



Challenge

Disasters, accidents and natural catastrophes result in many loved ones injured, missing or unaccounted for. Numerous people are still missing since Haiti's earthquake (12.01.2010) and the status of many Chilean earthquake victims remains unknown.



Haiti man 'survives 27 days under quake rubble'

The family of a Haitian man says he has survived four weeks under rubble since the devastating earthquake that struck on 12 January.

Doctors said the 28-year-old man was dehydrated and wasted. His brother told the BBC someone had given him water during his 27-day ordeal.

The BBC's Matthew Price spoke to the man's mother in the capital Port-au-Prince and said she was very emotional.

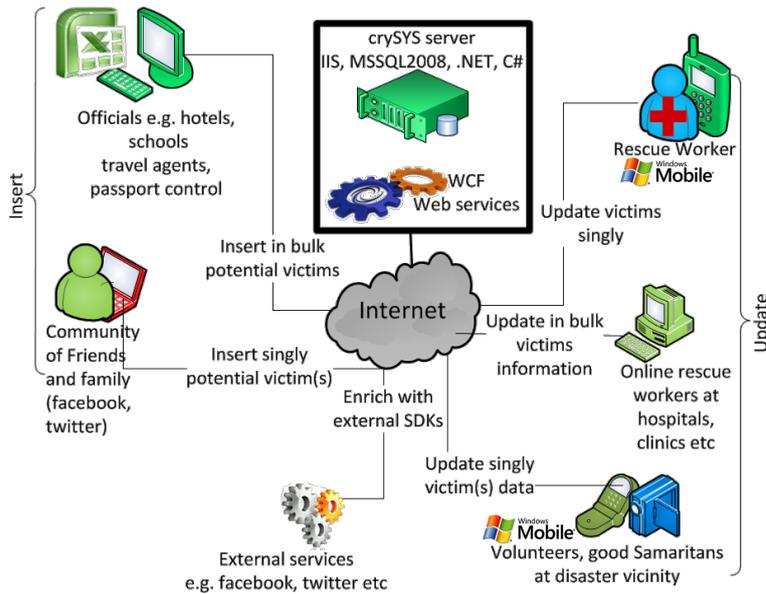


Much of Port-au-Prince was reduced to rubble by the quake

The family and friends of disaster victims can help rescue efforts by:

- Insert possible disaster affected friend/relative
- Identify survivors, deceased or injured persons
- Update/correct information of missing persons

Architecture



Solution

crySYS addresses the challenge by leveraging global partnership – 8th UN millennium goal. Our solution eases inserting list of possible victims by officials, updating persons status by rescue workers, the search, locating and updating of missing loved ones status by family and friends using the crySYS system and online community e.g. facebook, twitter, flickr etc.



crySYS integrates interfaces, technologies and social network communities to improve available information, correct the data and provide near real-time information update of victims status.

When rescuer workers find a victim, they update his status via their mobile devices as injured, critical or ok.

Use Cases

Simplification of crySYS enables:

- Officials (at hotels, schools, airports) to insert list of residents suspect to be in vicinity of disaster area.
- Community users input name of person known to be in the area not yet listed.
- Rescue workers update data of found persons, survivors or deceased i.e. photo, status, location
- Family and friends update data of persons still missing
- Online community searches and identifies persons in system
- Officials, family, friends and communities view real time statistics of disaster information updates

User Interface



Technologies and Tools

crySYS is powered by:

- Visual Studio 2008
- .NET framework 3.5
- MSSQL Server 2008
- Silverlight
- Expression Blend 3
- WCF web service
- Windows mobile 6.1
- Bing maps
- MS Office Excel SDK
- External service SDKs

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Introduction

During a sudden crisis scenario, earthquake, flood or something similar, one of the major problems facing a lot of people is the lack of information about the people in the area. People don't know where their friends and members of the family are. Even if they are well and fine, sharing this information with everyone interested is difficult since the phone lines and networks might be broken or at least in heavy use. Also the rescue workers trying to help people would want to know who is in the area and how they are doing. This information can help them coordinate their work better.

As a solution for this problem we propose a shared information system for collecting the information about the people in the crisis area which can be updated as new information arrives. The information can be updated by the people themselves, by rescue workers and by the community users who have information about a person in the area. This way sharing information becomes easier and all the interested people can find it in one location. This should reduce the burden on phone lines and Internet network in the crisis area.

The goals of our solution:

- Gathering the information about the people in crisis area in one location
- Providing easy way of accessing this information to everyone interested - Officials, rescue workers working in the area, people with friends or relatives at the area
- Providing easy way of updating the information about missing people
- Identifying the people found but not identified - children, injured or deceased people
- Providing general statistics about the crisis and it's development in the area to anyone interested

Mainly our system offers a common way of communicating and sharing information between all the people involved in crisis scenario. It tries to ease the distress caused by lack of information about people in the crisis area and to give the officials and rescue workers better information about the status of the crisis scenario.

Use Case

Our system has three major user types: the officials in charge of the crisis area, the rescue workers trying to help people and the community users – the people outside the crisis area who are looking for friends or relatives in the area or who are otherwise interested in the situation there. The following use case presents a typical usage scenario for our system. The use of CrySYS starts after a crisis has occurred somewhere.

The first thing to do is to setup a crisis scenario by inputting the location and name for the crisis. This is done on map view and it acts as a preliminary action for all future steps. Now adding, updating and viewing the information can start.

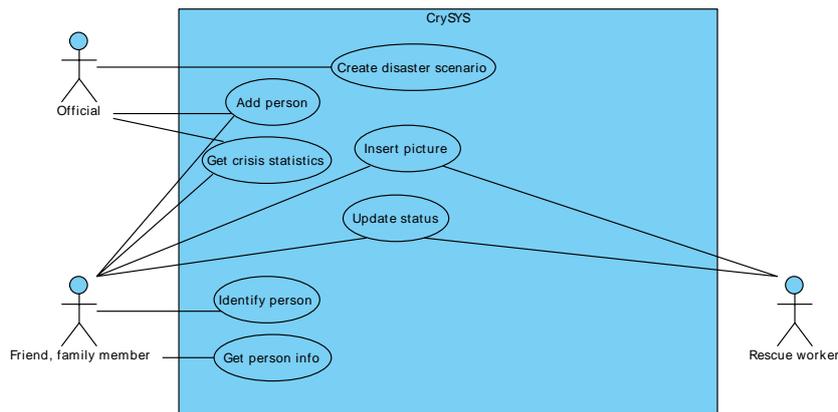


Figure 1: CrySYS use case diagram

First the officials of the area should input *the list of all the residents*. Also hotels, hostels and such should add the list of their *quests* to the system. After this other people, the community users can add information about the people they know to be in the area, but who are yet not listed in the system.

After the basic information of the people in the area has been input, their status has been set as unknown. Now the updating of these statuses can start. The people can *update* the information themselves to inform anyone interested that they are ok, or other people like medical personnel can do these updates for them. With the updates the overall picture of the crisis can be made more realistic and maybe most importantly the information of a person’s status can be *shared* easily with the friends and relatives etc. who are trying to contact him/her.

CrySYS can also be used to identify people. When rescue workers come across a person they can't identify for whatever reason, they can take a picture of that person and publish along the location he/she was found. This way the people browsing the information in CrySYS system can *identify* them.

For the people coordinating the rescue work in crisis area, one of the main features of CrySYS is the statistics it provides. All the time our system can present the number of people missing, found, in hospital etc. in the crisis area. This information can help focusing the rescue work more efficiently.

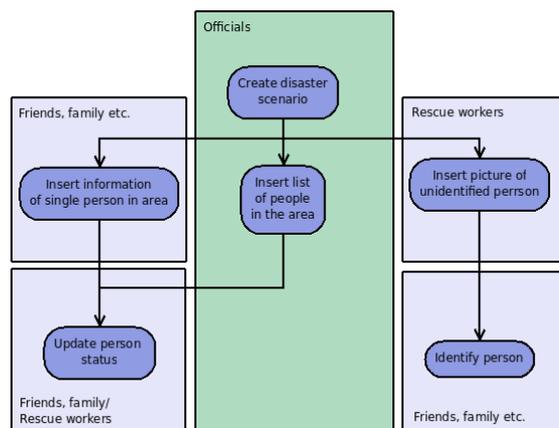


Figure 2: crySYS usage scenario

Architecture

The CrySYS architecture has four main parts visible in Figure 3: The CrySYS service and three clients – web, mobile and Excel. The CrySYS service acts as a central connection point for sharing the information between different clients – each designed for different users and usage scenarios.

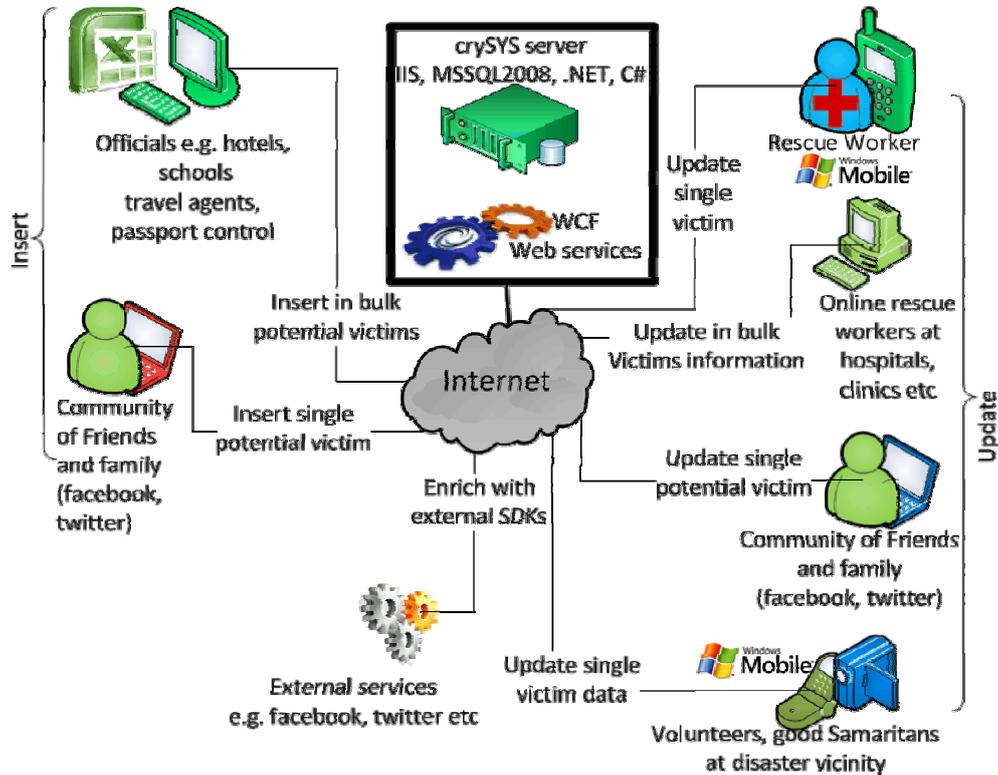


Figure 3: CrySYS Architecture

All the basic functionalities of the system will be implemented in the server and they are accessible through Windows Communication Foundation (WCF) *web service* interfaces. The service offers the following functions for inputting and getting data to/from CrySYS database.

Get/Set Person data

Person data is the basic information of a person like name and contact information. The setting happens mostly by officials inputting list of local residents, but also other people can input the information of friend, relative etc. who they know to be in the area.

Get/Set Status data

The status data tells the status of a person. In the beginning, after a person's info has been inputted to crySYS system, the status is set as unknown. Whenever new information arrives, the status is updated. The status can be updated by anyone with information of a person. The status data is important when people are searching for the information about the people they know, as it tells whether they are found and if they are ok.

Get/Set Picture

People can input a picture of a person they know to help in the search of this person or a picture of unidentified person so that community users may identify him/her.

Get Crisis statistics

The crisis statistics tell general numerical data about certain crisis scenario like the number of people involved and how their statuses have changed over time.

Get/Set Crisis info

The crisis info is the identification information of a crisis location.

The main user interface will be the *web user interface* implemented with Silverlight. The user interface relies on Bing map to show the locations of the crisis and the people in the area. This user interface can be used by all users, by the officials in charge, by the people working in field of the crisis area and by community users - people outside the crisis location who are interested in the crisis or who have some information about people in the area.

Mobile client is meant for people working in crisis area helping people. Using the mobile client they can update information about people they encounter or they can take pictures of unidentified people and upload them to the server so the community users may identify them.

The *Excel client* is a simple client meant just for adding information about a list of people. It can be used by officials who have the information about the residents of the area or for example hotel staff who can add the information about their clients.

The CrySYS system also supports sharing the information it contains to other *social networks* like Facebook or Twitter. This way the information about the crisis in general and about people in the area can reach a larger audience without the need for everyone to check the CrySYS website.

Conclusions

One of the major challenges during a crisis situation is the lack of information about the people in the crisis area. People are trying to find out how their friends and relatives are doing, but contacting them can be difficult as the phone and Internet networks in the area may be damaged or at least are under heavy use.

The CrySYS system presented here is designed to ease the trouble caused by this lack of information during a crisis. It is a shared information system for officials and rescue workers on the scene as well as for the community users around the world trying to locate their loved ones or just generally interested in the situation.

We feel that by providing this kind of centralized way of communication we can help people locate their friends or relatives in the scene of the crisis more easily and in the same time help the officials and rescue workers get better information about the crisis and to coordinate their work more effectively based on this information. Also the CrySYS system can be used to raise awareness about the crisis and can therefore help at collecting donations for helping the people who suffered in the crisis.

CrySYS Profile Summary

Team Name	CrySYS - "leaves no one behind"		
Short Description	A disaster management system promoting global partnership to help family and friends find out the status of their loved ones in the event of a catastrophic crisis.		
Team Members	Name	Email	
	Bishal Raj Karki	firstname.lastname@lut.fi	
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University	 <p>Open your mind. LUT. Lappeenranta University of Technology</p>		
Country	Finland		
Competition Category		Software Design	
Millennium Goals		Develop a global partnership for development	
Technologies and Tools Used	Visual Studio 2008	WCF web service	
	.NET framework 3.5	Windows mobile 6.1	
	C# programming	Bing maps	
	MSSQL Server 2008	MS Office Excel SDK	
	Silverlight 3	External service SDKs	
	Expression Blend 3		
Social Network Support	 Facebook	 Twitter	 Flickr