Developing Online Communities with LAMP (Linux, Apache, MySQL, PHP) – the IMIA OSNI and CHIRAD Experiences

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Abstract

Many health informatics organisations do not seem to use, on a practical basis, for the benefit of their activities and interaction with their members, the very technologies that they often promote for use within healthcare environments. In particular, many organisations seem to be slow to take up the benefits of interactive web technologies. This paper presents an introduction to some of the many free/libre and open source (FLOSS) applications currently available and using the LAMP - Linux, Apache, MySQL, PHP architecture - as a way of cheaply deploying reliable, scalable, and secure web applications. The experience of moving to applications using LAMP architecture, in particular that of the Open Source Nursing Informatics (OSNI) Working Group of the Special Interest Group in Nursing Informatics of the International Medical Informatics Association (IMIA-NI), in using PostNuke, a FLOSS Content Management System (CMS) illustrates many of the benefits of such applications. The experiences of the authors in installing and maintaining a large number of websites using FLOSS CMS to develop dynamic, interactive websites that facilitate real engagement with the members of IMIA-NI OSNI, the IMIA Open Source Working Group, and the Centre for Health Informatics Research and Development (CHIRAD), as well as other organisations, is used as the basis for discussing the potential benefits that could be realised by others within the health informatics community.

Keywords:
Nursing informatics; Database management systems; Software design

1. Introduction

One of the key features of many modern health informatics organisations is the need to quickly interact with their members, who are often spread around the world, in order to accomplish their work. However, many health informatics organisations, although they discuss and advocate the appropriate use of technologies, seem to be relatively slow in terms of their own uptake of the technologies to support their day-to-day operations. This seems to be especially the case in respect of the use of web-based technologies for providing information and for interacting with online communities comprising their members and wider constituencies of interest, whether that interaction is sharing resources or knowledge, developing or using tools to support such interaction and dissemination, or seeking to improve benefits to patients and improve health and healthcare.
There are, however, many applications with the multimedia-based [1] modular functionality to enhance organisational information exchange, collaboration and research where knowledge sharing is essential. Many of these are easy-to-use free/libre and open source software (FLOSS) tools that, in addition to carrying the many benefits of FLOSS, are readily available to less developed and wealthy countries, and so can help to fulfill the international commitments of health informatics organisations such as the European Federation of Medical Informatics (EFMI) and the International Medical Informatics Association (IMIA) and their Working Groups and Special Interest Groups. [Note: For the purposes of this paper, we use the term ‘open source’ or the acronym FLOSS (Free/Libre and Open Source Software) [2] to generically cover open source, free software, and GNU/Linux [3]; other widely used acronyms also exist, e.g. OSS/FS [4] ]

The aim of this paper is two-fold: to introduce some of the many FLOSS applications that are available to develop interactive portals and websites and support dynamic online communities as part of the structure of health informatics organisations; and to show how one group in particular, the Open Source Nursing Informatics Working Group (OSNI) of the Special Interest Group in Nursing Informatics of the International Medical Informatics Association (IMIA-NI) is using some of these tools for precisely those purposes on their website, at www.osni.info. The experience of the IMIA Open Source Working Group (OSWG) and of CHIRAD (the Centre for Health Informatics Research and Development) in moving to use these tools also provides supporting evidence for their benefits and ease of use.

The paper will discuss the use of FLOSS applications, and in particular Content Management Systems (CMS) such as PostNuke [5], which has been used by the IMIA-NI OSNI WG to develop an online community to meet the aims of the group. The model that can be derived from this could be of benefit to many other health informatics organisations, especially those in developing countries or other environments where scarce resources limit expenditure on costly proprietary systems.

It is not within the scope of this paper to rehearse the background descriptions of, or perceived benefits of, FLOSS nor to describe some of the common office and productivity open source applications available; these are available in many other papers and sources (for example [6], [7], [8], [9]) and a certain level of knowledge is assumed.

2. Some FLOSS applications for collaboration

2.1 LAMP and e-learning

Many FLOSS applications, especially the kind of Content Management Systems (CMS) we discuss here, use a combination that is often referred to as LAMP - the Linux, Apache, MySQL, PHP (LAMP) architecture - which has become very popular in the industry as a way of cheaply deploying reliable, scalable, and secure web applications. (the 'P' in LAMP can also stand for Perl or Python.) MySQL is a multithreaded, multi-user, SQL (Structured Query Language) relational database server, using the GNU General Public License. The PHP-MySQL combination is also cross-platform, ie will run on Windows as well as Linux servers.

FLOSS applications are gaining widespread use within education sectors, with one example of a widely-used e-learning application being Moodle (www.moodle.org). Moodle is a complete e-learning Course Management System, or Virtual Learning Environment (VLE), with a modular structure designed to help educators create high-quality, multimedia-based online courses. Moodle is translated into more than 30 languages, and handles thematic or topic-based classes and courses. As Moodle is based in social constructivist pedagogy (http://moodle.org/doc/?frame=philosophy.html), it also allows the construction of e-learning materials that are based around discussion and interaction, rather
than static content. Such interactive applications are ideal for supporting the learning needs of distributed health informatics organisations. Several OSNI members, working with CHIRAD (the Centre for Health Informatics Research and Development) are developing an open access health informatics repository using Moodle (see http://www.difference-engine.net/hivle/).

2.2 Content Management Systems

There are more than 25 FLOSS Content Management Systems (CMS) designed for developing portals/websites with dynamic, fully searchable content; PostNuke, PHPNuke, and Mambo are among the most commonly used (see http://www.opensourcemods.com/ for a fuller list). A CMS has a flexible, modular framework that separates the content of a website (the text, images, and other content) from the framework of linking the pages together and controlling how the pages appear. In most cases, this is done to make a site easier to maintain than would be the case if it was built exclusively out of flat HTML pages.

A CMS can be easily administrated and moderated at several levels from an Administration Panel, allowing flexibility of access to make different types of materials available to selected members of an online community, to the whole community, or to the wider world. Registration of members is necessary if different permissions and levels of access are assigned to different types of member, and if registered members of the site upload material directly or submit material for publication to moderators who give approval and publish on the web site. This gives complete control of compliance with the organisation’s policy for published material. In addition, the workload relating to publication of material and overall maintenance of the website can be spread among many members, rather than having only one webspinner, securing frequent updates of content and reducing individual workload, so making likelihood of member participation greater. The initial user registration and redistribution of passwords and access can be carried out automatically by user requests, while assignment to user groups is made manually by the site administrators or moderators.

2.3 Other server-side dynamic applications

In addition, blogs, bulletin boards, discussion forums and other applications such as photograph or picture galleries can be contained within, or linked to a CMS.

Bulletin Board(BB)/Discussion Forums(DF) applications essentially allow users to post and read news items and exchange messages with other users of the systems. From several FLOSS BB/DF applications available, all with good functionality, OSNI has incorporated phpBB (www.phpbb.com) as an external application linked to its OSNI PostNuke CMS web site (http://www.osni.info/phpBB2/index.php). As of mid January 2005, the OSNI BB had 17 registered users from Spain, UK, Norway, USA, India, and Cuba. There are 70 articles, grouped within one open and three closed forums.

The advantage with FLOSS BBS/DF such as phpBB is that the overview of discussions and topics is clear, as the thread of posts in the discussion is displayed and can easily be followed. Some material can be made open in public forums, and other material can be available in closed sections for particular user groups. Iterations of documents and topic based discussions can be handled effectively, directly available to those concerned. Thus the communication becomes much more efficient than communicating via e-mail as it is available to all with user permissions to view. In addition, as the discussions are automatically archived, they are available for later review by new members of an online community, or available as a valuable resources for researchers.

Blogs (weblogs) are open source web applications which contain periodic, reverse chronologically ordered posts on common web pages typically accessible to any Internet user. Their use is being explored to provide reports on health informatics events for those
unable to attend, and may be used to provide a form of distant interaction with such events [10]. An example of such a blog is the use of the FLOSS b2evolution software used to provide real-time reporting at medinfo2004 and planned for use to report on HC2005 and MIE2005 (see http://www.difference-engine.net/medinfo2004blog/).

Wikis are web sites that allows users to add and update content on the site using their own web browser, resulting in a site that is collaboratively developed and maintained by its users. [11]

3. IMIA, IMIA-NI and their Open Source Working Groups

IMIA established an Open Source Health Informatics Working Group (OSWG) in October 2002. The OSWG web site began as a series of simple, flat HTML pages. It was quickly realized that this would not meet the needs of the group, and the website was migrated to use PHPNuke, a FLOSS CMS similar to PostNuke, and can be found at: www.chirad.info/imiaoswg

In agreeing to the need to explore nursing-specific issues, IMIA-NI established a Working Group on Open Source Nursing Informatics (OSNI) in June 2003, its purposes to include raising awareness among nurses and exploring the existence or case for nursing-specific components to FLOSS developments and discussions. The IMIA-NI OSNI Working Group developed out of Open Nurse (the nursing open source network) which was initially based around the development of the open-nurse.info website. The network started at the NI2003 conference in Rio de Janeiro resulted in the launch of the OSNI.INFO web-site in March 2004 with the URL: http://www.osni.info/html/index.php, replacing open-nurse.info as the OSNI WG’s official website.

The two IMIA groups are complementary and synergistic, and seek to work with other bodies, such as the AMIA OSWG (the Open Source Working Group of AMIA, the American Medical Informatics Association) (http://www.amia.org/working/os/main.html) and other relevant organizations in nursing, healthcare, informatics, education, and other pertinent fields.

At present, the OSNI website aims to develop a comprehensive listing of other online resources. In the longer term, the OSNI network aims to publish a number of papers and other resources outlining for nurses some of the issues around the use of open source and free software within nursing and healthcare. The aim of the OSNI network is to work in a manner akin to that by which open source and free software is developed. We welcome all contributions, and will share all the contributions we receive with anyone who wishes to use them. In the same way that the development of open source software provides for transparency of processes, we wish to provide a transparent process that others can use as they see fit.

4. OSNI.INFO as a model

The decision to move the OSNI website from static html to a CMS was based in a number of issues, including a lack of up-to-date content and the workload on a single webspinner. The osni.info site uses the FLOSS CMS platform PostNuke (http://www.postnuke.com/). The OSNI website has had more than 16,000 page-views between its launch in March 2004 and mid January 2005. It has 14 modules, 74 international members from all over the world, 25 stories published, 5 active topics, 1 special section (member profiles), and 110 web links in 23 categories. The OSNI website has contributed to establishing a new network, where visitors and registered OSNI members can exchange information and news. The number of registered members and site traffic is steadily increasing, indicating a need
for this type of virtual organisation and network connecting nurses interested in FLOSS, and nursing informatics in general.

Among the facilities available to members using the website are: the ability to add new articles or news items that appear on the site almost instantaneously, and to add new weblinks are downloadable items; opportunities to contribute to discussion forums and have a complete, reviewable record of discussions; access to member-only areas through access control mechanisms, so as to provide recognizable benefits to members that may not be available to the wider community, and which give potential members a reason to become members.

The benefits that accrue to the group as a whole, and to individual members, are: interaction within a group, many of whose members may rarely meet physically; distribution of workload among members, to providing a feeling of community and interaction for members, and reducing reliance on and workload of a single webspinner; rapid uploading of new materials; and a searchable archive of all materials on the website.

CHIRAD, the Centre for Health Informatics Research and Development, is a virtual health informatics organisation based in the UK, but has members around the world, and is an Academic Institutional member of IMIA. In the past year, it has moved its websites from static HTML pages to FLOSS CMS such as PostNuke and PHPNuke. It has also begun moving its health informatics resources and virtual learning environment to use Moodle.

One author (KØ) is the osni.info webspinner and maintain several other websites using FLOSS CMS. The other author (PJM) is Chair of the IMAI OSWG and of IMIA-NI OSNI, maintaining their websites and the CHIRAD websites, in addition to several others. The authors have been involved in the installation and maintenance of over twenty examples of the FLOSS tools such as PostNuke, PHPNuke, Moodle, TikiWiki, Mambo, Moodle, b2evolution and Coppermine described in this paper. Their experience is that many of the tools are relatively easy to install, and with only a short period of exploration and learning how to use them, fully functional dynamic web applications can be developed.

5. Conclusion

The Internet has, in the last decade, played a leading role in facilitating communication across borders, becoming more and more important as a source of communication, education, research and collaboration. Problems with early stage Internet-based communication were related to high costs in developing, maintaining and updating websites as platforms for collaborative organisational work. The Open Source movement is changing all of this and the ways in which the sharing of knowledge and access to new development and refined and enhanced functionality in web-based applications, the healthcare informatics scene has the potential for going through a major change. The structure and functionality of websites has changed a lot from static flat-file html sites with hyperlinks and hypertext, to websites developed on relational databases with completely new dynamic and searchable retrieval of content.

The use of dynamic, FLOSS CMS tools for the development and maintenance of websites such as that used by the OSNI group facilitates the fostering of international links and collaboration among nurses around the world, who need only a simple web browser to access all the functionality of the website. This has particular advantages for developing countries, and activities to support the development of nursing and nursing informatics in such countries, and supports links to the wider global health informatics community. The model developed by OSNI for its website has the potential for easy adoption by other health informatics organisations and associated benefits, including low costs, rapid provision of current, relevant information, and the development of a sense of community.
6. References


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Section 6: Healthcare Networks