

Sustainable Development in the IT Sector with Open Source Software

Basic Concepts and Business Opportunities

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1 Sustainable Development in the IT Sector with Open Source Software

Basic Concepts and Business Opportunities

During the last few years Open Source or Free Software has gained considerable attention with the success of the GNU/Linux operating system and special infrastructure software like the web server system Apache or some widely used email server systems. Thus Open Source Software provides a cheap, efficient and reliable basis for a large part of the systems building the internet.

But there is also an increasing number of application software products like email clients, word processing software and other office applications, and even accounting packages available under an Open Source license. Thus for most companies, institutions and private users Open Source software provides access to the full range of up-to-date software technology without having to pay license fees.

This is of considerable importance for developing countries; the main reason is – at least at first sight – that because of tight budgets companies, institutions and private persons there often cannot afford expensive commercial software products. We will see that is not the only factor in favor of Open Source Software but that there are even more important advantages like flexibility, customizability and independence, and that there are also specific advantages for companies in the IT sector that give rise to new business models or make common business models especially feasible for IT companies in developing countries.

That there are no license fees to pay for Open Source Software does not mean that it comes for free – leveraging the potentials of Open Source Software is bound to a number of prerequisites.

One important aspect that might limit the use of Open Source Software are the special skills often necessary to install or run Open Source Software products or to take part in the customization or even development of such products. This is the reason why the education of IT professionals especially directed at Open Source products and the Open Source development processes becomes increasingly important.

Another important prerequisite for leveraging Open Source Software is an efficient access to the world-wide communication networks – the internet and world-wide web; not only does the development of Open Source Software occur in communities spread all over the world but these communities also provide documentation and support for their products.

2 What is Open Source Software?

The concept of Open Source or Free Software means a substantial change in the way software is developed and is distributed. According to the commercial development and licensing model a person or company developing software will

- get money for their development work from selling licenses to the customers that allow these to use the software,
- avoid to make the source code of the software available to others in order to protect their know-how and intellectual property.

On the other hand, the basic element of Open Source development is

- to give away the software for free so that everybody can use it without having to pay any license fees,
- to even disclose the source code of the software and explicitly allow others to extend the programs and even build their own software on top of them.

So the question arises how the development of Open Source Software is funded – if not by selling license fees – and why giving others access to the source code is not only the basis for an improvement of software quality but also is – in most cases – definitely advantageous for the developers and users of the software.

This will also shed some light on why Open Source Software may provide the basis for a sustainable business for software developers as well as companies and persons providing IT services.

3 Who pays for Open Source Software?

The following list gives an overview on the various possibilities the development of Open Source Software may be funded. It is probably not complete; it should also be noted that a typical Open Source project is funded by a mixture of these ways and even the activity of single developers may be a combination of different ways of funding.

- (1) **Nobody** – students or other persons develop software in their spare time – just for fun (as Linus Torvalds started to develop the Linux operating system [2]) or because somebody needs a piece of software for his/her personal work.
- (2) **Public funding** – ranging from a direct funding for projects of public interest to work done in public institutions like universities.
- (3) **Software needed for other products** – hardware manufactures and sellers provide Open Source Software to work with their products, or companies building their main business on commercial software licensing models provide infrastructure components or tools as Open Source Software.
- (4) **Development supports service business** – IT service providers use Open Source Software, e.g. the Linux operating system or Apache web server, as the basis for their services and contribute to the development of the software product in order to make it fit their needs.
- (5) **Customer pays for solution** – in the simplest case extending existing solutions by customer-specific features, but may also imply the development of basic software components that will be needed for a customer project.
- (6) **Special Open Source model** – e.g. Linux distributions as bundled product packages that are sold on CD-ROM together with documentation.

While (1) and (2) would not be the basis of a business model they nevertheless play an important role for making Open Source solutions possible. Public funding – also possible e.g. by cooperating with a public institution like a university – may also help IT companies build up an Open Source-based business.

The business opportunities we will talk about in the following are mainly based on the points (4) and (5) that constitute probably the most important revenue sources for small and medium-sized companies not only in developing countries. This does not necessarily mean that an IT service provider using Open Source Software has to take part in the development of the software; but, as we will see, profound knowledge about the software components used are an important prerequisite for Open Source-based service offers and it may often necessary also for service providers to adapt the software used or develop even own components.

4 Benefits and Opportunities

Basically we have to look at the benefits of Open Source Software from two different points of view: that of the user of the software (that may be a company or institution but also a single private user) and that of a company providing services to software users.

In practice the roles in the Open Source business may look much more complicated – a detailed discussion on the various roles of stakeholders in the Open Source Software business can be found in [4] and [5].

But there are some common advantages – and also critical aspects – of Open Source Software that hold for all parties involved:

- **Low cost** – not only because there are no license fees to pay but in many cases also the Total Cost of Ownership (TCO) is lower for Open Source–based solution because of easier systems management and lower cost for customization and development of extensions. So some of the advantages listed below (quality, security, customizability, flexibility) may also be expressed in terms of cost savings.
- **Quality and security** – for typical Open Source projects there is a very large number of developers and users that stay in communication with each other so that e.g. software bugs and security flaws are usually detected early and solved quickly.
- **Choice** – there is considerable freedom and independence, not only in choosing solutions but also in selecting business partners like supporters and service providers, so there is usually no tight binding to a certain company that develops or provides the software.
- **Customizability and flexibility** – as the source code is available it is possible for everybody with corresponding skills and knowledge to implement additional or extended features or adapt features according to the customer's needs. This also means that the development of custom–specific solutions may start at a really high level of existing software thus leading to low cost for the customer even for complex and feature–rich highly customized applications.
- **Investment protection** – the independence of a certain solution provider that may go bankrupt or change its business strategy as well as the possibility to adapt the software to changing needs make it possible to use the software for a longer time in the future even in a rapidly changing world.

These advantages are not always present when just using Open Source Software; as we will see later in the section *What to care about* there are certain preconditions and prerequisites that have to be met in order to get real benefit from building a business on Open Source Software.

There are a few advantages of Open Source Software that are specific to **software developers** independently of how the development is funded:

- There are high–level **development systems and environments** available as Open Source Software thus lowering the entry barrier for developing new software.
- Open Source Software allows **learning from the source code** giving new developers a steep learning curve and making them productive within a relatively short time.
- As common Open Source Software projects are usually developed by large communities with not seldom hundreds of members these provide a perfect means of **learning from the community**, e.g. by asking questions in mailing lists and discussing development issues.
- And, as stated already above, the ease of providing customized or customer–specific solutions with Open Source Software may provide **better value for customers** at lower cost thus giving a competitive advantage.

5 What about Open Source Business Models?

When turning to **IT service providers** one can find out that there aren't really special Open Source Software business models; to the contrary – as Steven Weber [7] points out, Open Source Software is not a *business model* but just a *software development model*. So it's just a set of classical IT services that gain considerable advantage when based on Open Source Software, whereas the service and revenue models are just the same as for the classical IT business, e.g.:

- **Maintenance contracts** for support and service related to IT infrastructure (servers, web servers, desktop computers) as well as application software
- **Application Service Providing (ASP)** providing full service especially for web-based or intranet-based systems
- **Installation services** for infrastructure systems and application software
- **Integration services** putting together different kinds of systems and applications
- **Internet and Web-oriented services** like Web hosting, web design, web application development
- **Consulting**
- **Training**
- **Custom software development**

Put all the benefits discussed above together, especially

- low investment, lowering the entry barrier and giving a special opportunity for small enterprises,
- cost-effective offer for customers,
- customized solutions,

give IT service providers that base their work on Open Source Software a considerable advantage over competitors and provide a solid base for a sustainable business.

In addition, Open Source Software gives **developing countries and emerging economies** access to state-of-the-art software technology, even when ICT budgets are extremely limited. From this point of view Open Source Software helps to

- ensure local autonomy and independence, as software and support may be provided by local providers,
- avoid lock-in to service providers and software vendors from abroad,
- make available software solutions that are specifically adapted to the prerequisite of the country and its markets, e.g. by providing localized software versions.

6 What to take care about

As already mentioned above, Open Source Software does not deliver these benefits per se; it is extremely important that those who want to employ Open Source Software for their business are aware of the specialties of the Open Source development model and that certain prerequisites are met in order to make business based on Open Source Software really productive.

So special care has to be taken to ensure the quality of the **user interface and usability** of Open Source Software products, and often technical and especially end user **documentation** is not provided at the level known from commercial software products.

Other things to care about are:

- **Warranty, liability** – e.g. which level of warranty can a service provider offer his customer when using Open Source Software that is usually developed by somebody else?
- **Licenses** – do the license under which an Open Source module is published limit the use of own work in the future in an unwanted way? Or – on the other hand – is own development work protected sufficiently against unwanted misuse?
- **Public marketing issues** – often the customer has not ever heard about an Open Source solution and prefers the better known – though much more expensive and limited – commercial offer; so one should be prepared with good arguments and possibly a prominent reference list of projects using the Open Source solution.
- **Project/community activity / market share** – in most cases it does only make sense to use Open Source Software that is developed and maintained by a sufficiently large community and has considerable market share.

The most important prerequisites that must be met in order to enter the Open Source–based business effectively are:

- **Knowledge about Open Source projects** and the availability of Open Source solutions – where and how to search for projects and solutions and to judge and evaluate them.
- **Technical skills** and deep understanding of the Open Source systems to be used – here the technical education of employees and partners of a service provider play an important role. On the other hand, Open Source Software makes learning much easier because the source code is available.
- **Communication abilities** – people just need social competence, an open communication culture and fluent English to get into contact with the Open Source communities and thus get information and support.
- **Communication facilities**, that means just a fast (broad–band) – and possibly cheap – internet connection for access to Open Source repositories and community sites. This may still be the most critical factor that limits the use of Open Source Software in a lot of countries. So one of the key points of development aid would be to help those countries to establish a powerful and cheap internet communication infrastructure.

7 Conclusion

The use of Open Source Software offers a cost-effective way to get access to high-quality, flexible and powerful state-of-the-art infrastructure and application software. Furthermore Open Source Software offers interesting opportunities for IT companies in emerging economies and can be the basis for economic autonomy and independence in the ICT sector.

But Open Source Software is not just a special kind of technology – as Steven Weber puts it: "Open source software should be seen then as more than simply a different kind of product. It is a different kind of process for building, maintaining, and changing the rules that govern information flows." [7]

8 Resources

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8.1.1 OS Business Models

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