

Humanitarian IT with Open Source: A Case Study on Disaster Management

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Introduction

The Tsunami that hit Sri Lanka on December 26th resulted in a massive outpouring of support for the relief of the nearly one million people that have been affected by it. When literally thousands of people from every conceivable multilateral organization and from many other places arrived here to help, it became clear immediately that without information technology it would be impossible to coordinate their efforts to maximize the impact on the affected people. The Sahana [3] project was thus born.

Despite the tremendous value this type of software can bring to disaster management, there are only very few systems that exist today and none of them are widely deployed. In fact, the most widely used system appears to be non-Web based and using completely out-dated technology. While there are indeed various specialized parts that exist, there does not exist a single cohesive system that organizations such as United Nations Disaster Assistance and Coordination (UNDAC) deploys at every disaster situation they go to.

The long term objectives of Sahana is to grow into a complete disaster management system, including functionality for mitigation, preparation, relief and recovery.

Why Open Source for Humanitarian ICT Projects?

Very few countries and organizations today can afford to invest a lot of resources in disaster management when there is no disaster present. While this is obviously true of poor, developing nations, it is also true of richer, developed countries as well because there are always higher priority items that need the funding. You will also find very little commercial motivation as it almost seems unethical to restrict licenses to such software at a point of a humanitarian disaster. This is what we see in the world today – while disaster management software is critically needed, there is no complete commercial or non-commercial software solution that is widely available.

Going the Open Source [1] (or FOSS [10] to be precise) way can address these concerns. Using the Open Source development model, it is possible to develop this software at a much reduced cost compared to pure commercial development models. This is true because while commercial entities are not willing to invest into these systems, there are hundreds and thousands of well-meaning IT professionals who are very happy to donate a few hours of effort to helping build such systems. Also being freely available source code means the resultant software is freely available to modify as you wish to suit the disaster at hand, by anyone willing. This is specially important as there is lot of requirements around customization and interop with existing systems for disaster management. Finally going with Open Source approaches can also greatly reduce the deployment cost of this software especially as the LAMP (Linux, Apache, MySQL, Perl) [2] solution stack has very low hardware requirements and will work just as well on an old PC.

Current Sahana Project Status

The present phase of the Sahana Project was quickly built over a 2-3 week period around the time of the Asian Tsunami by a group of volunteers to help coordinate the relief effort in the for Sri Lanka. It was deployed and run as a Sourceforge [4] project (a well know Open Source software development portal) and about 40+

people contributed to it's development from various groups and companies. An implementation of Sahana was authorized and deployed by CNO [9] (The main government body in Sri Lanka coordinating the relief effort) to help coordinate all the data being captured and at the end of their tenure it had captured data on 32,000+ families.

The current Sahana system exists as a collection of interconnected, yet independently usable, subsystems that interact with each other via a set of shared databases. The separate concerns and related components of the Sahana system implemented as of now are given below:

Component	Description
Organization registry	Keeps track of all organizations and the role + ownership areas they have in the relief effort.
Request management system	Database of all requests for support from various locations (camps, hospitals, etc), as well as offers of support from relief providers.
Camp registry	Registers all temporary camps, hospitals and locations setup to house the victims of the disaster
People registry	Database of missing, displaced, dead, orphans etc. (including pictures, finger prints, DNA samples) with advanced search capabilities.
Assistance management system	Database of all pledges of assistance and attempts to match it to the requests. Also records where the assistance was provided.
Key contacts database	A collection of key contacts for critical areas during a disaster.

The technology stack used to build Sahana was based on the well known Open Source solution stack, LAMP [2] and Java and this effectively makes it free to install end to end. Also the hardware resource requirements of this solution stack is low it was initial deployed on a standard desktop machine, but subsequently migrated to it own dedicated server. We also tested and found that it could be deployed on a resource limited PDA such as the iPAQ with OPIE [6] (a linux distro supporting iPAQs) within 32 Mb of RAM.

Lessons Learned and the Future Direction of Sahana

The current version of Sahana was developed for the specific needs of a few Sri Lankan organizations to work as a back office in coordinating the relief effort. Due to the time constraints it was not built to be easily extensible and the pure Open Source "bazaar" [11] style of development was not the best when requirements were quite urgent. A hybrid development model similar to that used by the Mozilla foundation [8] (creates of the firefox web browser) would probably be more suitable moving forward. This includes a dedicated core team, a usability focus and a strong release process, supported by automation. However the lessons learned and the domain knowledge gained was invaluable to the volunteer effort help rebuild and generalize the system for the future. Phase II is being planned as a semi-funded effort in collaboration with a to-be-formed international consortium of Humanitarian Open Source projects.

For Phase II, in addition to greatly enhancing the existing modules, the new functional requirements we are looking to build include a damage database, relief logistics management system and burial registry. Across the whole system we will

enforce a security framework to protect data privacy, reducing potential abuse of victim records (e.g. identify theft) and will look to allow for localization all aspects of the user interface to improve accessibility in native languages. Also an automated data transformation/import mechanism needs to be introduced as a lot data, due to the lack of awareness often first ends up being captured paper forms, spreadsheets or adhoc databases. This data should not be lost, rather we should have a quick and easy mechanism to transform and import the data into the Sahana system. Finally the system needs to operate in a mobile and disconnected network mode and be accessed through devices such as satellite phones allowing for operating in an environment where regional ICT networks are destroyed.

Conclusion: The potential for Humanitarian FOSS

Disaster Management is but one example where Free and Open Source Software (FOSS) based solutions are being used to alleviate human suffering. However this concept finds a natural home not just in disaster management, but in a superset that extends to humanitarian ICT or any other ICT requirement which concerns the improvement of human welfare. We have found that the currently taxonomies of projects on well known Open Source repositories like SourceForge [4] or Freshmeat [5] does not presently allow us to classify such project easily and often get dropped into a miscellaneous category. However we believe there is a lot of potential for growth in this area, namely "Humanitarian FOSS" and if positioned and promoted well they should be many volunteers flocking to build and contribute to such projects globally, especially as the Open Source community operates with a strong set of ethics for the benefit of the community at large.

References:

- [1] "The Open Source Initiative OSI", (2005), (opensource.org), Available: <http://www.opensource.org/docs/definition.php>
- [2] "LAMP: The Open web platform", (2001) (onlamp.com), Available: <http://www.onlamp.com/pub/a/onlamp/2001/01/25/lamp.html>
- [3] "Sahana Project", (2005), (sourceforge.net) Available: <http://sahana.sourceforge.net/>
- [4] "Document A01 - About SourceForge.net?", (2005), (sourceforge.net), Available http://sourceforge.net/docman/display_doc.php?docid=6025&group_id=1
- [5] "freshmean.net : About", (2005), (freshmeat.net), Available: <http://freshmeat.net/about/>
- [6] "News - Opie - Open Palmtop Integrated Environment", (2005), (opie.handhelds.org), Available <http://opie.handhelds.org/>
- [8] "Mozilla Developer Central", (2005), (mozilla.org) <http://www.mozilla.org/developer/>
- [9] "CNO Main Page", (2005), (cnosrilanka.org) Available: <http://www.cnosrilanka.org>
- [10] "Free/Libre Open Source Software", (2005), (wikipedia.org) Available: http://en.wikipedia.org/wiki/Free/Libre_Open_Source_Software
- [11] The Cathedral & the Bazaar (paperback) By Eric S. Raymond ISBN: 0-596-00108-8