profit firms, libraries do not generally compete with one another; therefore, a library that creates its own ILS would not be at any disadvantage should other libraries adopt their software. Under an open-source regime, the library that initiates the ILS software project may find their software enhanced by other libraries, with all user-libraries reaping the benefits. Thus many obstacles to the creation of open-source vertical-market software do not exist in the library domain.

The *Koha* ILS illustrates this. Horowhenua Library Trust (HLT), which manages several public libraries in New Zealand, faced the Y2K problem on their existing ILS. They distributed an RFP for a replacement system, but found nothing adequate and affordable among the submitted bids. Thereupon, they decided to create a new open-source ILS from scratch, and hired Katipo Communications, a Web software development firm, to help them create it. The new software became operational in just over fifteen weeks, through intense cooperation between Katipo and HLT's librarians. They called it *Koha*, and they created it for 40% of the cost of the average turnkey solution (Ransom, Cormack, and Blake, 2009).

Other libraries worldwide have contributed improvements to Koha, and all the libraries that use it can take advantage of the enhanced software. HLT, at relatively low initial cost, has broken free of the lock-in and concomitant high licensing fees of proprietary ILS's, and has acquired a high-quality, free (from onerous licensing conditions), open-source ILS (Ransom et. al., 2009).

In addition to the five ILS's, two microfinance programs were found: *Mifos* and *Octopus*. Mifos was developed by the Grameen Foundation, and Octopus by the Agency for Technical Cooperation and Development (ACTED). Both organizations are charitable organizations rather than profit-making businesses, and their goal is to promote microfinance.

Tool and Die ERP is enterprise resource management software for the tool and die industry. It was created under the sponsorship of the European Union to help improve the competitiveness of European tool-and-die firms. As a government project, the *Tool and Die ERP* project had no concerns about inadvertently sharing competitive advantage with other firms.

Each of the projects discussed thus far seems to owe its success to its immunity to the disincentives that generally stifle open-source vertical-market (OSVM) software. Are there any other circumstances under which OSVM software can arise?

FloreantPOS is a point-of-sale system for restaurants. It was developed by Moonrank U.S.A., a Web software development firm. Their Website does not reveal the motivation for FloreantPOS's development, but it does seem that Moonrank expects to profit by providing support (Moonrank, 2011). FloreantPOS claims at least one major restaurant chain, *Denny's*, as a client. It is not clear how FloreantPOS has overcome the disincentives against OSVM. Perhaps restaurants, or at least those restaurants that are FloreantPOS users, consider their food and ambiance greater differentiators than their IT systems. Attempts to contact Moonrank for further information were unsuccessful.

The last OSVM to be discussed is an interesting new project that has been initiated by OpenGamma, a startup company. OpenGamma is developing software for the front office and risk analysis functions of Wall Street firms. They

believe that these functions have become sufficiently standardized that they no longer provide significant competitive advantage to Wall-Street firms, and that it will be cheaper for companies to use OpenGamma's open-source program and pay for support than to license third-party software or develop and maintain their own (Woods, 2011). They will depend on dual-licensing and confidentiality agreements to assure their clients that their trade secrets will not be compromised.

As of the date of writing, September 2011, OpenGamma has not reached version 1.0, (OpenGamma, 2011a), and until that point is reached, one would not expect it to be used as a production system. The OpenGamma Website indicates that they are "trialing it with a number of financial institutions" (OpenGamma 2011b), but that is no guarantee that any significant institutions will become production users. While venture-capitalists are betting on OpenGamma, the low success rate of VC-funded firms, about 45% (Davis, 2008) precludes any assumption that VC funding necessarily predicts success.

Dual-licensed Software

There appears to be a relative scarcity of dual-licensed open-source software. MySQL, SugarCRM, Zimbra, and Bacula are high-profile dual-licensed open-source projects. As profit-making endeavors, these projects need to stimulate public interest through advertising and press releases. Hearing about such projects regularly may leave the impression that dual-licensed projects are more common than they actually are.

Dual-licensing software is a proposed solution to the problem of making profits from free, open-source software. The rapid rise of MySQL showed that such a business model could both generate profits and produce rapidly-improving software. MySQL's success also gave the model significant exposure, leading other enterprises to imitate. However, this survey suggests that there are not very many companies replicating MySQL's success.

7. CONCLUSIONS

Open-source software has limited penetration into the vertical-market world. Most of the existing OSVM software rely on government sponsorship or their situation in a noncompetitive industry for their success. However, there are OSVM applications for competitive markets, and at least one of these has met with significant acceptance. It seems likely that open-source software will move further into vertical markets only if exceptions are found to the disincentives to OSVM software.

The exceptions so far identified include

a) government or non-profit sponsorship,
b) territorially-segregated or other non-competitive markets,
c) ability to profit from selling support,
d) potential cost savings from avoiding license fees of proprietary software and sharing the development burden with your industry, and, perhaps,
e) maturing technology eliminating the competitive advantage of proprietary software technology.

In those cases where several of these factors are present, the emergence of open-source software in that vertical market would be more likely.

Firm conclusions about dual-licensed software are harder to come by. It could be that MySQL's success owed much to timing: arising just as the World-Wide Web and e-commerce were emerging, when an alternative to expensive and bloated commercial databases was particularly needed, MySQL met a need.

It may be that users of open-source software distrust mixed-model (another term for dual-licensing) companies, but that the need was so great at MySQL's emergence that the part-proprietary aspect was overlooked. It is certainly possible that other software might find a similar niche at emergence, and so there are other successful dual-licensed projects. However, if this conjecture is true, a mixed-model project should find it hard to compete against a pure, community-developed open-source project. It would be intriguing to study the several dual-license projects, and their competitive environment, to elucidate which ones are truly successful and why.

8. REFERENCES

Association for Computing Machinery (1998). The 1998 ACM Computing Classification Scheme. Retrieved June 7, 2011 from http://www.acm.org/about/class/ccs98-html.

Davis, M.P. (2008). VC Backed Startup Success Rate. Retrieved June 14, 2011 from

www.markpeterdavis.com/getventure/2008/09/vc-backed-start.html.

Freshmeat.net (2011). About freshmeat.net. Retrieved June 11, 2011 from http://freshmeat.net/about.

Google (2011). Google Summer of Code. Retrieved June 11, 2011 from http://code.google.com/soc.

Harvey, C. (2011) 70 Open Source Replacements for Small Business Software. Datamation, April 19, 2011. Retrieved June 7, 2011 from http://itmanagement.earthweb.com/osrc/article.php/12068_3931181_1/70-Open-Source-Replacements-for-Small-Business-Software.htm.

Karaguchi, S., Garg, K., Matsushita, M., & Inoue, K. (2004). MUDABlue: an automatic categorization system for open source repositories. ***APSEC '04:*** *Proceedings of the 11th Asia-Pacific Software Engineering Conference (APSEC 2004)*, 184-193.

Moonrank, U.S.A., L.L.C. (undated). FloreantPOS Home Page. Retrieved June 14, 2011 from http://floreantpos.com.

Open Source Initiative (ca. 2008). History of the OSI. Retrieved June 3, 2011 from http://opensource.org/history

OpenGamma (2011b). *Blog* page. Retrieved September 5, 2011 from http://www.opengamma.com/blog

OpenGamma (2011a). *Developers* page. Retrieved June 10, 2011 from http://developers.opengamma.com

Rabellino, G (2007). Lies, Damn Lies, and Sourceforge Statistics. *Boldly Open*, April 4, 2007. Retrieved June 14, 2011 from http://boldlyopen.com/2007/04/04/lies-damn-lies-and-sourceforge-statistics/

Raymond, Eric S. (2000). The Cathedral and the Bazaar. Retrieved June 7, 2011 from http://www.catb.org/~esr/writings/cathedral-bazaar/cathedral-bazaar/index.html

Ransom, J., Cormack, C., and Blake, R. (2009). How Hard Can It Be? : Developing in Open Source. Code{4}lib Journal, (7), June 26, 2009. Retrieved on June 12, 2011 from http://journal.conde4lib.org/articles/1638.

Shaffer, George (2006). The Limits of Open Source - Vertical Markets Present Special Obstacles. *GeodSoft Website*. Retrieved June 10, 2011 from http://geodsoft.com/opinion/oslimits/vertical.htm.

Sourceforge (2011). Sourceforge.net homepage. Retrieved June 11, 2011 from http://sourceforge.net.

United States Census Bureau (2011). The North American Industry Classification System (2007 NAICS). Retrieved Sept. 5, 2011 from http://www.census.gov/cgi-bin/sssd/naics/naicsrch?chart=2007.

United States Patent and Trademark Office (2011). The U.S. Patent Classification System. Retrieved June 7, 2011 from http://www.uspto.gov/web/offices/documents/classescombined.pdf.

Wikipedia (2011). List of Free and open source software packages. Retrieved June 7, 2011 from http://en.wikipedia.org/wiki/List_of_free_and_open_source_software_packages.

Woods, Dan (2011). Open Source for Vertical Apps: Is Wall Street Ready? Forbes' *CIO* Central, June 8, 2011. Retrieved June 10, 2011 from http://blogs.forbes.com/ciocentral/2011/06/08/open-source-for-vertical-apps-is-wall-street-ready.

Appendix

Software	Type																			Web Resource	Description
Name	Vertical Market	Horizontal Market	Art&Entertainment	System	Operating System	Utility	Development	Server	Application	Client	Web	Cloud	Productivity	PIM	General Business	Dual License	Middleware	Graphics	Video	Music		
7-Zip		Y		Y		Y															www.7-zip.org	Compress/archive utility
AbiWord		Y							Y				Y								www.abisource.com	Word processor
Adempiere		Y						Y	Y		Y	Y			Y						www.adempiere.com	ERP software
Adium		Y								Y											adium.im	Instant messaging client
Alfresco		Y						Y	Y		Y	Y			Y	Y					www.alfresco.com	Content management system
Amanda		Y		Y		Y									Y						amanda.zmanda.com	Backup utility
Apache HTTP Server		Y		Y				Y			Y	Y									httpd.apache.org	Web server
Ardour		Y	Y																	Y	ardour.org	Audio/music processor
Areca Backup		Y		Y		Y															www.areca-backup.org	Backup utility
Argentum		Y						Y	Y		Y	Y			Y	1		Y			www.argentuminvoice.com	Invoicing software
ArgoUML		Y		Y			Y														argouml.tigris.org	Uniform Modeling Language s/w
Ascalaph Designer		Y							Y									Y			www.biomolecular-modeling.com/Ascalaph	Molecular modeling and dynamics
Asterisk		Y						Y	Y						Y						www.asterisk.org	Digital PBX (VOIP)
Audacity		Y	Y						Y											Y	audacity.sourceforge.net	Audio/music processor
Avogadro		Y							Y									Y			avogadro.openmolecules.net	Molecular modeling
Bacula		Y		Y		Y										Y					www.baculasystems.com	Backup utility
Bioclipse		Y								Y											www.bioclipse.net	Bio/Chem Informatics
BioRails		Y							Y									Y			biorails.org	Bioinformatics
Blender		Y	Y						Y									Y			www.blender.org	3D graphics software
Boo		Y		Y				Y													boo.codehaus.org	Programming language compiler
Bookyt		Y						Y	Y		Y	Y			Y						redmine.cyt.ch/projects/bookyt	Double-entry bookkeeping
Boost C++		Y		Y			Y														www.boost.org	Programming libraries for C++
Bricolage		Y					Y	Y	Y		Y	Y									bricolagecms.org	Content management system
Broadleaf Commerce		Y						Y	Y		Y				Y						www.broadleafcommerce.org	eCommerce software
CellProfiler		Y							Y									Y			cellprofiler.org	Microscope image processing s/w
Chemistry Development Kit		Y		Y			Y											Y			cdk.sourceforge.net	Cheminformatics library
Chrome		Y							Y	Y	Y										www.google.com/chrome	Web browser
Cinelerra		Y	Y						Y										Y		cinelerra.org	Video editing software
ClamAV		Y		Y		Y															www.clamav.net	Anti-virus filter for servers
ClearOS		Y		Y	Y			Y								Y					www.clearfoundation.com/Software/overview.html	General-purpose network server
Collabtive		Y						Y	Y		Y	Y		Y	Y	1					collabtive.o-dyn.de	Groupware
CUPS		Y		Y		Y		Y	Y												www.cups.org	Unix printing system
Compiere ERP and CRM		Y													Y	Y					www.compiere.com	ERP & CRM software
DaisyCMS		Y		Y		Y	Y	Y		Y	Y										www.daisycms.org	Content management system
Dia		Y						Y										Y			live.gnome.org/Dia	Diagramming tool
Django		Y		Y		Y	Y		Y		Y										djangoproject.com	Web framework (CMS?)
Dojo		Y		Y		Y	Y	Y			Y										dojotoolkit.org	Javascript toolkit
Drupal		Y		Y		Y	Y	Y			Y	Y									drupal.org	Content management system
Eclipse		Y		Y		Y	Y														www.eclipse.org	Integrated development environment
EdgeERP		Y						Y	Y		Y	Y			Y						www.edgeerp.org	ERP software
Edoceo Imperium		Y							Y			?			Y						imperium.edoceo.com	Accounting and business mgmt. s/w
eHour		Y						Y	Y		Y	Y			Y						www.ehour.nl	Timesheet management
Endian Firewall		Y		Y		Y		Y								Y					www.endian.com	Firewall
Endrov		Y		Y				Y	Y	Y	Y	Y						Y			www.endrov.net	Microscope image proc'ing apps & lib
ERP5		Y									Y	Y			Y	1					www.erp5.com	ERP software
Evergreen	Y							Y	Y	Y	Y	Y									evergreen-ils.org	Integrated Library System
Evolution		Y							Y	Y		Y		Y							projects.gnome.org/evolution	Personal information manager
FFmpeg		Y		Y				Y											Y	Y	ffmpeg.org	audio/video programming library
FIJI		Y							Y									Y			pacific.mpi-cbg.de/wiki/index.php/Fiji	Microscope image processing s/w

Software	Type																					Web Resource	Description
Name	Vertical Market	Horizontal Market	Art&Entertainment	System	Operating System	Utility	Development	Server	Application	Client	Web	Cloud	Productivity	PIM	General Business	Dual License	Middleware	Graphics	Video	Music			
Firefox		Y							Y	Y	Y											www.mozilla.org	Web browser
Floreant POS	Y							Y	Y	Y												floreantpos.com	Point-of-sale software for restaurants
FreeBSD		Y		Y	Y																	www.freebsd.org	Operating system
FreeMind		Y							Y													freemind.sourceforge.net	Mind-mapping software
Freenet		Y						Y	Y		Y											freenetproject.org	Anonymous information server
Frescobaldi		Y	Y						Y									Y		Y		www.frescobaldi.org	Music notation editor
Front Accounting		Y						Y	Y		Y	Y			Y							frontaccounting.com	ERP for small companies
Gallery		Y	Y						Y		Y	Y						Y				gallery.menalto.com	Photo album organizer
GanttProject		Y							Y						Y			Y				www.ganttproject.biz	Project-management software
GCC		Y		Y			Y															gcc.gnu.org	Programming language compilers
GENtle		Y																Y				gentle.magnusmanske.de	Bioinformatics
Get Simple		Y							Y		Y				Y							get-simple.info	Content management system
GhostScript/GhostView		Y							Y				Y					Y				pages.cs.wisc.edu/~ghost	Postscript/PDF viewer/printer
GIMP		Y	Y						Y									Y				www.gimp.org	vector graphics processor
Gnome		Y		Y					Y													www.gnome.org	GUI desktop environment
Gnu Cash		Y							Y						Y							www.gnucash.org	Personal finance manager
Gnu Utilities		Y		Y		Y																directory.fsf.org/GNU	Unix shell commands
Gnumeric		Y							Y				Y									projects.gnome.org/gnumeric	Spreadsheet
gPXE		Y		Y		Y																etherboot.org	Network bootloader
Grass		Y						Y	Y	Y					Y							grass.fbk.eu	Geographic information system
Grisbi		Y							Y													www.grisbi.org	Personal finance manager
GROMACS		Y							Y						Y							www.gromacs.org	Molecular dynamics
Group-Office			Y		Y			Y	Y		Y	Y		Y		Y						www.group-office.com	Groupware
Haskell			Y		Y		Y															haskell.org	functional programming language
HomeBank			Y						Y													homebank.free.fr	Personal finance manager
Horde			Y		Y		Y	Y	Y	Y	Y	Y		Y								www.horde.org	Web/cloud PIM framework and apps
ImageJ			Y						Y									Y				rsb.info.nih.gov/ij	Microscope image processing s/w
InkScape			Y	Y					Y									Y				inkscape.org	SVG editor
Int'l Components for Unicode			Y		Y		Y															site.icu-project.org	Unicode programming library
Jabber			Y					Y	Y		Y											codex.xiaoka.com/wiki/jabberd2:start	instant messaging server
jBoss			Y						Y								Y					www.jboss.org	Middleware
jFin			Y		Y		Y								Y							jfin.org	Derivatives trade processing library
Jfire			Y					Y	Y	Y					Y							www.jfire.net	ERP, CRM, & Framework
Jgnash			Y				Y		Y													sourceforge.net/projects/jgnash	Personal finance manager
JquantLib			Y		Y		Y								Y							www.jquantlib.org	Quantitative finance library
Jmol			Y		Y		Y		Y		Y							Y				www.jmol.org	Molecular modeling
JOELib			Y						Y													sourceforge.net/projects/joelib	Cheminformatics
Joomla			Y		Y		Y	Y	Y	Y	Y	Y										opensourcematters.org/joomla.html	Content management system
K-meleon			Y						Y	Y	Y											kmeleon.sourceforge.net	Web browser
Kamaelia			Y		Y		Y															www.kamaelia.org	Concurrency library
KDE			Y		Y				Y													www.kde.org	GUI desktop environment
Kdenlive			Y	Y					Y										Y			www.kdenlive.org	Video editing software
Kino			Y	Y					Y										Y			www.kinodv.org	Video editing software
KmyMoney			Y						Y						Y							kmymoney2.sourceforge.net	Personal finance manager
Koffice			Y						Y				Y									www.koffice.org	Office suite
Koha		Y						Y	Y		Y	Y										koha-community.org	Integrated Library System
KompoZer			Y		Y						Y											kompozer.net	Web page editor
LAMMPS			Y						Y									Y				lammps.sandia.gov	Molecular dynamics
Lazy8 Ledger			Y						Y			?			Y							lazy8.nu/lazy8ledger	Bookkeeping software

Software	Type																				Web Resource	Description
Name	Vertical Market	Horizontal Market	Art&Entertainment	System	Operating System	Utility	Development	Server	Application	Client	Web	Cloud	Productivity	PIM	General Business	Dual License	Middleware	Graphics	Video	Music		
LedgerSMB		Y							Y			?			Y						www.ledgersmb.org	Small business accounting software
Lemon POS		Y						Y	Y	Y					Y						www.lemonpos.org	Point-of-sale software
Libre/Open Office		Y						Y					Y								www.libreoffice.org	Office suite
LilyPond		Y	Y						Y									Y		Y	lilypond.org	Music notation processor
Linux		Y		Y	Y																www.kernel.org	Operating system kernel
LIVES		Y	Y						Y										Y		lives.sourceforge.net	Video editing software
MDynaMix		Y							Y									Y			people.su.se/~lyuba/mdynamix	Molecular dynamics
MeshLab			Y							Y								Y			meshlab.sourceforge.net	Mesh processing (3-D graphics) s/w
Mifos		Y							Y	Y	Y	Y		1							mifos.org	Microfinance software
MindTouch			Y						Y	Y	Y	Y			Y	Y					www.mindtouch.com	Business intelligence software
Molekel			Y						Y									Y			molekel.cscs.ch	Molecular modeling
Mono			Y		Y		Y														www.mono-project.com	Byte-code interpreter and compilers
Monotone			Y		Y		Y	Y													www.monotone.ca	Distributed version control system
Mplayer			Y	Y					Y										Y		www.mplayerhq.hu	Digital audio player
MuseScore			Y	Y					Y									Y		Y	musescore.org	Music notation processor
MySQL			Y		Y		Y	Y								Y					mysql.com	Database management system
NAMD			Y						Y									Y			ks.uiuc.edu/Research/namd	Molecular dynamics
NetBSD			Y		Y	Y															www.netbsd.org	Operating system
NewGenLib		Y						Y	Y		Y	Y			Y						www.verussolutions.biz	Integrated Library System
Nmap			Y		Y		Y														nmap.org	Network security scanner
nopCommerce			Y						Y		Y				Y						www.nopcommerce.com	E-commerce software
NSIS			Y		Y		Y														nsis.sourceforge.net	Windows software installer generator
NVU			Y		Y			Y			Y										net2.com/nvu	Web design software
Octopus Microfinance Suite		Y																			www.octopusnetwork.org	Microfinance software
OFBiz			Y						Y	Y	Y	Y			Y						ofbiz.apache.org	ERP software
OpenBabel			Y		Y		Y														openbabel.sourceforge.net	Cheminformatics
OpenBiblio		Y							Y	Y	Y	Y									obiblio.sourceforge.net	Integrated Library System
Openbravo ERP			Y						Y	Y	Y	Y			Y	Y					forge.openbravo.com	ERP software
Openbravo POS			Y						Y	Y	Y	Y			Y						forge.openbravo.com	Point-of-sale software
OpenBSD			Y		Y	Y															www.openbsd.org	Operating system
OpenERP			Y						Y	Y	Y	Y			Y	1					www.openerp.com	ERP software
OpenGamma		Y							Y							Y					www.opengamma.com	Financial analytics calc and delivery
OpenProj			Y						Y						Y						openproj.org/openproj	Project management software
opentaps			Y							Y	Y	Y	Y		Y						www.opentaps.org	ERP & CRM software
Orange HRM			Y						Y	Y	Y	Y			Y	1					www.orangehrm.com	HRM software
OSCAR			Y		Y		Y														svn.oscar.openclustergroup.org	Sets up a Beowulf computer cluster
osCommerce			Y						Y	Y		Y			Y						www.oscommerce.com	Retail e-commerce software
PeaZip			Y		Y		Y														www.peazip.org	File and archive manager utility
Perl			Y		Y			Y													www.perl.org	Programming language interpreter
phpGroupWare			Y						Y	Y	Y	Y	Y	Y	Y						savannah.gnu.org/projects/phpgroupware	Groupware
Phreedom			Y						Y		Y	Y			Y						www.phreesoft.com	ERP software
Pidgin			Y							Y											www.pidgin.im	Instant messaging client
PMB		Y							Y	Y	Y	Y									www.pmbservices.fr	Integrated Library System
PrestaShop			Y						Y	Y	Y				Y						www.prestashop.com	Retail e-commerce software
PyMol			Y															Y			pymol.org	Molecular modeling
Python			Y		Y		Y														www.python.org	Programming language compiler
QCAD			Y						Y							Y		Y			www.qcad.org	CADD
QuickFIX/J			Y		Y		Y														www.quickfixj.org	Financial Info eXchange protocol lib
QuteMol			Y						Y									Y			qutemol.sourceforge.net	Molecular modeling

Software Name	Type: Vertical Market	Horizontal Market	Arts&Entertainment	System	Operating System	Utility	Development	Server	Application	Client	Web	Cloud	Productivity	PIM	General Business	Dual License	Middleware	Graphics	Video	Music	Web Resource	Description
RasMol		Y							Y							Y		Y			www.rasmol.org	Molecular modeling
Rosegarden		Y	Y						Y									Y		Y	www.rosegardenmusic.com	Music processor
Ruby		Y		Y			Y														www.ruby-lang.org	Object-oriented scripting language
Scribus		Y							Y									Y			www.scribus.net	Desktop publishing software
ShoutCast		Y	Y					Y	Y											Y	www.shoutcast.com/broadcast-tools	Internet "radio" station software
Simple Invoices		Y						Y	Y	Y	Y	Y			Y						www.simpleinvoices.org	Invoicing software
SimPy		Y		Y		Y	Y														simpy.sourceforge.net	Discrete event simulation package
Siwapp		Y						Y	Y		Y	Y									www.siwapp.org	Invoicing software
Sonar		Y		Y			Y	Y		Y	Y										www.sonarsource.org	Code quality management software
SplendidCRM		Y						Y	Y	Y	Y	Y			Y	Y					www.splendidcrm.com	CRM software
SQL-Ledger		Y						Y	Y		Y	Y			Y	Y					www.sql-ledger.com	Ledger and ERP software
Subversion		Y		Y		Y	Y	Y			Y	Y									subversion.apache.org	Distributed version control system
SugarCRM		Y						Y	Y		Y	Y			Y	Y					www.sugarcrm.com	CRM software
The GIMP		Y	Y						Y									Y			www.gimp.org	Raster graphics editor
Thunderbird		Y							Y	Y			Y	Y							www.mozillamessaging.com/en-US/thunderbird	Personal information manager
TimeTrex		Y						Y	Y		Y	Y			Y	Y					www.timetrex.com	Worker time and attendance tracker
Tinker		Y							Y									Y			dasher.wustl.edu/tinker	Molecular dynamics
Tk/Tkl		Y		Y			Y														tcl.sourceforge.net	Programming language interpreter
Tool and Die ERP	Y							Y	Y												toolanddie.sourceforge.net	ERP for tool-and-die companies
Tryton		Y						Y	Y	Y					Y						www.tryton.org	ERP software
TurboCash		Y							Y						Y	Y					turbocash.net	SMB finances software
TuxType		Y							Y												tux4kids.alioth.debian.org/tuxtype/	Typing tutor
UGENE		Y							Y			Y						Y			ugene.unipro.ru	Bioinformatics
Umbrello		Y		Y			Y											Y			www.umbrello.org	CASE software
Untangle		Y		Y		Y		Y								Y					www.untangle.com	Network mgmt. server
VoltDB		Y		Y			Y	Y								Y					voltdb.com	Database management system
vTiger		Y							Y	Y		Y	Y		Y						www.vtiger.com	CRM software
webERP		Y							Y	Y		Y	Y		Y						www.weberp.org	ERP software
WinAmp		Y							Y							Y			Y		www.winamp.com	Digital audio player
Wine		Y		Y				Y	Y								Y				www.winehq.og	Windows compatibilty layer
World Wind		Y						Y	Y									Y			www.freeearthfoundation.com	Virtual globe server (GIS)
xTuple PostBooks		Y						Y	Y	Y					Y	Y					www.xtuple.com	ERP software
Xwiki		Y						Y	Y		Y										www.xwiki.org	Wiki development platform & apps
Zen Cart		Y						Y	Y		Y	Y			Y						www.zen-cart.com	E-commerce shopping-cart software
Zentyal		Y		Y	Y			Y			Y	Y									www.zentyal.org	SMB multipurpose server
Zimbra		Y						Y	Y	Y	Y	Y	Y	Y	Y	Y					www.zimbra.com	SMB multipurpose server
Zinf		Y	Y						Y											Y	www.zinf.org	Digital audio player
App count	184	1. Not dual licensed, but commercial hosting is available from the vendor.																			100%	
	Count	10	174	18	60	6	21	37	71	130	21	61	49	6	7	49	30	2	39	6	10	
	Fraction	.05	.95	.10	.33	.03	.11	.20	.39	.71	.11	.33	.27	.03	.04	.27	.16	.01	.21	.03	.05	