

Building the Free/Libre Open Source Health Care (FLOSS-HC) Community: A Strategy for Pushing Free/Libre Open Source in European Health Care

Thomas Karopka

IT Science Center Rügen gGmbH, Circus 14, 18581 Putbus, Germany

Abstract. Free/Libre Open Source Software (FLOSS) is both a process of software development and a method of licensing. Although FLOSS plays a significant role in several market areas, the impact in the health care arena is still limited. This is mainly due to the special requirements and the different circumstances when compared to other market areas. However, FLOSS is thought to be one of the most effective means to overcome the fragmentation in the health care sector and provide a basis for more efficient, timely and cost effective health care provision. In this position paper I will give a short overview of FLOSS applications in the health care sector, I will briefly discuss the special challenges and the identified barriers that need to be overcome to push FLOSS in health care. I will then describe a possible strategy that may help in improving the situation for FLOSS in European health care.

1 Introduction

FLOSS is thought to be one of the driving forces in overcoming the fragmentation in the health care market, which is one of the main efficiency barriers in the context of ICT in health care. Other fields have already adopted the FLOSS business model to some extent, e.g. Linux, MySQL, JBoss, Apache Tomcat or Mozilla Firefox/Thunderbird are some popular examples of successful FLOSS applications. However, although quite successful in horizontal applications, i.e. that are useful in many different industries, there is still limited success in vertical applications, i.e. applications that are specific to one single industry, such as the health care market. On the other hand several governments are pushing open source in the public sector and the European Commission's initiative eEurope 2005 which builds on the Action Plan (June 2000) sets the target "to promote the use of open source software in the public sector and e-Government best practice through exchange of experiences across the Union". The European Union has set up the Open Source Observatory and Repository for European public administrations (OSOR) (<http://www.osor.eu>) a site devoted to the re-using, sharing and collaborative development of E-Government applications for European public administrations. The site was official launched at the Open Source World Conference in Malaga on October 20th 2008. So what about the health care arena? In this paper I will give a non-comprehensive overview of FLOSS pro-

jects in the health care sector, I will identify barriers for the adoption of FLOSS strategies in health care and name challenges for the FLOSS community. The ideas and theses in this paper were stimulated by discussions with various participants at the EFMI special topic conference “Open Source in European Health Care” which took place in September 2008 in London. My special thanks go to all participants of this conference.

2 FLOSS Applications in Health Care

The “List of open source healthcare software” in Wikipedia [1] lists more than 120 different tools or projects in 19 categories. Some of the projects are apparently dead or are not maintained for a long time. Other new initiatives like the “Open health tools” project of the Eclipse foundation [2] or the newly founded Open eHealth Foundation [3] are still missing. The largest category is the imaging/visualization category with 39 applications followed by electronic health or medical records with 18 entries and medical practice management software with 12 entries.

If it comes to open source in healthcare often one of the most comprehensive and most successful applications of FLOSS-HC, the VistA application [4], is mentioned. This is an open source HIS application developed over several years by the federally funded U.S. Veterans Administration. This software is further enhanced and adapted for other healthcare systems under the WorldVista [5] project. As mentioned above, hundreds of other tools have been developed with different levels of complexity and maturity. To integrate this already huge amount of knowledge and person-years of software development will be one of the top issues in the proposed strategy for European open source healthcare software.

3 Challenges and Barriers for FLOSS-HC

The health care sector provides special challenges for FLOSS applications. While a large part of traditional FLOSS applications is either in the professional IT sector (server software, operating system software i.e. Linux) or in the traditional office sector (OpenOffice, Firefox, Thunderbird) where the end users are used to IT applications, the situation in health care is different. Hospital Information Systems are very complex systems often comprising hundreds of different small applications. Each sector within the hospital often has its own standards and tools. This has led to a fragmentation in the IT sector which hinders an effective information exchange between sectors or other health professionals that are part in the care process. The situation in the practice management sector is comparable. For example in Germany there are more than 100 different providers of practice management systems. This leads to a similar situation like in the HIS sector. Additionally the end users, the health professionals, are often not trained sufficiently in the use of IT applications. Often they feel uncomfortable with IT applications and perceive them as barriers instead of support for their work. These are challenges for IT in health care in general. For FLOSS applications there are several additional barriers. Some of them are:

- Lack of professional support
- No road map (Sustainability?)
- IT administrators need someone to sue in case of failure
- Functional gaps
- Publish early – publish often not the right strategy in health care
- Health care needs mission critical applications

At the top of the agenda is the lack of professional support. It is absolutely necessary for hospitals to get professional support if something is not working as expected. Often changes have to be made to adapt the system to local specialties of the hospital. Another point is the lack of a roadmap. Hospitals need to have sustainable solutions and the possibility to plan the future extension of the system. FLOSS projects are often driven by single persons or groups. If these persons loose interest in the project or move to other fields, the product may not be supported further. This is absolutely unacceptable in the health care market. Functional gaps need to be closed. If this can not be done by the hospital IT group, the vendor should be able to provide this support. In the case of FLOSS it can not be expected that the community fulfils the requests of the hospital because the developers usually work on features that they are interested in or on a pre-specified work package. The usual strategy in FLOSS projects is “publish early – publish often”. The community is part of the development process. The test phase is done by the clients in the field. This is also not acceptable in health care. Last but not least the security and reliability demands in health care are extremely high. It is often not clear to the management in health care whether they can trust the software in respect to these demands.

4 Success Factors for FLOSS

In this section I will look at the success factors for FLOSS applications. Probably the most successful FLOSS application is the operating system LINUX. One of the reasons for this success is the inventor of LINUX, Linus Torvald. He still coordinates and integrates the Linux kernel together with input from the community. Other successful FLOSS projects have different organizational structures. In the case of the Apache project and the Eclipse Project a Foundation provides the professional frame for managing and coordinating the development of the different applications and products. Also from the sister field of bioinformatics we have learnt that successful projects need either a professional structure or it depends on the leading role and the support of an individual or a group, e.g. Ensembl [6] or BioPAX [7].

5 A Strategy for FLOSS in European Health Care

In the US FLOSS applications have already gained some success in the health care market. This is mainly due to the professionalization of the sector. Companies like ClearHealth Inc. [8], MedSphere [9], Akaza Research [10], WebReach Inc. [11] or Tolven [12] have adopted the FLOSS business model. One advantage of the US market is the size and the number of potential customers. It is far easier to reach the criti-

cal number of customers. In Europe this is more difficult due to the smaller countries, the different health care systems and the language barrier. Several systems have been developed in a European context (e.g. Care2x [13], O3 [14]) but the use is still limited due to the aforementioned barriers to the market. Despite the differences in the healthcare system and the language barrier, it is possible to work on the basis of common standards and modules as several existing projects are trying to implement. To push FLOSS HC application development in a European context I propose the adoption of the following strategy:

1. FLOSS-HC inventory
(What is already there?)

In this first step an inventory should be carried out to provide an overview of what is already there. To date several projects start inventing the wheel again. Although this might be desirable to some extent, it is more effective to try to work together and reuse modules as often as possible. A very valuable resource to achieve this is the Wikipedia list of open source software in health-care [1].

2. FLOSS HC Communication platform and software repository
(Where can I find FLOSS HC applications and information about FLOSS-HC?)

The effort from the first package should result in a communication platform backed up by a database which contains links to the resources assembled in the first package. The platform should provide means for communication like a wiki and/or a forum for discussion about the projects and the road map. The forum should be moderated. Otherwise it is not possible to work towards a common aim.

3. FLOSS HC use case database
(What is really needed? What is the impact of the proposed package? How realistic are the chances of success?)

The database of already existing software and projects should be complemented by a database of use cases where the necessities from the field are stored in form of use cases. These use cases and may be workflows should describe the use cases from the health professional point of view. This is probably one of the most important but also most difficult parts to achieve.

4. FLOSS HC knowledge base
(Description of modules and their capabilities)

A sheer database of FLOSS software is not sufficient. With technologies like the Web Services Description Language (WSDL) or an ontology about FLOSS-HC applications it is possible to describe the capabilities of the software and issue complex queries for searches in the knowledge base. A good example from the bioinformatics realm is the TAVERNA tool [15] which may be used to build workflows based on the orchestration of services from over 1.000 registered service applications.

To successfully apply the strategy outlined above it is necessary to have some kind of professional corporate body. Probably the most appropriate would be the foundation of a European Center for FLOSS in European Health Care. This non-for-profit public corporate body should provide monetary support and also the manpower in form of a steering team that is responsible for guiding the community process and if possible

also organizational work. The concentration on the European level does not exclude projects and initiatives from non-European states but mainly provides a means for European funding and a thematic focus on issues that are relevant in a European context. Having said this it is clear, that the initiative is open for all interested people and that it should not be an effort to reinvent the wheel. There should be an exchange with already existing similar efforts. Finally the communication platform should use Web 2.0 technologies to provide the best possible means for communication and interaction for all stakeholders.

6 Conclusions

FLOSS has become a viable alternative to proprietary software development in several business areas. However, in the health care IT sector open source is still rare. To improve the situation and chances for FLOSS in health care, a coordinated action of all stakeholders in FLOSS-HC is needed. To make FLOSS a viable alternative to proprietary software in the health care arena, several barriers need to be overcome. The proposed strategy may be one way to accomplish this aim.

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References

1. Wikipedia list of open source healthcare software. http://en.wikipedia.org/wiki/List_of_open_source_healthcare_software. 2008
2. Open Health Tools. <http://www.openhealthtools.org/>. 2008
3. Open eHealth Foundation. <http://www.openehealth.wikispaces.net/>. 2008
4. VistA CPRS Demo Site. <http://www1.va.gov/cprsdemo/>. 2008
5. WorldVista. <http://worldvista.org/>. 2008
6. Ensembl. <http://www.ensembl.org>. 2008
7. BioPAX. <http://www.biopax.org/>. 2008
8. ClearHealth Inc. <http://www.clear-health.com>. 2008
9. MedSphere. <http://www.medsphere.com/>. 2008
10. Akaza Research. <http://www.akazaresearch.com>. 2008
11. WebReach Inc. <http://www.webreachinc.com/>. 2008
12. Tolven. <http://www.tolven.org/>. 2008
13. care2x. <http://www.care2x.org/>. 2008
14. Open Three (O3) Consortium. <http://gnbts9.units.it>. 2008
15. Oinn T, Greenwood M, Addis M *et al*. Taverna: lessons in creating a workflow environment for the life sciences: Research Articles. *Concurr Comput: Pract Exper* 2006; 18(10):1067-100.