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Projet OsiriX

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An Open Source Experience in Medical Imaging

The “open source” movement in the field of data processing began in the 1980s. This movement aims to free software users from the constraints imposed by commercial companies who create, distribute and sell the software. The designation “open source” means that any user is able to utilise the programme free of charge, has access to the program’s operation (that is to say, access to the source code) and is able to modify its operation. Open source projects multiplied in the 1990s, with consumer projects such as the Linux system, Internet Netscape/FireFox explorer, or even the bureaucratic Open Office suite, to name the most famous.

Birth of the OsiriX Project

The OsiriX project was born in 2004, at the University of California, Los Angeles(UCLA, USA) with the aim of applying the “open source” concept to the very specialised field of medical imaging.

Modern medical imaging is entirely digital and requires both a heavy infrastructure (computers, networks, servers) and advanced software to read the images produced by radiological methods (MRI, CT, Ultrasounds, etc.). The images produced are in the DICOM format. The commercial software that enables these images to be read is expensive. It is only intended for medical imaging specialists, i.e. radiologists, given the cost of these solutions. Companies regard this market as vertical and specialised, practicing high prices for each station on which the software is installed. But the constant developments in medical imaging mean that increasing numbers of clinicians, and sometimes patients today wish to have complete access to the images produced in a radiology department.

The open source project, OsiriX, was born of a desire to offer a transversal deployment solution to the greatest number of users. With this software, any user can access and read the radiological images freely and free of charge. The software also offers advanced post-processing functions such as volumic 3D images, PET-CT fusion or the management of 4D data, produced by the most recent generations of cardiac CT.

Operation of OsiriX

The OsiriX project is managed in the same way as the majority of open source projects:

_ the project can be downloaded free of charge from an Internet site: **7** (http://homepage.mac.com/rossetantoine/osirix);

_ the source code for the software can also be downloaded, on the largest site for the management of open source projects:

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(http://sourceforge.net);

_ the software is constantly updated by the developers, thanks to the comments and criticisms of the community of users

_ the software is thus in constant development; and

_ the software developers all work voluntarily and all stem from the medical imaging environment, with the advantage of having an excellent knowledge of the entire workflow in medical imaging, acquisition techniques for the criteria and the diagnostic qualities of the images. There are currently five developers on the project: two in Geneva, Switzerland, two in the US and one in South America.

Today, we estimate that there are approximately 10,000 users of the OsiriX software throughout the world. One third of users are radiologists, one third non-radiologist doctors whose activity is dependent on imaging, such as orthopaedists, neurologists or even cardiologists, and, finally, the last third include scientists or researchers working in diverse fields such as molecular imaging, confocal imaging or even functional imaging. These varied users symbolise the success of the project: offering an imaging tool to the greatest number of people and enabling the use and development of imaging outside of the single field of radiology.

Open Source and Health

Beyond the obvious advantage of free software, what can open source software offer and how can it be integrated into the world of health? Data processing in hospitals has become increasingly evident, with a quasi-total management in administration, invoicing and medical activity (laboratory results, digitalised patient files, imaging, medical reports, etc.). Hospitals are thus using numerous information processing systems originating from internal developments, commercial solutions that are more or less outdated, and often with a heavy historical past in the development of the systems, where former and recent technologies are more or less successfully combined. The commercial software is closed, with limited possibilities for adaptation to the hospital's pre-existing information processing environment.

The modification of this commercial software often adds to the invoice. And if the company goes bankrupt, or if it decides to abandon the development of the product, users risk finding themselves with no possibilities for development. Moreover, this fear often drives a preference for a large company over a small one, even if the cost or the characteristics of the software indicate a preference for another solution.

Advantages and Disadvantages of Open Source

The advantage of having access to the source code of open source software thus becomes clear: users can modify the software at will to obtain an optimal integration of the software, and even if the development of the project is abandoned by its authors, users can continue to keep their software alive by bringing about the necessary modifications. Open source guarantees users that they will not find themselves stranded with closed software, without the possibility for development. The counterpart is to have a team of data processing specialists ready to invest in the source code of the open source software.

One of the disadvantages of the use of open source software is the absence of support for users. An open source project does not, in fact, offer hotlines or personalised assistance. At best, users will be able to have access to a mailing list, with no guarantee of finding an answer to their question or problem. These problems are common to all open source projects. This is why an open source business model was developed at the end of the 1990s, allowing companies to offer paying services around open source products.

Conclusion

The open source phenomenon is certainly set to develop in the field of health, where costs and expenditure must increasingly be rationalised. The success of open source projects in the field of health can allow an inter-hospital collaboration by enabling users to share their experiences and developments, and developing countries can benefit from advanced technologies at a lower cost. Other open source projects are being developed in the field of health, such as the OpenVista project aiming to offer a total environment of electronic patient files (Healthcare Information System, HIS, and Electronic Health Record, EHR). The success of these projects will depend on the interest of users, as well as the quality of the software.

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