

Developing a Text Messaging Based Community Domestic Violence Response System Using FrontlineSMS

By:

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Overview

In mid-2008, I was approached by an Oklahoma based domestic violence agency seeking to better use technology to reach victims and to provide a safer, more reliable, way of reporting, recording, and responding to reports of domestic violence.

The agency was much like many other social service agencies in the United States: low on cash but high on enthusiasm. All told, they had less than \$2,000 USD to spend on an initial pilot and would have liked some of that money to go towards victims services.

After some needs discussion, I introduced the program director to FrontlineSMS and suggested that they develop and implement a text messaging based reporting and tracking system. Using features already built into the software, combined with a bit of custom software programming, I felt developing an easy way to gather statistics on the domestic violence population would be a quick and simple process.

Over the course of three weeks, working by myself in my spare time, I was able to utilize FrontlineSMS to develop a system that not only met the agencies needs, but whose robustness and utility shocked us all. That system, which we hope will serve as the basis for a statewide pilot program on text message in domestic violence situations, is still operational today and was developed for under \$1,000 USD.

This brief paper will discuss the technologies we used and the steps we took to develop the system, officially called "FamilyFirst" and show how any agency can deploy a similar system for very little money.

Some Statistics on Domestic Violence in Oklahoma

By comparison, Oklahoma is a small state. With just over 3.6 million residents, the entire state is smaller than some large U.S. cities. It's for this very reason that I was shocked by the statistics on domestic violence in Oklahoma

In 2007, the Oklahoma Mental Health and Substance Abuse Services Agency, through their domestic violence and sexual assault division provided services to 7,038 adults and 2,967 children. Of that, 5,500 adults and 2,650 received domestic violence and 1,500 adults and 325 children received sexual assault services.

While the sheer amount of these cases is astounding, what's even more so is that it is estimated that over 50% of domestic abuse and sexual assault cases go unreported every year.

While speaking with the Director of the domestic violence agency for which this project was created, I learned that their hotline receives about 500 calls *per month*, most of which never go any further than the initial call.

A System of Hope Starts to come Together

Over the course of a few days, agency staff and I engaged in wild speculation. Without another system of this kind being in place somewhere else for reference, we really didn't know what kind of system we needed or how it might be received once it was deployed. But we all knew that, if we were going to better reach the closeted away domestic violence survivors in our area, the proper use of technology was going to be the key.

After much discussion, we all agreed that SMS text messaging would be the safest, most secure, and easiest way for victims to communicate with helpers. Text messaging was fast, silent, didn't take a lot of time, and, perhaps most importantly, could be erased from the phone with no record of the message being sent. It had all the traits of the kind of system we knew would be essential in creating a successful and usable system for the community.

The Technology Comes Together

Once we'd decided on the kind of system we wanted to implement, finding the right components that fit within the agencies tight budget was the next challenge. We knew at the very least we'd need a computer and a mobile telephone. These items were both fairly easy to come by as we were able to find a cheap netbook at Wal-Mart for under \$400 USD and an affordable prepaid AT&T mobile phone with unlimited SMS messaging for \$20 startup and \$20 per month for unlimited messaging.

Next, we began the search for software. We basically had two options: write our own software from the ground up or buy one of the expensive solutions that were mostly tailored towards businesses. For a moment, we considered using one of the Internet based services but opted not to because of reliability issues and the concerns about privacy expressed by the agency.

Since I was already involved in another project that needed SMS capability, I was already looking for cheap software. But it was pure luck that a friend had recently become involved with a developing project in Malawi that used a piece of software called FrontlineSMS, which did exactly what we needed it to do.

After doing some research on the software and finding that, not only was it free, but it was also open source, I went to Sourceforge and downloaded a copy. Within 30 minutes I had the system set up and communicating with the mobile phone and I spent all night working with it so I could do a hasty demonstration to the agency the next day.

At 7:00am the next day, I walked in the Directors office, laptop in hand and mobile phone in my pocket, and showed them a system that did just about everything the needed it to do. Needless to say, I got the green light to move forward with the project.

Bending technology to our Will

The next step in putting together a fully working system was to use custom programming to fill in gaps that the FrontlineSMS developers had left open. Because the software had the ability to communicate and exchange data with external programs, it was very easy to write fairly standard PHP scripts to handle things like responding to keywords, perform database lookups and insertions, and route messages back and forth between the software and the remote user

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"Software and IT Services done right"

Once again, I met with the agency director. It was Monday morning and we all assumed that, as fast as development was going, we could likely have the coding done by Wednesday, test until Sunday night, and go live with the working system on the following Monday. While the director and her assistant went about contacting area workers and printing up fliers, I went back to coding.

By Wednesday at 4:00pm, the system was complete and I was able to do a full working demonstration for the agency staff and the local county Sherriff. The system worked flawlessly and we stopped development and went into testing mode.

On Thursday night, I received a call from the Sherriff asking how hard it would be to route messages to specific people based on keywords. His thought was that we could provide a 'crisis' keyword that would allow victims in particularly hostile and dangerous situations to summon the Police without tipping off the abuser. After looking at the coding involved, I determined that it wouldn't be hard at all (just a few more PHP scripts) and I called the director for approval.

I spent all of Thursday night and some of Friday developing the routing scripts, setting up a near real-time website where messages for the police would be displayed, and setting up keyword triggers in FrontlineSMS. By 1:00pm on Friday afternoon, I, once again, had a working system with no bugs.

After spending the weekend testing the system, we determined that it was good enough to deploy and the agency began getting the word out. The agency posted fliers around the city, passed information to other area workers and police agencies, and we prepared ourselves to begin to receive our first real messages.

The Silence before the Storm

For the first few days, the system was fairly quiet, receiving between 1 and 3 message per day. By the following Monday, the agency reported that it was receiving 20-50 per day and, within the first month, that had ballooned to over 300 messages per day.

While all of these weren't crisis situations, all of them were from people seeking more information on domestic violence. Some wanted a shelter hotline number, some wanted tips on how to get out, some wanted to discuss their situation with a crisis worker and, a few, summoned the police.

The System: Several Months On

FamilyFirst has now been in operation for nearly a year and the statistics of the system are amazing and tragic:

- 6,000 to 8,000 incoming messages per month
- 12-15 request for police intervention per month
- 2,200 request for the domestic violence hotline number per month

Perhaps you've noticed something odd about the statistics above, and, if you did, you'd be right. The total number of messages this system receives per month is more than the total number of victims processed by the Oklahoma Mental Health and Substance Abuse Services processed *for the entire year of 2007*. This single fact is perhaps the most heartbreaking but also one of the most hopeful: domestic violence is on the rise in Oklahoma but more victims are open to using technology to find their voice than are comfortable seeking face to face services.

Another hopeful statistic is that, so far, a local District Attorney has been able to convict 18 abusers because victims were able to silently summon help without the abuser knowing. The system is working.

Where do we go from here?

Since the systems deployment, we've had to tackle several technical hurdles. Timely message routing, protecting victims privacy, data retention, and how to appropriately utilize the data it collected in both a therapeutic and legal capacity. System growth has also presented a unique hurdle since a regular mobile phone simply can't process high volumes of text messages quickly.

The future of the system looks bright: the agency intends to continue to expand it and push the system further into the community. We're going to be purchasing and setting up a dedicated GSM modem to replace the mobile phone so we can process more messages quicker. I've started looking for grant funding to better develop the system and, hopefully, push it into use throughout Oklahoma and, perhaps, in other area too.

Sadly, we're also confirming our darkest fears: domestic violence is alive and well in Oklahoma and, no matter how robust and useful of a system we provide, we won't be able to save all victims. To be honest, I think it's that very regret that drives us to push harder.

Addendum – Technology Used

The goal of FamilyFirst has always been to operate as robust and useful of a system as possible as cheaply as possible. Most of the components used in the system were off the shelf hardware and software. Those components are

- Acer Aspire One netbook - \$329.00
- AT&T "Go" Phone Prepaid Mobile - \$19.99
- USB/Serial Data Cable - \$12,99
- Unlimited Prepaid Text Messaging Card - \$20.00/Month
- Microsoft Windows XP Home Edition (Included on Netbook)
- PHP Scripting Language – Free
- Apache Web Server – Free
- MySQL Database Server – Free
- Custom PHP programming of 'external' commands – Free (volunteer work)

Total Cost to Launch: \$381.98 USD

Ongoing Monthly Cost: \$20.00 USD

Yearly Cost: \$248.00 USD

Software Component Downloads:

The prebuilt software used in this deployment is available from the following sites:

PHP Scripting Language

<http://www.php.net>

Apache Web Server:

<http://www.apache.org>

MySQL Database Server:

<http://www.mysql.com>

END