Towards a software licensing guide for Open Source Business Models: Rafael de Albuquerque Ribeiro (Federal University of Pernambuco, Brazil)

Rafael de Albuquerque Ribeiro[2], Fábio Queda Bueno da Silva[1], Alan Kelon de Oliveira Moraes[1,2], Jones Oliveira de Albuquerque[3] and Silvio Lemos Meira[1,2]

[1]Federal University of Pernambuco, [2]C.E.S.A.R - Recife Center for Advanced Studies and Systems, and [3]Federal Rural University of Pernambuco (UFRPE), Brazil

```
{rafael.ribeiro, alan.kelon, silvio}@cesar.org.br, fabio@cin.ufpe.br,
                           joa@ufrpe.br
```

Abstract. Companies that use Open Source Software in their business models are already showing up at the top hundred biggest computing companies in the world, confirming in this way that Open Source Software is compatible with profitable business. Among the concerns still outstanding for startups is figure out how to license its product since the source code, considered as the raw material for traditional software companies, is now almost freely available. The goal of this study is to propose a software licensing guide for the development of new business based on Open Source Software.

Introduction

After successful examples of international software companies based on Open Source Software, the theme started to draw an even bigger attention (OSBC, 2006; Goth, 2005). What really motivated someone to startup a new business based on Open Source Software as its basis and which would be the advantages of such choice had become an interesting topic in the software market (Rossi, 2005). Companies such as Red Hat, MySQL, Trolltech and JBoss had already presented excellent market results (MySQL, 2004; Marson, 2005).

It is still worth pointing that there exist some difficulties for using Open Source Software in a commercial manner. Among those difficulties, two of them deserve a special attention. The first - and probably the most important - is the understanding of the market niches where Open Source Software is a viable solution (Karels, 2003; Softex, 2005). The second difficulty - mostly related to the entrepreneurs used to the traditional software marketing model where the main revenue source is only the licensing of the software and its source code, in this model, is considered secret - is to understand how to be profitable giving away what was considered to be the raw material of the company (Goldman, R. and Gabriel, R. 2004).

Along these dilemmas, it is already known that licenses play an important role on the success of the Open Source project (Krill, 2006). This work is an initial atempt to address this issue, aiming to propose a licensing guide for startups based on products or services that are Open Source.

The article is structured as follows. In the second section, every variable used for the development of the business model guide is defined. In the third section, a case study is presented to support the guide that is present on the fourth section. Apart from presenting the proposed guide, the fourth section explains the details of each possible path that exists on the model. The last section draws out future works and trends in open source business models field.

Licensing guide variables

In this section we define the variables that were used to build the proposed guide on the last section: location (Lins, 2005), business strategy and licensing model.

Location in the Products x Processes matrix

The first variable analysed on this study is the location of product or service in the Products

x Processes matrix (see Figure 1). This matrix was first developed in a study by Hayes and Wheelwright (Hayes, 1984) and further tailored for software market-(Lins, 2005).
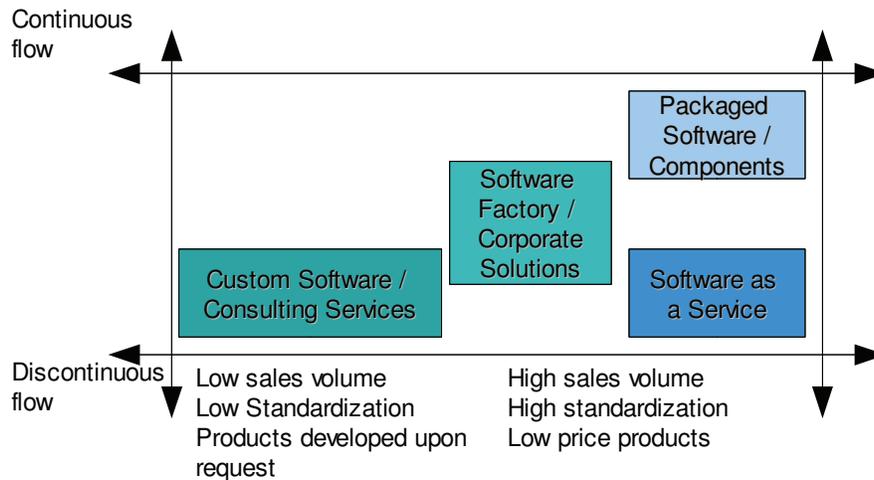

Figure 1. Products x Processes matrix

In the Figure 1, the horizontal axis of the matrix represents the sales volume of the product (or the transaction volume in the case of services), the left boundary of the matrix represents products with low sales volume and low standardization, on the right boundary are represented products with high sales volume and high standardization. The production process is represented on the vertical axis of the matrix. The upper boundary represents the products that have a continuous development flow and on the lower boundary the products with a discontinuous development flow.

In Lins' research, there were only three categories identified, the only change made to the matrix found on Lins' research was the inclusion of a new *Software as a Service* category that represents software that are not sold but charged per usage without providing any binary or source code at all, it is actually renting the software without providing any form of ownership.On the next paragraphs, each category is analysed.

Packaged Software and Components

Packaged products are usually commodity software, they can be components on a bigger product or software that are embedded on devices. SGBDs, operating systems, application servers and routers are all part of this category.

Software Factory and Corporate Solutions

Products that are identified as Corporate Products usually have characteristics of Packaged Software but they have a potential for personalization.

Custom Software and Consulting

Custom Software has the characteristic of having low sales volume and low production volume, they are usually made upon request and are highly customized for each customer. In certain cases they are even sold along with the source code.

Software as a Service

Software as a Service is a direct consequence of the focus shift on the value chain on computing market as pointed by O'Reilly (2005) "software itself is no longer the primary locus of value in the computer industry. The commoditization of software drives value to services enabled by that software"(O'Reilly, 2005 pp. 468). He also adds that "New business models are required" (O'Reilly, 2005 pp. 468). Those new business models are built around the easy medium that Internet

provided for offering such services.

Business Strategy

The second variable analysed on this study is the strategy used, a research from ITManagers (Koenig, 2004) has classified the main strategies used with Open Source Software, those strategies are related to the means of revenues and the incentives that the companines provide to the software development. The following strategies were identified:

Patronage

Strategy in which a company gives incentives for the development of a Open Source Software project. The main reasons for a company to use this strategy are usually the attempt of imposing a *de facto* standard or the effort of commoditizing a software layer in order to spur competition and have revenue based on an upper layer above the one that was commoditized.

Optimization

The optimization strategy consists of using a commoditized software where the company can not have profits anymore and make the product have an optimal performance on top of that commoditized software. On closed architectures this strategy is impossible since changes on the underlying layer are not possible. The optimization strategy is based on the "law of conservation of modularity" from Clayton Christensen (Christensen, 2004) that says that either the integrated system or the subsystem needs to be modular in order to maximize the performance of the other system.

Dual Licensing

The dual licensing allows the possibility of the software to be used in an Open Source Software project without any costs but it imposes fees for the usage on closed source projects.

Embedded

Due to the fact that GNU/Linux is a very flexible, extensible and portable system, it can be found on more than a half of the embedded systems found in the market. This strategy consists on using the GNU/Linux as a basis for developing embedded devices. The exchange between the company and the software community will be heavily dependent on the licensing used on the embedded software.

Subscription

In this strategy the user is charged for a value added service and the software itself is freely distributed in order to increase the installed user base.

Hosted

Service providing companines that have their services based on Open Source Software are examples of companines that use the hosted strategy. The hosted strategy is characterized by companines that offer hosted services based on Open Source Software and charge for their usage or for something related to the usage.

Licensing models

The last variable of the model is the licensing model. Software licenses are the legal contract that dictates the rules for the user about the software usage and, if possible, the modification and redistribution of the software. Although the great majority of the users never knows what is expressed on them, this is a very sensitive subject for any company that is willing to make any commercial usage of the software, and knowing the terms expressed on it is pre-requisite for taking benefit of the software. Open Source licensing is often considered by some as radical, nevertheless they are built on solid legal foundations of law and copyright laws (Laurent, 2004).

Among the main licenses, five of them deserve a greater analysis. The GPL and LGPL from the Free Software Foundation (http://www.fsf.org), the BSD based licenses, MPL based licenses and the Apache License 2.0.

GPL

The General Public License (GPL) (GNU, 2006), used on the majority of the GNU/Linux is also the most known license from Free Software Foundation, its main principle is that any modification made to a software governed by GPL that is distributed must be made available to the ones that receive that software. This imposition denies companines from hiding improvements done on top of GPL software.

LGPL

The imposition of releasing source code for any distributed software under GNU OS would be such a high barrier for commercial softwares to be written for it. For solving that issue, the Free Software Foundation developed another license, the Lesser General Public License (LGPL) (GNU, 2005).

The main difference between the LGPL and the GPL is that the LGPL protects only the original code, making it impossible for closing its source code, but any code that only links to the original code can be licensed under any license.

BSD based

The Berkeley Software Distribution (BSD) license (OSI, 2006) is the most permissive Open Source Software license analysed on this study. It allows even that the software becomes part of another software without imposing any restriction at all. For such reason, it is very common to find commercial projects that are based on a BSD licensed software. The only restriction and that was found only on the original BSD license was that the derivative work should contain an advertisement on the documentation metioning the original authors of the BSD licensed software.

MPL based

The Mozilla Public License (MPL) (Mozilla Project, 2006a), used on the Mozilla web browser, can be considered as the half way in between the GPL license and BSD license, it allows derivatives works that uses software licensed as MPL. The only imposition is that modifications made to the original code needs to be published, any other code that is not part of the original product does not need to be published (Mozilla Project, 2006b).

Apache License 2.0

The main difference between the Apache 1.0 license and the 2.0 was the inclusion of clauses to cover patent aspects (OSSWatch, 2006). The rules that govern the Apache are basically the same of the BSD based licenses, it even allows code to be included in a closed source product.

The table 1 compares the licenses above.

Table 1. Comparison between the analysed licenses.

License	Demands redistribution of source code		
	Original	Derivative	That makes usage
GPL	Yes	Yes	Yes
LGPL	Yes	Yes	No
BSD	No	No	No
MPL	Yes	No	No
Apache v2.0	No	No	No

Case study

In order to validate the proposed guide, some of the most known softwares companines that uses or develops Open Source Software were analysed. The companies were: former JBoss (now part of Red Hat), Covalent, Wind River, MySQL AB, Cyclades and Google. Each of them will be analysed on the following pages.

JBoss

JBoss (http://www.jboss.com) is most known for its Java products. The product line of JBoss range from persistence tools for Java to a full fledged J2EE Container, the JBoss Application Server. The source of revenue for JBoss is the consulting provided for its products, the suport services and the professional certification services offered. The majority of JBoss products are licensed under LGPL license.

In relation to the model, JBoss is located on Consulting Services since it both provider services in the form of consulting and support. The strategy identified is a mix of Subscription and Consulting.

Covalent

Covalent (http://www.covalent.com) offers both services and products. The services are support and consulting for the whole line of products from the Apache Foundation (http://www.apache.org). One of the products Covalent offers is Enterprise Ready Server (ERS), a bundle with a customized Apache HTTP server and Jakarta Tomcat server preconfigured with support for ASP, Perl, PHP, JSP and other features without requiring almost any configuration.

Covalent is placed on two locations in the matrix, Consulting Services and Packaged Software. The strategies identified from the ITManagers research were Optimization and Subscription. The license used in the ERS is a closed license and the product is based on Apache products licensed under Apache License.

Wind River

Wind River (http://www.windriver.com) focus is on developing software for devices. In 2003, it announced their line of Linux solutions in response to demmand from customers. The move to Linux based products has not discontinued the development of it proprietary software, the VxWorks. According to the Wind River CEO, Ken Klein, some companies have still some concerns about using GPL in its products.

The products and services Wind River provides are both located on the Consulting Services/Custom Software in the matrix. The strategies identified were consulting, optimization and embedded. And the license when developing for the Linux kernel is GPL as it is imposed by the rest of the Linux kernel.

MySQL AB

The swedish MySQL AB (http://www.mysql.com), owner of MySQL one of the best known Open Source SGBDs, has three revenue sources: licensing of the MySQL server, support and consulting services, and licensing of the usage of the MySQL trademark.

The MySQL server uses a dual licensing scheme that results in virtually two distinct products that share the same source code. The free version is available only for non-commercial softwares developed under GPL license. The reason for having that license scheme is to increase the installed user base and serve as and advertising of the product.

MySQL AB is located on the Consulting Services and Packaged Software inside the matrix. Two strategies could be identified, Consulting and Dual. MySQL server licensing is based on two licenses, a traditional one and GPL.

Google

Google (http://www.google.com), owner of the most used search engine on the Internet

(Sullivan, 2006) that carries the same name as the company, runs its services on a tailored and enhanced version of the Red Hat Linux server. Google developed its own file system on top of the Linux kernel called Google FS (Google, 2003) and since there is no product distribution, it does not need to release the source code for its enhancements.

Google business are located in the Software as a Service location in the matrix, the strategy identified was Hosted and the licensing of the software used in Google search engine implementation is partly based on GPL licensed software, the Linux Kernel.

Cyclades

Cyclades (http://www.cyclades.com) specializes on the development of network devices as routers, keyboard-video-monitor (KVMs) for remote management and other devices. Cyclades products are based on Linux in order to reduce the production costs and make the product development easier. It is worth mentioning that the software used on Cyclades products are all tailored in order to run on limited hardwares. Since part of the software used on Cyclades products are based on GPL licensed products, Cyclades customers can download the source code for such products on Cyclades web site after filling in a form and verifying that they own a Cyclades product.

The location on the matrix identified for Cyclades was Components, the strategy is embedded and the licensing is a mix of traditional and GPL but for this study we are going to take only GPL into consideration.

The table 2 summarizes the case study.

Table 2. Case study summary.

Company	Location	Strategy	Licensing
JBoss	Consulting Services	Consulting Subscription	LGPL
Covalent	Consulting Services Packaged Software	Optimization Subscription	Traditional (Based on Apache licensed software)
Wind River	Consulting Services Custom Software	Consulting Optimization Embedded	GPL**
MySQL AB	Consulting Services Packaged Software	Consulting Dual	GPL, Traditional
Google	Software as a Service	Hosted	GPL
Cyclades	Components	Embedded	GPL, Others***

*Only for ERS
**Software developed for Linux kernel
***Traditional licensing and other OSS licenses

Guide

Based on the case study presented on the previous section and on the characteristics of each license analysed, a licensing guide was developed to help the establishment of new business based on Open Source Software.

Products

For business models with revenue based on products, the following alignments on the Products x Processes matrix were identified: Packaged Software, Components, Software Factory, Corporate Solutions and Custom Software.

For the alignments above, the following strategies were identified:

Packaged Software and Components

Since there is a high standardization and sales volume on both Packaged Software and Components, it is common to find the following strategies associated to those alignments: Dual, Embedded and Optimization.

In the dual strategy, the Open Source licensing plays an importante role since it is used both for increasing the installed user base and for stimulating the enhancement of the product through the community. The main source of revenue will be the licensing of the software for commercial usage.

For using the embedded strategy, the pre-requisite should be a product that is a device and use some Open Source software on it. It is worth mentioning that if the product is based on a GPL licensed software, the code needs to be available at least to the customers of the product.

The Optimization strategy is based on offering some competitive advantage for your product to be run on top of an Open Source stack, the benefit for the customer is having a better product while for the community is having more compatible applications.

Software Factory and Corporate Solutions

A possible strategy for this alignment is Patronage, because the products offered on those alignments are always highly customizable products that usually share its core with another products. According to West (2003), IBM found out that working with a large user driven environment such as Apache project is more flexible than using someone else solution. This impression was a result from the experience it had with the Apache project group when it founded the porting of the Apache Server to Windows NT in order to accomplish its Websphere Server market strategy (Moltzen, 1998). IBM experience with the Apache foundation is a sample of the Patronage strategy.

Custom Software

In the Custom Software alignment, where there is a low production and sales volume but associated to high cost products, it is common to find the Optimization strategy, where the company builds a product on top of a commoditized Open Source layer.

Services

For service based business models, the Consulting and Software as a Service alignments were identified. The next step is to analyse the strategies compatible with each alignment.

Consulting Services

The Consulting Services alignment has the characteristics of having low sales volume associated to a high value per service. The strategies Consulting and Subscription are commonly associated to this alignment.

In the consulting strategy, the company usually offers a transition path from a proprietary solution to an Open Source solution, companines that offer those services usually sponsors or have agreements with projects or Open Source companies.

The other strategy used for this alignment is Subscription, where the company produces a software and releases it without any charges, but instead charges for services such as updates or consultancy for improving the usage of the product.

Software as a Service

Associated to the Software as a Service alignment it is possible to identify the Hosted strategy, since there is a high volume of transactions associated to a low charge per transaction. Another characteristic of this alignment is not having software distribution but instead offering the

product and charging for its usage.

Licensing Guide

The last step in the development of the guide is to stablish a relation between the strategies and the licensing options.

Dual

The option of GPL on Dual licensing is to stimulate non commercial software to use GPL licensing as well.

Embedded

The GPL license is only mandatory in the case of developing against the Linux Kernel or other GPL licensed software, in case it is a user space software running on Linux or any other case, there is no imposition of using GPL license, any less restrictive license can be freely used.

Optimization

The same rule applied for Embedded can be applied to the Optimization strategy, GPL is only mandatory when linking directly to GPL licensed code.

Patronage

The license that fits for Patronage strategy is MPL since it protects only the original code and allows the development of proprietary extensions. Apart from MPL, there is the possibility of using a more restrictive license as LGPL or even GPL, the only diference is that there will be the necessity of an extra contract between the company and the developers that states that the company has the rights of usage of the code under a different license or product. An example is the scheme used on OpenOffice by Sun Microsystems, where there is a Joint Copyright Agreement associated to the LGPL licensing (Vaughan-Nichols, 2005).

Consulting

There is no license associated with Consulting strategy since there is no direct association between the service and the code.

Subscription

The Subscription strategy is usually used in conjunction with licenses from the Free Software Foundation such as the GPL and LGPL. The reason for using such restrictive licenses is avoid closed forks that diminish the project energy.

Hosted

There is no imposition on the license for usage in the hosted strategy, but the usage of GPL code to build the software deserves special attention on this strategy because there will be no imposition for sharing the modifications due to the fact that there will be no code distribution.

Licensing Guide Summary

The first step in order to find out the business model is deciding the main source of revenue. The next step is to identify the location of the product or service on the Products x Processes matrix, after that, it is time for picking one of the possible strategies, the last step is to pick the licensing model when there is more than one possibility.

Figure 2. Guide for using Open Source Software.
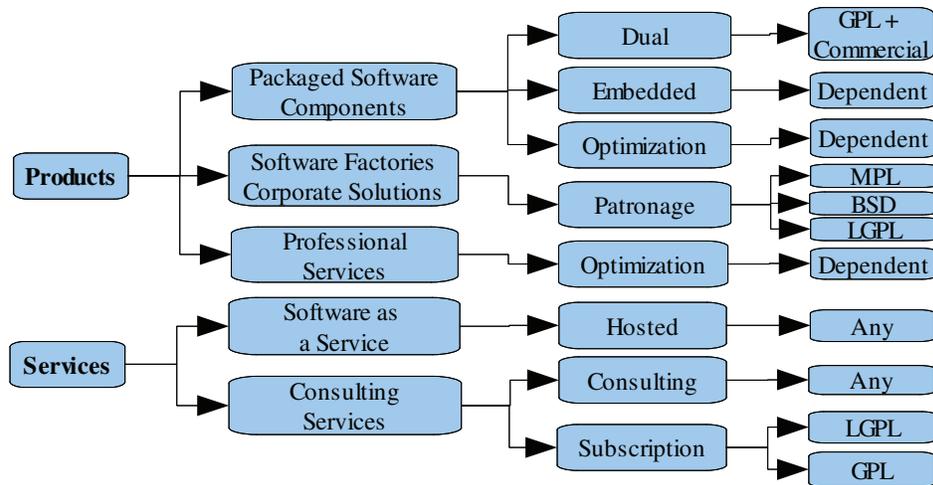
Conclusion

This article makes a contribution to the development of a guide for startups enabling a overview on the aspects involved in establishing a licensing schema and business strategy. Further investigation as well as an increase of the scope of the Case Study is needed in order to improve the accuracy of the preliminary license guide. Another key aspect for improving this research is to do a deeper analysis on the Business Model subject, since it plays an important role in the overall scope of this research.

References

Christensen, C (2004) Clayton Christensen on Disruptive Technologies and Open Source. Paper presented at Open Source Business Conference 2004, San Francisco, CA. Retrieved September 15, 2006 from http://www.windley.com/archives/2004/03/16.shtml

GNU (2005) GNU Project – GNU Lesser General Public License. Retrieved September 15, 2006 from http://www.gnu.org/copyleft/lgpl.html

GNU (2006) GNU Project – GNU General Public License. Retrieved September 15, 2006 from http://www.gnu.org/copyleft/gpl.html

Goldman, R. and Gabriel, R. 2004 Innovation Happens Elsewhere: How and Why a Company Should Participate in Open Source. Morgan Kaufmann Publishers Inc.

Goth, G. 2005. Open Source Meets Venture Capital. IEEE Distributed Systems Online pp 2, 6(6).

Hayes, M. & Wheelwright, S. C, 1984. Restouting our competitive edge: competing through manufacturing. New York: Wiley.

J. West. How open is open enough? melding proprietary and open source platform strategies. Research Policy, 32, 7 (July 2003), 1259--1285.

Karels, M. J. 2003. Commercializing Open Source Software. Queue 1, 5 (Jul. 2003), 46-55.

Koenig, J, 2004. Seven open source business strategies for competitive advantage, ITManagers. Retrieved October 16, 2005 from http://management.itmanagersjournal.com/management/04/05/10/2052216.shtml?tid=85

Laurent, A. M. 2004 Understanding Open Source and Free Software Licensing. O'Reilly Media, Inc.

Lins, T. S. A, 2005. relação entre a implantação da qualidade de software e o ciclo de crescimento empresarial: proposição de um modelo baseado em um estudo de casos reais (pp 11). Centro de Informática – Universidade Federal de Pernambuco, Graduation thesis.

Marson I, 2005. JBoss hints at financial success, ZDNET UK. Retrieved October 9, 2005, from http://news.zdnet.co.uk/software/applications/0,39020384,39189951,00.htm

Mozilla Project (2006a) Mozilla Public License. Retrieved September 15, 2006 from http://www.mozilla.org/MPL/MPL-1.1.html

Mozilla Project (2006b) Mozilla Public License FAQ. Retrieved September 15, 2006 from http://www.mozilla.org/MPL/mpl-faq.html

MySQL, 2004. Leading Open Source Software Companies MySQL AB, Sleepycat Software and Trolltech AS Prove Strength of Dual-License Model. Retrieved October 9, 2005, from http://www.mysql.com/news-and-events/press-release/release_2004_10.html

O'Reilly, T. (2005) The Open Source Paradigm Shift. In Perspectives on Free and Open Source Software, eds. Feller et al., MIT Press

Rossi, C. and Bonaccorsi, A. 2005. Why profit-oriented companies enter the OS field?: intrinsic vs. extrinsic incentives. In Proceedings of the Fifth Workshop on Open Source Software Engineering (St. Louis, Missouri, May 17 - 17, 2005). 5-WOSSE. ACM Press, New York, NY, 1-5.

OSBC (2006) Open Source Business Conference. http://www.osbc.com

OSI (2006) Open Source Initiative – The BSD License. http://www.opensource.org/licenses/bsd-license.php

OSSWatch (2006) Apache License (v2) – An Overview. Retrieved September 15, 2006 from http://www.oss-watch.ac.uk/resources/apache2.xml

Vaughan-Nichols, S, 2005. Sun Changes OpenOffice.org Licensing, eWeek. Retrieved January 15, 2006 from http://www.eweek.com/article2/0,1759,1855892,00.asp