Open Source in Africa: An Opportunity Wasted? -Why and How FLOSS Should Make Sense for Africa-

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–Why and How FLOSS Should Make Sense for Africa–

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Abstract. We discuss the topic of a Master's thesis which aims at providing resources for an effective exploration of FLOSS opportunities in Africa. Indeed, in view of the potential of FLOSS, we believe that Africa's developing nations have much to gain from an increased involvement in free software. However, because vulgarization of FLOSS requires a new model of *need assessment*, we propose a road-map for making open-source a new strategic growth platform for Africa. To this end, we introduce in this paper the FLAIR pilot project.

Key words: FLOSS, ICT4D, open source, Africa, development, FLAIR

1 Introduction

Building on the potential of the digital economy is essential to countries across the world for a sustainable recovery from the current economic crisis. This *new economy* has, indeed, progressively become the most dynamic sector of the world economy, with a highly paced growth rate, among the few that were not durably affected by the crisis. In emerging countries where it was relied upon as a sustainable pillar of development, the new economy has allowed for the creation of millions of jobs. In developing nations, such as African countries, endless innovation opportunities are brought by the IT sector.

Based on rich services that are built atop software engineering projects, the digital economy has long been dominated by big ICT players such as Microsoft™ or IBM™ which have flooded the market with proprietary solutions whose substantial costs cannot be matched by the financial conditions of African populations, businesses and even governments. Recently, however, the paradigm of Free/Libre/Open Source Software(FLOSS) has brought openness in software engineering and has seen an increasing momentum, leading to the production of competitive software that often shadow their proprietary alternatives.

Unfortunately, even though FLOSS has shaped a new and ever-growing economy that is now supported by many governments around the world and that has steered the interest of prominent IT companies, such as Google™, significant adoption in many areas of Sub-saharan Africa is still lagging. Despite a few successful implementations of Open Source initiatives, such as software localization[1], most sub-Saharans involved with the information society ignore the reality of FLOSS [2]. At the same time, a large body of literature has been pointing out the numerous advantages of FLOSS to deliver development paths for developing

[1] see. http://www.africanlocalisation.net

countries [1]. What is at stake in such an unprecedented opportunity? What can be done?

This paper. This paper summarizes the goal of a master thesis to produce an assessment model for allowing decision makers in businesses, education institutions, and governments, to objectively consider the opportunity of FLOSS.

Due to the limited space, we provide, in Section 2, a quick overview on the nature of FLOSS. Then, in Section 3, we concisely enumerate some benefits for adopting FLOSS in the context of Africa's developing nations. We subsequently explore, in Section 4, a roadmap for promoting FLOSS in Africa building on a community repository of shared insights: FLAIR. Section 5 describes the first steps and the current status of our project.

2 Disambiguating and Demystifying FLOSS

The concept of "free software" is often misunderstood in the user community. The GNU Free Software Foundation provides a regularly-updated definition where pioneers state how free software refers to software that users have the freedom to run, copy, distribute, study, change and improve. They emphasize in the definition of free software philosophy that it is not about the price of the software[2]. Rather, one should think of "free" as in "free speech", not as in "free beer". The word FLOSS was then coined at the beginning of the Dot-com bubble to regroup different terminologies that were, and still are, used interchangeably, to refer to free software.

FLOSS is pervasive in today's computing environments: Linux, the 10-year old operating system kernel, is one prominent success of open source development that is increasingly run in millions of personal computers as well as in mainframes and embedded systems. Free software is also strongly represented in web environments: the Apache HTTP server is omnipresent server-side while, client-side, the Firefox browser has rapidly recovered a large market share despite the fact that its main competitor comes preinstalled in the Windows commodity operating system. Open source development toolkits such as the Eclipse IDE have irreversibly penetrated most software engineering tasks. Finally, the vlc open source media player is reported on SourceForge[3] to be downloaded millions of times every week. There is thus a wide range of opportunities for alternative FLOSS software in all application areas, for every purpose and with different level of features and implementation complexity. Previous studies have however shown that Africa is the last-ranked region in terms of involvement with Open-source [3]. What can Africa gain from a graduated adoption of FLOSS in education, business, government, and at home?

3 Seven Opportunities and counting

FLOSS has been reported to provide huge opportunities to countries worldwide. Governments in emerging nations support FLOSS to mitigate costs, to ensure security by limiting dependence to foreign industries, to boost local economies, etc. The ongoing process of computerization that is sweeping through most african

[2] `http://www.gnu.org/philosophy` [3] `sourceforge.net`

countries have lead to a surge of the demand for computer-related products, in particular software. Africa being the fastest growing markets for PC[4], what is at stake with the adoption of FLOSS? In the context of Africa's developing nations we focus on an incomplete list of 7 great opportunities for:

1. Cutting costs. Free software drastically reduces initial costs of software acquisition by waiving license fees. Furthermore, open source products often have limited hardware requirements, reducing the need for extra costs. These benefits are essential for managing cost-conscious budgets in african countries.

2. Enhancing education. An immense learning potential lies in FLOSS. African IT educations systems can leverage open source software for teaching good programming practices learned from the code, and thus contribute to mitigate the numerous insufficiencies in the prevailing inadequate curricula.

3. Fostering home grown companies. Promoting FLOSS would encourage young graduates to build start-ups that could seek and re-provide expertise in FLOSS products. Rather than calling upon foreign companies for proprietary solutions, adoption of FLOSS can empower local economies.

4. Building communities. One of the important upside of FLOSS is its tendency to bring people around a unique project. Building on the philosophy of open source development, african developers can pull together to investigate and address African needs in ICT4D.

5. Fighting piracy habits. Embracing open source software will undoubtedly contribute to the fight against piracy. Furthermore, due to flexible *use and reuse terms*, free software can be re-adapted to fit the context of Africa, its requirements, its needs and its facilities.

6. Strengthening independence. Because the philosophy of FLOSS does not permit any vendor lock-in, the use of free software will empower countries to be autonomous in their IT infrastructures, avoid the need for resorting to specific foreign companies, and estrange us from western "ways of doing IT".

7. Catching up with developed nations. Finally, FLOSS could be the best opportunity for Africa to leapfrog development stages in the area of IT. Indeed, with the possibility of code reuse, Africa does not have to start from scratch as it is the case for many other areas of science.

The above-mentioned opportunities have been seized in recently underdeveloped countries, such as India, allowing them to gracefully sustain their emergence. Then, why is FLOSS not leveraged at a wide-scale in sub-Saharan Africa? What are the missing pieces to realize this?

4 FLAIR: FLoss Alternative Insights Repository

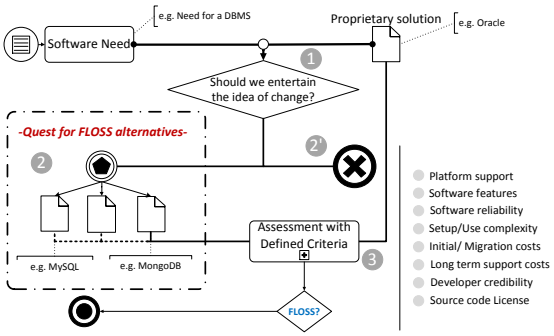
Two main reasons explain why sub-saharan Africa has not yet succeeded in fully leveraging the potentials of FLOSS: (1) First, managers and policy makers lack knowledge about the possibilities of open source and/or they do not trust the reliability of such software. Unfortunately, marketing has never been a priority for FLOSS developers. (2) Second, there are relatively few software engineers that have expertise in FLOSS solutions due to out-dated education curricula;

[4] `http://www.adzeevents.com/et/html/the_market_africa.html`

companies willing to use FLOSS may also face the scarcity of local IT businesses that can offer good support. While we do not advocate for a global and immediate switch to FLOSS, we note that the research community can actually help to add the missing pieces in the exploration of FLOSS opportunities as depicted in Fig. 1. This master thesis aims at yielding two contributions in the roadmap for FLOSS in Africa:

Guidelines. First, an assessment model should be established with guidelines for helping developers, education institutions and businesses explore the possibilities of embracing open source. Similar to the concept behind ITIL[5], we wish to devise a library of best practices for first adoption or migration to FLOSS.

Repository. Second, we plan to setup an online repository to collect experiences of practitioners as well as expertise of developers about FLOSS. With the FLAIR repository we aim at providing insights in existing open-source alternatives, by identifying them, discussing their strengths and weaknesses, and allowing users to contribute with remarks on their hands-on experiences.



We highlight the example of a business seeking to setup a Database Management System. The proprietary DBMS that the management knows about is Oracle^{TM}. Thanks to the extensive guidelines that we propose, they can first raise the question of a need to investigate other, less costly but as efficient, alternatives. To find those alternatives, the FLAIR repository is accessed and used to assess reported FLOSS instances based on criteria proposed by users.

Fig. 1. Work-flow for exploring the opportunity of FLOSS and discovering alternatives

5 Current Status

In the course of this project, we have already investigated the best practices in information systems and business intelligence for producing the guidelines. To setup the prototype of FLAIR, we have undertaken to identify proprietary solutions and explore potential alternatives. To this end, we have sent forms to Universities of Burkina Faso to list all software that are used both by the staff and for teaching purposes. Based on this corpus, we hope to design a pilot portal for evaluating the first return-on-experience of FLAIR.

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[5] Information Technology Infrastructure Library – `http://www.itil-officialsite.com`