

**Sahana
Free and Open Source
Disaster Management System
Project Overview**

December 20, 2006

DRAFT 0.9

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Table of Contents

Table of Contents

1.Introduction.....	4
1.1.Sahana Project Goals.....	4
1.2.Application Description.....	5
1.3.Alignment to Free and Open Source Software (FOSS).....	10
1.4.Deployment Strategy.....	12
1.4.1.Large Scale Deployment.....	12
1.4.2. Lightweight Deployment.....	12
2.Impact of Phase II for Disasters.....	13
2.1. Asian Earthquake - October 2005.....	13
2.2. Philippines Mudslide Disaster – February 2006.....	13
2.3. Mount Merapi Earthquake, Indonesia – June 2006.....	14
2.4. Pre-Deployment for the Civil Society	15
3.Impact of Sahana on the global community.....	16
3.1. Recognition of Sahana and Humanitarian-FOSS.....	16
3.2. Recognition as a leading FOSS Project.....	17
3.3. Recognition of Sahana as a disaster management and humanitarian assistance tool.....	18

3.4. Available Online Resources.....19

3.5. Available Sahana Installation Packages.....20

1.Introduction

The Sahana Free and Open Source Disaster Management System was conceived during the 2004 Dec Asian Tsunami. It was developed to help manage the scale of the disaster and was deployed by the government's Center of National Operations (CNO) which included the Center of Humanitarian Agencies (CHA). Based on the success of this initial application and dire need good disaster management solutions particularly to handle large scale disasters SIDA funded a second phase through LSF (Lanka Software Foundation) to generalize the application for global use and to help in any large scale disaster. The project now grown to become a globally recognized project with deployments in many other disasters such as the Asian Quake in Pakistan (2005), Southern Leyte Mudslide Disaster in Phillipines (2006) and the Jogjarkata Earthquake in Indonesia (2006). The phase II funded by SIDA did much to foster the capability of the project and the global community, now 110+ strong around it.

Following the Tsunami the system was rebuilt from scratch on the stable Free and Open Source technology stack, AMP (Apache MySQL, PHP/Perl). The system is available for free for anyone to download and customize based on their requirements and the only latest release of Sahana just before the end of phase II has been downloaded over 8000 times from all over the world. The system is tested to work on GNU/Linux, Windows XP, Mac OS X and FreeBSD operating systems and is also available on a LiveCD or which boots up all from a CD drive without requiring installation. The system is very scalable and It can operate standalone on a laptop without network connection for a single responder up to a server cluster for 1000s of users. The focus on design has been on usability, adaptability and resilience to make it suitable for disaster scenarios.

1.1.Sahana Project Goals

The scope of the Sahana project is to be an integrated set of pluggable, web based disaster management applications that provide solutions to large-scale humanitarian problems in the relief phase of a disaster.

The aspirations on the project are captured in the following goals:

1. **Primary:** Help alleviate human suffering and help save lives through the efficient use of IT during a disaster
2. Bring together a diverse set of actors from Government, Emergency Management, NGOs, INGOs, spontaneous volunteers and victims themselves in responding effectively to a disaster
3. Empower the victims and their next of kin and better enable them to help themselves
4. Protect victim data and reduce the opportunity for data abuse
5. Provide a Free and Open Source solution end-to-end available to everyone

However in subsequent phases we hope to extend the scope to the prevention, rehabilitation and reconstruction phases. Work is already on the way to develop new modules in these areas.

1.2.Application Description

Sahana is a suite of web based sub-applications that provides solutions to different problems with regard to the information required for managing certain coordination problems during post-disaster. Beyond being a database of information the value it provides is in the a well structured and usable interface and data design making the management of information simple. In phase II the Sahana project release 8 modules that address these problems called Missing Person Registry, Organization Registry, Request/Pledge Management System, Camp Registry, Inventory Management, Catalog, Messaging and Volunteer coordination.

The main problem/solution pairs implemented in Sahana with the associated modules are given in detail below and they have been identified and applied during actual disasters. They have also been validated by our humanitarian and emergency management consultants from our project community.

Problem 1: Helping Families and Next of Kin Find Each Other

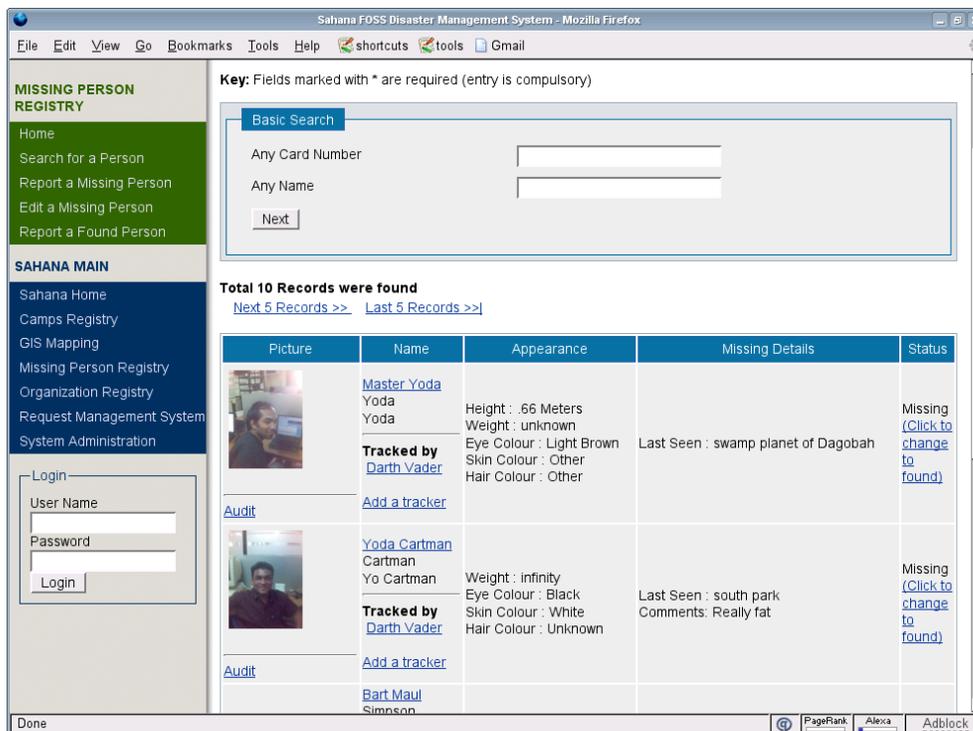
The objective here is to reduce the trauma caused by waiting to be found and to help connect families and acquaintances quickly in order for them to support each other. The trauma damage is especially acute for children waiting for loved ones to find them. For example in Sri Lanka there were 100s of bulletin boards with pictures of missing people being pinned on them.

Physically reviews say about 100,000s of such pictures to find someone is going to take quite a while. Here IT can help with an on line bulletin board where you can search by name, appearance, age group. Even if the victims or families do not have access themselves it is quite easy for any authorized NGO/civil society group to hook up to the central portal and provide that service in the areas they are operating in.

Solution 1: Sahana Missing Person Registry

The Missing person registry is an online bulletin board of missing and found people. It not only captures information about the people missing and found, but the information of the person seeking them is also captured, which adds to the chances of people finding each other. For example if two members of the a family unit is looking for the head of the family, we can use this data at least to connect those two family members.

Sahana Free and Open Source Disaster Management Project



Features include:

- Meta data around the individual such identity numbers, visual appearance, last seen location, status, etc
- Sounds-like name search (using metafore and soundex algorithms)
- Uploading of a persons picture
- Grouping by family unit or other groups types

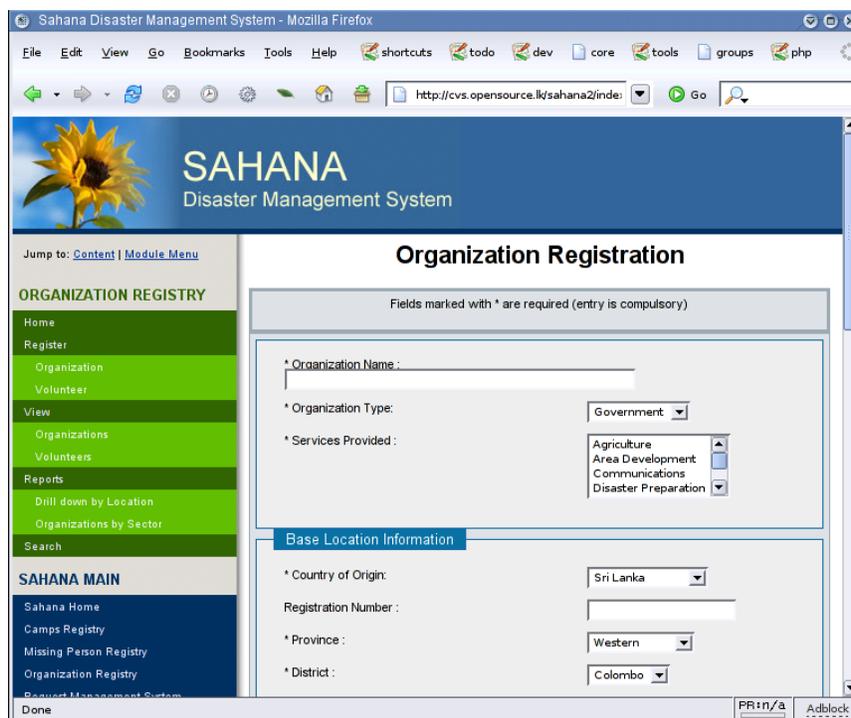
Problem 2: Coordinating All Aid Groups and Helping Them to Operate Effectively As One.

During the Tsunami we had a massive outpour of support from INGOs, NGOs and the general civil society setup to help the victims. In Sri Lanka I believe we had about 300+ NGOs registered providing support. If all groups are not coordinated effectively it results in problems such as clogged up supply routes, competition for providing support (e.g. double vaccinations) in some areas whilst other areas suffer a dearth of support. As a result all that goodwill and aid pledged can go wasted, under-utilized or unvalued.

However this can be an overwhelming coordination task for authorized emergency controllers to do manually. An IT solution can help here where you have an organization registry where we keep track of who is doing what where and more importantly where nothing is being done at all (or there is no coverage of a certain service). This way they could even self-distribute themselves evenly across affected regions just by being aware what other relief groups are doing.

Solution 2: Sahana Organization Registry

The Organization Registry keeps track of all the relief organizations and civil society groups working in the disaster region. It captures not only the places where they are active, but also captures information on the range of services they are providing in each area.



The screenshot shows the Sahana Disaster Management System interface in a Mozilla Firefox browser. The page title is "Sahana Disaster Management System - Mozilla Firefox" and the URL is "http://cvs.opensource.lk/sahana2/index.php". The main header features a sunflower logo and the text "SAHANA Disaster Management System". A left sidebar menu includes "ORGANIZATION REGISTRY" with sub-items like Home, Register, Organization, Volunteer, View, Organizations, Volunteers, Reports, Drill down by Location, Organizations by Sector, and Search. Below this is the "SAHANA MAIN" section with links to Sahana Home, Camps Registry, Missing Person Registry, Organization Registry, and Request Management System. The main content area is titled "Organization Registration" and contains a form with the following fields: "Organization Name" (text input), "Organization Type" (dropdown menu with "Government" selected), "Services Provided" (checkbox list with "Agriculture", "Area Development", "Communications", and "Disaster Preparation" options), "Base Location Information" section containing "Country of Origin" (dropdown menu with "Sri Lanka" selected), "Registration Number" (text input), "Province" (dropdown menu with "Western" selected), and "District" (dropdown menu with "Colombo" selected). A note at the top of the form states "Fields marked with * are required (entry is compulsory)".

Features include:

- Capturing a comprehensive list of meta data on a relief organization and all the activities they have in the region
- Registering ad-hoc volunteers willing to contribute
- Capturing the essential services each group is providing and where
- Reporting on the converge of services and support in the region and more importantly where there are no aid services being provided

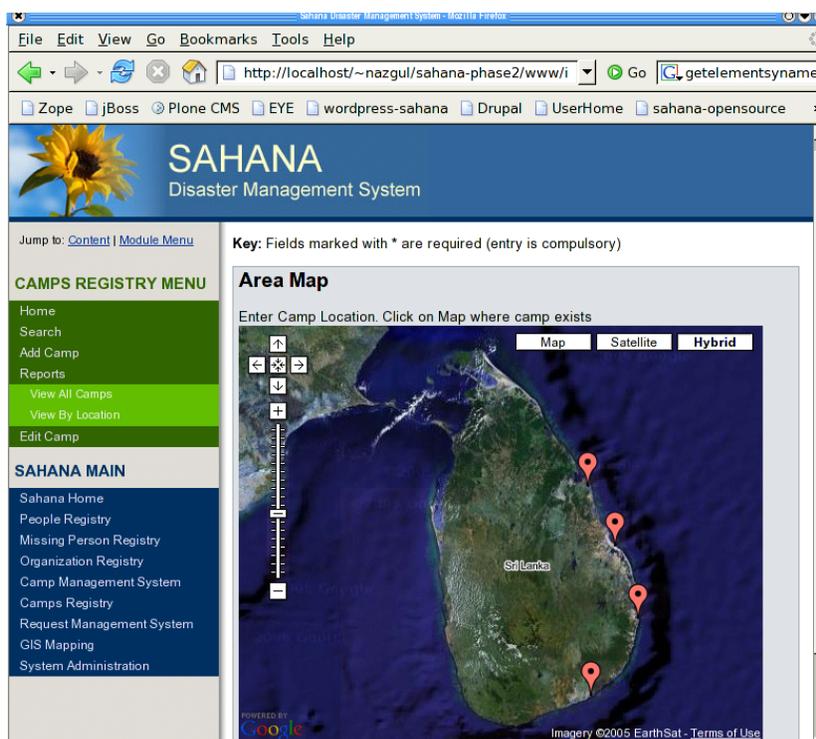
Problem 3: Capturing the Location of All Temporary Camps and Shelters

A temporary shelter or a camp can be just about anything. It can range from a large government run camp to a school to a house. Regardless of the type of camp we need to capture information of where they are located and how many people are in them to be able to know how to distribute aid effectively. Camps off the beaten path or those that are inaccessible can often get omitted in aid

distribution, so here IT can help to ensure that such camps are being represented and reported.

Solution 3: The Sahana Camps Registry

This sub application of Sahana keeps track of the location of all the camps in the region and some basic data on the facilities they might have and the number of people in them. It also provides a Geo spacial view to plot the location of the camps in the affected area.



Current features include:

- Tracking of basic meta-data on the location, facilities and size of the camp
- Integration of google maps to provide a GIS view of the affected region
- Ability to customize the list of important facilities needed at a camp
- Basic reports on the camps and drill-down by region

Problem 4: Effectively Utilizing the Pledges of Aid

During the Tsunami there was an unprecedented response in terms of aid and supplies, however even 8 months after the Tsunami we find a lot of those pledges of aid are not utilized. The main reason for this is that there is a lack of awareness and visibility to the aid available between those that require and those

that can provide it. For example one NGO might get a specific request for aid, however probably only one of 100s of NGOs actually have a supply of that aid item. It would be impractical for this NGO to check with all those 100s of potential places to see if that item is available. Instead what we need is a well structured central repository of aid being pledged and a track of detailed requests for aid. An IT system should additionally help intelligently match these two items.

Solution 4: Sahana Request Management System

The Sahana request management system is a central online repository where all relief organizations, relief works, government agents and camps can effectively match requests of aid and supplies to pledges of support. It effectively looks like an online aid trading system tracking request to fulfillment.



Features include:

- Basic meta data on the request and pledges such as the category, the units, contact details and the status
- Customizable aid catalogs
- Filtered search of aid pledges and requests
- Ability to track partial fulfillment of the request

Other Modules that have been Built

Inventory Management and Catalog System

Keeps track of inventories at a high enough granularity to account for the chaotic transfer of goods and aid. Features include:

- Tracking of inventories and item classification
- Inbuilt catalog based on WHO standards, but fully customizable
- Tracking of the transfer of goods from one inventory to another
- Tracking and warning of the expiry of aid items
- Co version of units to allow for summations

Child protection module

Keeps detailed track of children and their needs both in a disaster and conflict situation. This model was build specifically for the NGO Terre des Hommes

Volunteer management system

Helps track volunteers, their skills and evenly distributes them to affected region for an organization. Features include:

- Tracking of volunteers, their skills and their availability
- Allocation of volunteers to projects
- Ability of volunteers to manage their own skill and availability information
- Ability to search for volunteers based on skill and availability

Messaging module (SMS / email / CAPs)

The messaging module helps to alert responders and victims of new events in their vicinity as they respond to a disaster.

- Ability to create adhoc groups of SMS numbers and email addresses
- Ability to send SMS messages through a mobile phone attached to the computer
- Ability to send messages using the CAPS protocol

Situation Awareness

This module gives an overview of the situation and allow people to add information on what is happening on the ground

- Geographic map of situation with markers capturing incidents and objects
- Ability to attach a picture and text to a marker

1.3.Alignment to Free and Open Source Software (FOSS)

There are multiple reasons why Free and Open Source software find a natural fit into humanitarian-ICT applications in general (of which disaster management is but one) and why there seems to be limited propitiatory alternatives available.

They are:

- 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. This is because there are always higher priority items that need funding compared to disaster preparations for a disaster that may or may not happen. A FOSS approach provides a low budget, volunteer supplement and global way to build such systems

- There is not much commercial interest in developing solutions in this domain as often during humanitarian disasters software licenses are given freely and it almost seems unethical to restrict software. With FOSS there need not even be any delays in getting permission for a license as anyone has the freedom to download the software and use it.
- Also such systems should be shared, developed and owned globally as the problems they address are all too common for any country dealing with a disaster effectively making such software a global public good. The FOSS development and community mechanisms have a proven track record to build such goods.
- The global community of IT volunteers who can contribute their goodwill to such causes by using their skills to develop and customize FOSS software for the disaster situations
- As in conflict situations, during disasters segregation arises between Gov, NGOs and INGOs. The main reason is often the urgent circumstances, the lack of transparency and the lack of coordination capacity. So an open and transparent and globally owned system is more likely to be trusted to mediate between the groups. It will also help organizations self-distribute themselves based on what other organizations are doing in the affected region.
- Finally no two disasters are alike. There are often localizations and customizations needed for the software before it can get applied effectively to the disasters. Some of these localizations include adding additional meta-data around the entities in the system or translating the system to handle entry in a particular language. With FOSS, the code is available for anyone to quickly pickup and make the needful customizations without restriction.

Going the open source way can address the above concerns and using the open source development model, it is possible to develop this software at a much reduced cost compared to pure commercial development models. Thus if there was a small team which was driving such a project ensuring the quality of the product, then it is possible to get a lot of assistance from the global IT community to make those systems truly exceptional. This is what we see with the Sahana project, which has a core team of 11 people that has built a global community of 110+ participants and contributors from all over the world. And the FOSS community spirit, philosophy and mechanisms has been a key ingredient in the the successful growth of such a vibrant community for Sahana.

1.4. Deployment Strategy

The Sahana system can be deployed on a variety of models, ranging from operating totally within a single notebook computer (with or without a portable Wireless LAN) to a fully distributed, networked platform.

Large Scale Deployment

The normal deployment diagram briefly illustrates what a large scale deployment involving multiple groups may look like. It is often the case that the disaster coordination hub is away from the affected region as shown below and that network based operation is often possible even though the affected region might have their telecommunications infrastructure destroyed.

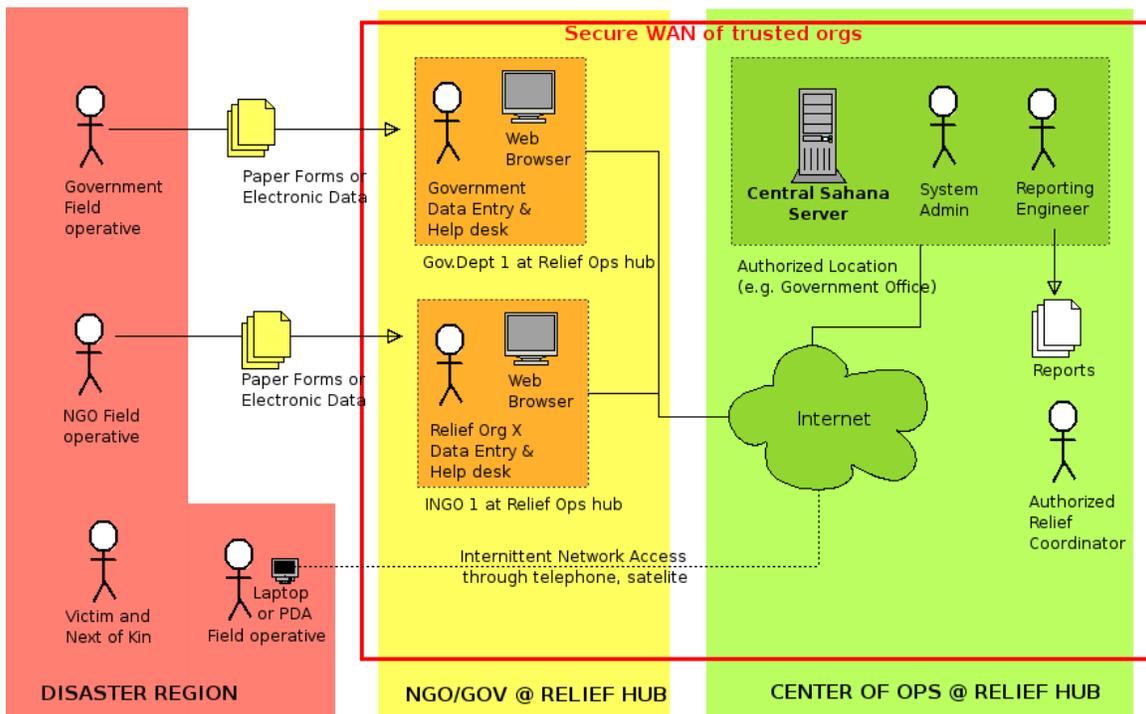


Figure 1: A possible Sahana Deployment

Access can now even be provided in the affected region with the support of groups such as Ericsson who provide wireless LAN based satellite based connectivity to networks.

Lightweight Deployment

If such infrastructure does not exist, Sahana being a “lightweight” solution can efficiently scale down to a standalone laptop and a secured portable wireless access point if short-range network collaboration is required. Such a requirement is often the case in a disaster coordination hub when there is no Internet or power during the initial moments post-disaster. The Sahana system has been tested to work with the above equipment at approx 130W, which can be easily

support by a solar panel, should power not be available. Additionally none of the applications depend on being connected to the Internet.

Sahana also has the ability to synchronize data between multiple instances of Sahana. What this allows for is for responders or district offices to capture data on victims in the field and seamlessly exchange them with the other field offices, headquarters or responders by exchanging data in USB flash drives or CDs.

2.Impact of Phase II for Disasters

Following the Tsunami and the development of Sahana phase II, the software has subsequently been used by both the Government and civil society in other disasters around the world. These include:

2.1. Asian Earthquake - October 2005

Sahana phase I is being deployed in Pakistan together with the support of NADRA (National Database and Registration Authority of Pakistan (<http://www.nadra.gov.pk/>) and IBM Pakistan(<http://www.ibm.com/pk/>). NADRA has a comprehensive people database as they build and maintain the central system that maintains the registration of people (identity card, passport, etc) in Pakistan, however the system is not web based and under tight security controls. Thus Sahana fills the gap of making the data accessible to the other organizations involved in the relief effort such as the NGOs. Apart from that NADRA does not have the equivalent of the request management system and organization registry. The Sahana system was promoted for use in the relief effort for the Asian Earthquake by a team consisting of the member volunteers of IBM Pakistan, IBM Crisis Response Team (<http://www.ibm.com>), WSO2 (<http://www.WSO2.com>), Virtusa (<http://www.virtusa.com>) and LSF/Sahana (<http://www.opensource.lk>).

References:

- <http://www.reliefsource.org/foss/index.php/Use:Asian-Earthquake-OCT-2005>
- http://www.earthquakepakistan.com/images/IBM_CRT_Pakistan_Mission_Report.pdf

2.2. Philippines Mudslide Disaster – February 2006

On February 17, 2006, a devastating mudslide killed over 1,800 Filipinos in Guinsaugon in the southern part of Leyte Island in the Philippines. IBM immediately contacted the Sahana core team and the Lanka Software Foundation to deploy Sahana. IBM provided an initial list of required customizations for the Philippines deployment. The customizations were analysed and divided into two groups. The first group of *simple* modifications were those that could be directly completed by Sahana clients using the *administrative interface*. One paragraph about what this interface can support.

The second group of customizations required significant modification to the core modules of Sahana. Organization registry, Camps registry, Missing persons and Request management system were heavily customized. To streamline the customization process, a demonstration server for the ongoing modifications was setup at www.sahana.lk and the IBM team continually reviewed the customizations. The major modifications were completed within 7 days. Over the course of the disaster, approximately 50 organizations and about 1000 missing people were managed. 5 camps were also established and supported.

The following is a quote from Avelino J. Cruz, Jr., Secretary of National Defense, Philippines, to exemplify the impact Sahana had as a disaster management system:

“The NDCC and OCD value SAHANA’s contribution to the relief and rehabilitation phases of the Southern Leyte landslides and recognize the tremendous boost to our preparedness for future disasters. While SAHANA cannot solve all the problems in a disaster, it is an excellent tool to create registries that can provide timely and reliable information on missing persons, donated goods and services, camp locations, and the like. It is technology that can help many people in a disaster. In fact, there is no greater innovation that matters more than that which saves” lives.

Sahana has subsequently been used to manage two other disasters in Philippines and has been adopted as part of their national disaster management strategy.

References:

- http://www.stii.dost.gov.ph/sntpost/NewPOST/JanMar2006/IT_helps_Guin_saugon_rise_again.html
- <http://www.em-dat.net/documents/bangkok06/PhilippinesManagingDisasterInfo.pdf#search=%22sahana%20philippines%22>
- http://202.90.128.18/index.php?mod=or&act=view_org

2.3. Mount Merapi Earthquake, Indonesia – June 2006

In early 2006 there were signs that the Mount Merapi volcano near Yogyakarta in Central Java, Indonesia, may erupt. The Australian Computer Society asked UrRemote to prepare a report on the feasibility of deploying a computer system to assist with relief coordination in the event of an eruption. The report "Deploying Sahana For The Merapi Eruption", indicated that such a system was feasible. The report was completed just as the Yogyakarta earthquake occurred. The ACS therefore sponsored further work for the system to be deployed for earthquake relief. Indonesian Whitewater Association (IWA) and Indonesian Rescue Source

(IRS) have experience in rescue work and were undertaking relief support for the earthquake. A plan was therefore devised for IWA/IRS to deploy the system, with technical support from UrRemote, and assistance by ACS and the Sahana core team. The Sahana system was deployed capturing data on camps, temporary shelters and organizations working in the region.

References:

- <http://australianit.news.com.au/common/print/0,7208,19594319%5E15851%5E%5Enbv%5E15309,00.html>
- http://urremote.com/index.php/Deploying_Sahana_For_The_Merapi_Eruption
- http://www.acs.org.au/ctb/Sahana_Merapi_Report.ppt

2.4. Pre-Deployment for the Civil Society

Sahana has also been pre-deployed with two NGOs as follows:

- Sarvodaya, Sri Lanka: Customized and pre-deployed in the HIH unit of Sri Lanka's largest NGO, Sarvodaya in preparation for future disasters. Extensive customization was made, so that the fields and theme match Sarvodaya's requirements and a new CAPs messaging client was created to submit alert messages to CAPs brokers and servers that in turn send the alert to the target region through various mechanisms including SMS. The core team probably spent the greatest amount of their effort on the customization for Sarvodaya compared to any other deployment, however though the system has the support of the Sarvodaya leadership more need to be done to train the volunteers and operators to apply it. Regardless the system is available and ready for use should another massive natural disaster strike Sri Lanka.
- Terre des Hommes: A new module on Child Protection was designed and created for Terre des Hommes to track affected children of the conflict in the east of Sri Lanka. This showed the flexibility of the Sahana framework to work for the first time in a conflict resolution scenario. It was deployed with training by the Sahana core team and is current in use by Terre des Hommes

References:

- <http://www.spotonsolutions.net/foss.htm>

In all instances the funded core team worked diligently to support the requirements and needs of the disaster environment partnering with the Government and NGOs working in the field. The above reflect the deployments of Sahana we are aware of, because as Free and Open Source software it is free for anyone to download and use without notifying the Sahana core team. Just the latest release of Sahana (version II 0.4) has been downloaded over **8,000** times

so far. Thus there probably is numerous uses of the Sahana system and we have had unconfirmed reports of utilization in Lebanon and Ecuador.

3. Impact of Sahana on the global community

3.1. Recognition of Sahana and Humanitarian-FOSS

Sahana has gained a tremendous amount of recognition in its short tenure both for the project and for the concepts it promotes, which is the application of FOSS for humanitarian ICT problems. The above alignment to FOSS was generalized and named “humanitarian-FOSS”, which is effectively the application of free and open source software to alleviate human suffering and was coined by the Sahana project. 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 found that the currently taxonomies of projects on well known open source repositories like sourceforge or freshmeat does not presently allow us to bucket such projects easily and often get dropped into a miscellaneous classification bucket. However we believe there is a lot of potential for growth in this area and if positioned and promoted well, there 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.

The concept is recognized by the [Free Software Foundation](#) (FSF), known as one of the two leading organizations responsible for the FOSS movement. The founder of FSF, Richard Stallman's aspiration has been "help thy neighbor with software", where projects like Sahana comes as a specialization of this where it is “help alleviate human suffering with software”. In recognition of this the FSF has created a new award for social benefit that was inspired by the Sahana project.

Reference:

- <http://newsvac.newsforge.com/newsvac/05/11/05/0553230.shtml>
- <http://www.fsf.org/news/social-benefit-award.html>
- <http://www.tectonic.co.za/view.php?id=686>

In addition to this the UNDP IOSN network has allocated a section on their portal for Humanitarian-FOSS which features Sahana. This section is managed by the Sahana PM/SA

(Reference: <http://www.iosn.net/foss/humanitarian>)

Chamindra de Silva was also invited to talk on this concept on a BBC digital planet radio show on the Sahana disaster management system and why the application of FOSS makes sense in humanitarian software

(Reference: http://truckandbarter.com/mt/archives/2006/06/opensource_soft.html)

The project and the humanitarian-FOSS concept, also has a reference in Wikipedia, the worlds largest online encyclopedia

References:

- <http://en.wikipedia.org/wiki/Sahana>
- <http://en.wikipedia.org/wiki/Humanitarian-FOSS>

3.2. Recognition as a leading FOSS Project

There are a few notable places in the FOSS community which gives an indication that a FOSS project is recognized. One of them is the Free Software Foundation as indicated above where Sahana is registered and inspired a new award. Another is a repository called Sourceforge where most of the Free and Open Source projects register themselves and utilize their portal for development and running of FOSS projects as Sahana does. Right now sourceforge has over 120,000 Free and Open Source projects registered on it's site. Out of them they award one project a month in recognition of the work their doing, the recognition they have recieved and progress they are making. Sahana was given this honour as the Sourceforge Project of the Month for June 2006

Reference: <http://sourceforge.net/potm/potm-2006-06.php>

Another notable instance where Sahana was recognized as a leading FOSS project was the BBC documentary "Code Breakers" on Free and Open Source software application around the world. Sahana was featured in this documentary and was one of the few examples where the project was built from scratch in the resident country. The Sahana project team and other IT industry leaders in Sri Lanka were interviewed for the documentary.

Reference: <http://www.apdip.net/news/fosdoc>

The initial recognition of Sahana as a FOSS project was received when Dr Sanjiva Weerawarana, the founder of Lanka Software Foundation, was awarded a Redhat user award at the Redhat User Summit recognizing his contribution to the inspiring the Sahana system

Reference: <http://www.redhat.com/magazine/008jun05/features/awards/>

Other conferences where Sahana was recognized:

- Ravindra de Silva represented Sahana in the 8th camp of Asia Pacific Networking Group (APNG)
(Reference http://www.apng.org/8thcamp/APNG2006/ravi-sahana_at_APNG.ppt
<http://www.apng.org/8thcamp/reports/ravindra.htm>)
- Chamindra de Silva was invited and sponsored to the IOSN FOSSAP II conference in Cambodia to present Sahana
(Reference: <http://www.iosn.net/events/fossap-2005/presentations/case-studies-ict4d/sahana.pdf>)

3.3. Recognition of Sahana as a disaster management and humanitarian assistance tool

Probably the highest recognition of Sahana as a humanitarian assistance tool came when Chamindra de Silva represented Sahana in the UN World Summit for Information Society (WSIS), where he was a panelist in the ICT4Peace panel together with other high profile panelist such as Martti Ahtisaari, Former President of Finland; José Antonio Ocampo, UN Under-Secretary-General; Swiss Ambassador to the UN Daniel Stauffacher; Linton Wells, US Assistant Secretary of Defense and Raymond Johansen, State Secretary of Foreign Affairs of Norway.

Reference: <http://mail.fsfeurope.org/pipermail/wsis-euc/2005-November/000635.html>

Representatives from Sahana were also invited and sponsored to present it in the following conferences:

- Sahana was presented at the Commonwealth Technology Organization (CTO) conference in disaster management
(Reference: <http://www.cto.int/dmasia/index.php?page=agenda>
http://www.cto.int/dmasia/presentations/S7_Intro_Chamindra_De_Silva.pdf#search=%22CTO%20sahana%22)
- Sahana was demonstrated in Strong Angel III, an integrated disaster response demonstration in San Diego, US together with a large range of NGOs, technology vendors, US military and civil society groups
(Reference: <http://www.strongangel3.net/>
<http://www.linux.lk/~chamindra/docs/StrongAngel3-Sahana.pdf>)
- Sahana was presented in the Global Knowledge Partnership International Forum 2006
(Reference: http://www.globalknowledge.org/gkps_portal/view_file.cfm?fileid=4113#search=%22sahana%20gkp%22)
- Chamindra was invited to Emergency Communications Asia 2005 in Shanghai-China to speak on the role of IT in Large Scale Disaster Management representing Sri Lanka (ICTA).
(Reference: http://www.terrapinn.com/2005/eca_CN/SpeakerList.stm)

In terms of awards Sahana was one of the three finalists in the Stockholm Challenge 2006 and got a special mention in it's category, though the category was filed by mistake as health.

(Reference: <http://www.stockholmchallenge.se/default.asp?id=2>)

However the project did receive the Good Samaritan award at Software 2006 in California, USA

(Reference:

http://www.sandhill.com/conferences/sw2006_materials/sw2006_awards_final.pdf)

Lastly but importantly the IBM Crisis team proactively promotes the use of Sahana for disaster management, promoting it both for application after the Katrina Hurricane and the recent Asian Earthquake. They are actively working with the Philippines government to incorporate Sahana as part of their contrywide disaster management strategy.

(Reference:

http://www.earthquakepakistan.com/images/IBM_CRT_Pakistan_Mission_Report.pdf)

In most instances above travel and accomodation was sponsored for the Sahana team with only additional expenses being reimbursed by the Sahana travel budget. Thus we were able to save significantly from the travel budget.

3.4. Available Online Resources

Many online resource have been created for collaboration has been setup by the team, which includes 4 mailing lists (humanitarian-ICT, sahana-maindev, sahana-general, sahana-cvs), a website, 2 WIKIs (for domain and technical documentation respectively) and CVS. The list of resources available online is given below

The Sahana website is the main portal and directory to all other online resources of Sahana. It is designed as a typical FOSS product website having all the standard links expected of such a FOSS product site: <http://www.sahana.lk>

The Sourceforge project page (<http://www.sourceforge.net/projects/sahana>) is where most of the project development takes place. It is the main repository for the code, packages, mailing lists and bug/tasks trackers that are used by the Sahana team:

- Humanitarian ICT mailing list is the meeting and discussion point between a diverse group of people from humanitarian consultants, emergency management practitioners, academics and FOSS developers.
<http://groups.yahoo.com/group/humanitarian-ict/>
- The requirements WIKI strives to capture disaster management/humanitarian requirements and discussion on the problem domain independent of a technical bias:
<http://www.reliefsource.org/foss/index.php/Sahana>
- The developers mailing list is for collaborative development
https://sourceforge.net/mailarchive/forum.php?forum_id=43600
- Development WIKI captures all the standards, development conventions and helps new module developers build new features for Sahana:
<http://www.sahana.lk/wiki/doku.php?id=dev:home>
- Sahana Demos are hosted both for the stable version (<http://demo.sahana.lk>) and also for the latest CVS version of Sahana (<http://demo.sahana.lk/cvs>). They are updated automatically and periodically.

- The bug tracker helps us capture and track bugs that need to be resolved in a branch until we get it into a stable version
http://sourceforge.net/tracker/?group_id=127855&atid=709778
- The CVS is the main repository of code:
<http://sahana.cvs.sourceforge.net/sahana/>
- The Sahana Brochure has been designed to give a quick overview of Sahana for distribution:
<http://www.linux.lk/~chamindra/docs/Sahana-Brochure.pdf>

3.5. Available Sahana Installation Packages

Each release of Sahana is packaged in 5 main forms to make it easy for people to download and install it. They are given below:

1. **TAR.GZ Package:** This is the source package of Sahana and as PHP is a scripting language (no compilation needed) it is a valid deployable package of Sahana. This is the best package to use for a Windows XP, OS X or FreeBSD installation of Sahana
2. **DEB Package:** Debian is the largest community based linux distribution and additionally 100+ other distributions are based on debian
3. **RPM Package:** For deployment on a commercial Redhat platform mainly, especially together with IBM servers. Additionally there our other distributions (e.g. CentOS) that uses RPM compatible to Redhat.
4. **LiveCD Package:** This is a Sahana CD package that boots the entire LAMP stack with Sahana pre-configured from the CD drive without touching the harddisk. This is ideal for Sahana demos or it is a portable installation of Sahana to be taken to the field with a USB drive.
5. **LiveUSB Package:** This package is like a liveCD except it boot the LAMP base with Sahana pre-configured from a USB flashdisk.